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Urban Socio-Economic Segregation and Income Inequality

A Global Perspective

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Preface

This book attempts to get a true global overview of trends in urban inequality and residential socio-economic segregation in a large number of cities all over the world. It investigates the link between income inequality and socio-economic residential segregation in 24 large urban regions in Africa, Asia, Australia, Europe, North America and South America. In many ways the book is a sequel to the earlier book "Socio-Economic Segregation in European Capital Cities" which focussed solely on trends in Europe. Although that book was very well received, readers also asked whether trends in Europe were representative for what is happening in the rest of the world. This new book is a direct response to that question and aims to be more globally representative.

The main outcome of this book is the proposal of a Global Segregation Thesis, which combines ideas of rising levels of inequality, rising levels of socio-economic segregation, and important changes in the social geography of cities. At the time of writing this preface, the world is still grappling with the global outbreak of COVID-19. Now the spread of the virus is slowing down in the Global North, the Global South is hit very hard. In response to the spread of the virus, unprecedented measures were taken, having a huge impact on the world economy. It is widely expected that these measures will lead to a deep economic crisis, which will hit those who are the most vulnerable hardest. Some of the chapters in this book mention the COVID-19 crisis, and it is expected that this crisis will speed up the increase in inequality, both globally and locally, leading to an accelerated growth in socio-economic segregation in cities.

This book would not have been possible without the generous contributions from author teams from all over the world. We are very grateful for their generosity and their contributions. Much of the editorial time invested in this book was covered by funding from the European Research Council under the European

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Delft, The Netherlands — Maarten van Ham
Tartu, Estonia — Tiit Tammaru
Delft, The Netherlands — Rūta Ubarevičienė
Delft, The Netherlands — Heleen Janssen
March 2021

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Maarten van Ham is Professor of Urban Geography at Delft University of Technology in the Netherlands, and Professor of Geography at the University of St Andrews in the UK. In Delft, he leads the Urban Studies group and is head of the Urbanism Department, at the Faculty of Architecture and the Built Environment. Van Ham studied economic geography at Utrecht University, where he obtained his Ph.D. with honours in 2002. In 2011, he was appointed full Professor in both St. Andrews and Delft. Van Ham has published over 100 academic papers and 10 edited books. He is a highly cited academic with research projects in the UK, The Netherlands, Germany, Sweden, Finland, Lithuania, Estonia, Spain and China. Maarten has expertise in the fields of urban poverty and inequality, segregation, residential mobility and migration; neighbourhood effects; urban and neighbourhood change; housing market behaviour and housing choice; geography of labour markets; spatial mismatch of workers and employment opportunities. In 2014, van Ham was awarded a 2 million Euro ERC Consolidator Grant for a 5-year research project on neighbourhood effects (DEPRIVEDHOODS).

Tiit Tammaru is Professor of Urban and Population Geography and Head of the Chair of Human Geography at the Department of Geography, University of Tartu. He is the member of the Estonian Academy of Sciences. Tammaru leads the development of longitudinal linked censuses and registers data for urban and population geographic studies in Estonia. He was trained in human geography and received a doctoral degree from the University of Tartu in 2001. In 2018 he was a Visiting Professor at the Neighbourhood Change and Housing research group at the Department OTB—Research for the Built Environment, Faculty of Architecture and the Built Environment, Delft University of Technology. He has also worked a guest researcher at the Department of Geography, University of Utah and Department of Geography, Umeå University. He is the Editorial Board member of Social Inclusion. Tammaru is theorizing the paradigmatic shift in segregation

studies from residential neighbourhood approach to activity space-based approach. Together with colleagues from Delft and Tartu he is developing the concept of vicious circle of segregation that focuses on how social and ethnic inequality and segregation are produced and reproduced across multiple life domains: homes, workplaces, schools, leisure time activity sites.

Rūta Ubarevičienė is a researcher with a background in urban and regional geography as well as sociology. Rūta has successfully defended two Ph.D. thesis in these fields. In 2017 she obtained Ph.D. degree from Delft University of Technology, and in 2018 from Lithuanian Social Research Centre. Currently Rūta is a postdoctoral researcher in the Urban Studies research group at the Department of Urbanism, Delft University of Technology and in the Department of Regional and Urban Studies at the Lithuanian Centre for Social Sciences. Using spatial analysis and statistical techniques, she analyses global and local spatial processes of the social and economic systems. Her research interests include socio-spatial inequalities, social segregation, depopulation, internal migration and post-socialist change.

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Part I
Introduction

Chapter 1
Rising Inequalities and a Changing Social Geography of Cities. An Introduction to the Global Segregation Book

Maarten van Ham, Tiit Tammaru, Rūta Ubarevičienė, and Heleen Janssen

Abstract The book "Urban Socio-Economic Segregation and Income Inequality: a Global Perspective" investigates the link between income inequality and residential segregation between socio-economic groups in 24 large cities and their urban regions in Africa, Asia, Australia, Europe, North America, and South America. Author teams with in-depth local knowledge provide an extensive analysis of each case study city. Based on their findings, the main results of the book can be summarised as follows. Rising inequalities lead to rising levels of socio-economic segregation almost everywhere in the world. Levels of inequality and segregation are higher in cities in lower income countries, but the growth in inequality and segregation is faster in cities in high-income countries, which leads to a convergence of global trends. In many cities the workforce is professionalising, with an increasing share of the top socio-economic groups. In most cities the high-income workers are moving to the centre or to attractive coastal areas, and low-income workers are moving to the edges of the urban region. In some cities, mainly in lower income countries, high-income workers are also concentrating in out-of-centre enclaves or gated communities. The urban geography of inequality changes faster and is more pronounced than city-wide single-number segregation indices reveal. Taken together, these findings have resulted in the formulation of a Global Segregation Thesis.

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Keywords Socio-economic segregation · Income inequality · Residential segregation · Global segregation thesis

1.1 Introduction

Since the 1980s, globalisation, restructuring of labour markets, and liberalisation of the economy, have led to rising income and wealth inequality across the globe (Piketty 2014; Alvaredo et al. 2018). These rising levels of inequality have consequences for the social and spatial organisation of cities as inequality also has a spatial footprint in the form of socio-economic segregation. When referring to socio-economic segregation we mean an uneven distribution of different occupational or income groups across residential neighbourhoods of a city or an urban region. Research has shown that residential segregation between high-income and low-income groups in European cities has increased in recent decades (Kazepov 2005; Musterd and Ostendorf 1998; Fujita and Maloutas 2016; Tammaru et al. 2016; Musterd et al. 2017; Tammaru et al. 2020). This means that people with high and low incomes are increasingly living separated in different neighbourhoods. Segregation by income is largely driven by the residential choices of higher income households as they have the financial means to realise their housing and neighbourhood preferences (Harvey 1985; Hulchansky 2010; Tammaru et al. 2020). At the same time, lower income households are living in those neighbourhoods where housing is cheap, often in the least desirable parts of a city. Rising levels of segregation cause concern regarding the social sustainability of cities and reduce the status of cities as places of opportunity with equal opportunities for all. As a result, there is increasing attention for understanding intra-urban inequalities and divided cities (see van Ham, Tammaru and Janssen 2018; EU/UN Habitat 2016).

The relationship between income inequality and socio-economic segregation is complex, as it partly depends on the local political, economic, and planning context in cities (see also Tammaru et al. 2016; Musterd et al. 2017). However, there are increasing indications that there is a causal relationship, and that it takes some time before a rise in income inequality leads to higher levels of socio-economic segregation. With other words, there is a time lag between a change in income inequality and a change in levels of segregation (Marcińczak et al. 2015; Musterd et al. 2017; Tammaru et al. 2020; Wessel 2016). This time lag can be explained by the fact that the relationship between income inequality and segregation is a process. As inequality rises, in situ processes will downgrade some neighbourhoods and upgrade others, and over time this will translate into selective residential mobility flows between neighbourhoods, ultimately leading to changes in the level of segregation. However, because of selective mobility, levels of segregation can also drop after a rise in inequality, because high-income groups move into low-income neighbourhoods as is characteristic to gentrification. This drop in levels of segregation at times of growing inequality is referred to as the segregation paradox (Sýkora 2009; Tammaru et al. 2020). As higher

income groups move into centrally located and attractive lower income neighbourhoods, these neighbourhoods temporarily become more socio-economically mixed and levels of segregation can drop. But as these gentrifying neighbourhoods become unaffordable for lower income households, lower income households move out, and levels of segregation go up. The fact that levels of income inequality have risen globally leads to the expectation that also levels of socio-economic segregation in cities will go up globally.

Another important process in global cities, which is related to segregation, is the changing occupational structure of the workforce. In the 1990s, Sassen (1991) argued that the occupational structure was polarising, with increasing shares of high-income and low-income workers, at the expense of the middle-income group. Hamnett (1994) argued that the concept of social polarisation is ambiguous, and in his work on London he found evidence of processes of professionalisation and socio-economic upgrading (Butler et al. 2008). More recent work has also found evidence of other forms of occupational changes since 2000 (Davidson and Wyly 2015; Manley and Johnston 2014). A very recent paper by van Ham and colleagues (2020) found clear trends of professionalisation in New York, Tokyo, and London, evidenced by a rising share of high-income occupations in all three cities. Professionalisation of the workforce can lead to a dramatically changing social geography of cities without changes in the levels of city-wide single-number measures of segregation. Over the last few decades, high-income workers are increasingly revaluing city life, leading to a high demand for inner city living. Van Ham and colleagues (2020) showed that over the 1981–2011 period levels of segregation in London remained relatively stable, but at the same time the social geography of London turned inside out. Where in the 1980s the rich lived on the edges of London and the poor in the centre, by 2011 this pattern was reversed. A similar process can be seen for the city of Toronto (Hulchansky 2010).

Despite a wealth of knowledge on socio-economic segregation and the changing geography of inequality, there is little internationally comparative research, and many regions of the world are still under researched. This book aims to fill this gap and provides a comprehensive picture of socio-economic segregation in a large number of large cities from all continents. Including cities from all over the globe enables us to study segregation in a truly international context, where many previous studies focussed on a much more limited set of case studies, including mainly Western countries with a good data infrastructure. The main question of this book is: Are there global trends in changes in inequality and segregation, or do cities in different parts of the world show very distinctive patterns of socio-economic segregation? Ultimately, the question is whether there is such a thing as a Global Segregation Thesis?

Fig. 1.1 Map of case study cities. *Source* The authors

The book includes the following case study cities[1] (see Fig. 1.1): Cairo (Egypt), Cape Town (SAR), Johannesburg (SAR), Hong Kong (Honk Kong), Jakarta (Indonesia), Mumbai (India), Shanghai (China), Tel Aviv (Israel), Tokyo (Japan), Melbourne (Australia), Berlin (Germany), Brussels (Belgium), Istanbul (Turkey), London (UK), Paris (France), Chicago (USA), Los Angeles (USA), Mexico City (Mexico), New York (USA), Bogotá (Colombia), Buenos Aires (Argentina), Lima (Peru), Paramaribo (Suriname), and São Paulo (Brazil). Each of these cities represents global cities in their own context. For some of these cities very detailed data was available for small geographies, while for other cities data was only available for very large spatial units. In addition to chapters on each of these case study cities, the book also includes a chapter which analyses data for 194 cities in 14 OECD countries. This study uses only one year of data but offers the most rigorous comparison of cities possible. The other empirical chapters use data for the 2000/2001-2010/2011 period, and earlier or later data if available and comparable.

Comparing case studies of 24 cities was a challenging task due to the richness of the data and the importance of the local and national context of each city. Based on the case studies we have formulated five main conclusions.

[1]We use "city" and "urban region" as synonyms in this introduction.

(1) There is general trend of professionalisation of the occupational structure of cities, with an increase in the share of high-income occupations, and a decrease in the share of low-income occupations. As many high-income workers have a preference for living in central cities, this explains the changing social geography of urban inequality.
(2) Segregation as measured city-wide by the Dissimilarity Index (DI) has increased for most cities (except Cape Town, Johannesburg, Mexico, and Buenos Aires, and excluding some cities with problematic data). Based on our results we expect levels of segregation to increase further in the future, as inequality is increasing, and because in the last decade processes of gentrification have temporarily caused central areas of cities to become more mixed in terms of income.
(3) The higher the level of inequality, the higher the level of segregation. This relationship becomes stronger when lagged inequality data is used. This is because when inequality levels increase, it takes time for this to be reflected in the geography of inequality.
(4) Generally speaking, middle-income countries combine high levels of inequality with high levels of segregation, while high-income countries combine lower levels of inequality with lower levels of segregation. Over time we see that there is convergence between the higher and lower income countries; levels of inequality and segregation in the higher income countries are going up and the gap between the higher and lower income countries is decreasing.
(5) The geography of social inequality is changing faster than levels of segregation measured by the Dissimilarity Index. In most cities the rich are moving to the centre and attractive coastal regions, and the poor are being pushed to the edges of the urban region. Where this does not happen, or sometimes in combination with this trend, the rich also concentrate in enclaves and gated communities.

The remainder of this introduction is organised as follows. First, we present the overall approach of the book; this section deals with the measures, geographies, and definitions used, and it discusses some of the challenges of doing international comparative work. Second, we present how income inequality leads to residential segregation. Next, we discuss the main findings of the book in detail, including summary tables and figures. Finally, this introductory chapter presents a discussion and overall conclusions, with an outlook to the future. After the introduction, each case study city is presented in a separate chapter, authored by expert local teams. The only deviation is Chap. 2, which compares data for one year for a large number of cities in selected OECD countries.

1.2 Approach and Justification

This book provides a systematic comparison of changes in income inequality, occupational change, and socio-economic segregation in large cities around the world over the last decades. As previous studies focussed on either a small number of case studies, or only on European cities, this study will provide a global coverage of cities from all continents, and it includes 24 case study cities in Africa, Asia, Australia, Europe, North America, and South America. Although we aimed for the largest cities, and an even geographical coverage in each of the continents, the final set of case studies was influenced by the availability of research teams and data.

A large-scale internationally comparative project raises many challenges. Not surprisingly, these challenges mostly concern data availability and comparability of case study cities. In the selection of case study cities, we complemented comparability with an inclusive approach, which means that some chapters are not strictly comparable to others. To maximise comparability of cases, the analysis of cities is based on fairly basic and harmonised guidelines (see Appendix 1). The authors were asked to use Functional Urban Areas as defined by the OECD (2013) or equivalent; to create socio-economic groups by categorising occupations into Top, Middle, and Bottom occupational status groups; to provide a city-level Gini index; and they were asked to use the Dissimilarity Index to measure residential segregation between occupations. To analyse the geography of segregation we asked authors to construct a series of maps based on the smallest possible spatial units of analysis (preferably census tracts of around 5000 inhabitants), and data from around 2000 and 2010. Although for some cities more recent data is available (and also presented in their chapters), for most cities 2011 is the year of the most recent census, and hence also the most recent data point.

For only a few case study cities it was possible to closely follow the guidelines. Most of the chapters had to deviate from the guidelines to a certain extent (see Appendix 2 for a detailed overview of the data used per chapter). For example, most chapters use data on occupational categories, but in cases where such data was not available, data was used on education, income, or unemployment. The spatial units of analysis ranged from as small as 800 inhabitants in Buenos Aires to as large as 750,000 inhabitants in Jakarta. The size of urban areas analysed also varies greatly: from 0.4 million inhabitants in Paramaribo to 35.7 million in Tokyo.

The analyses for the cities Berlin, Bogotá, Jakarta, and Mumbai deviate the most from the guidelines because of the lack of comparable data. For that reason, they are not included in our comparative analysis in this introductory chapter. These cities are still included in the book since they do provide very valuable insights on socio-economic segregation on their own. Jakarta and Mumbai could not be included due to the very large spatial units available for the analysis. Berlin could not be included because of a different indicator available to measure the level of segregation. Bogotá could not be included because only data for 2005 is available that does not allow to study changes in socio-economic segregation.

Central to this book is the link between income inequality and socio-economic segregation. Ideally, the relationship between inequality (measured using the Gini index) and segregation (measured using the Dissimilarity Index) would be measured at the city-level. However, the Gini index is not available on the city-level for most cities and, as a result, most chapters report inequality data at the country-level. For consistency, country-level Gini data as provided by the World Bank is used in this Introductory chapter. As a consequence, the relationship between inequality and segregation is somewhat weaker compared to using city-level Gini Index. As shown in previous studies, income inequality is almost always higher in large cities as compared to the rest of the country.

All chapters (except Berlin) have used the Dissimilarity Index (DI) to measure city-wide segregation. Although the Dissimilarity Index has certain disadvantages over other measures, it is important to use a simple measure to increase the comparability of cases. See Appendix 1 for more detail on the DI used. The index can range from 0 to 100, and levels of segregation are often categorised as being low when under 30, moderate when between 30 and 60, and high when above 60 (Massey and Denton 1993). This categorisation was initially developed to characterise ethnic and racial segregation in the US. However, this book focusses on socio-economic segregation in an international context, and there are large differences between countries, regions, and cities in the world with regard to what is considered a low or a high level of segregation. While 50 would be very high in Europe (e.g., chapter on Brussels), in Latin America (e.g., chapters on Paramaribo and Buenos Aires) it is considered moderate. Therefore, we find that a strict classification in high and low is not very useful in the context of this book.

Finally, in analysing the results from all the case study cities, it is useful to categorise cities. For this purpose, we have relied on a country classification by income as provided by the World Bank (2020). According to this classification, countries are divided into four income groups: low, lower middle, upper middle, and high. Income is measured using gross national income (GNI) per capita. In 2020, low-income countries are defined as those with a GNI per capita of $1,025 or less in 2018; lower middle-income countries are those with a GNI per capita between $1,026 and $3,995; upper middle-income countries are those with a GNI per capita between $3,996 and $12,375; high-income countries are those with a GNI per capita of $12,376 or more. The countries included in this book fall into the last three categories (see Appendix 2). No low-income country was included in this book due to a lack of data and researchers available to contribute. However, for simplicity, in this introduction we often refer to high-income countries and middle-income countries (pooling together upper middle and lower middle-income countries).

1.3 Income Inequality and Segregation

The level of residential segregation in a city is related to many factors, such as the spatial distribution of housing types by tenure and price. But one of the most important factors is the level of income inequality in society. According to Alverado and colleagues (2018), levels of income inequality dropped globally until the 1980s, and from that point onwards, levels of inequality started to increase again. As a consequence, levels of income inequality are now the highest of the last 30–40 years in most countries in the world. The increase in income inequality is largely related to the increasingly unequal distribution of capital that has accompanied the mass privatisation of public assets since the 1980s, directly affecting the functioning of both labour and housing markets (Alvaredo et al. 2018). This unequal distribution of resources is passed from one generation to another (Corak 2013). Housing is an important element in producing and reproducing inequality, linking thus income inequality and residential segregation to each other (Tammaru et al. 2020). Van Ham et al. (2018) proposed the idea of a vicious circle of inequality and segregation to show how inequality is transmitted from one generation to the next, through a complex interplay of family, housing, education, and labour market factors.

There are different ways to measure inequality, for example, by focussing on the distribution of income or wealth (Alverado et al. 2018). The most widely used and readily available measure of income inequality is the Gini Index, ranging from 0 (perfect equality) to 100 (perfect inequality). Of course, these extremes are never reached in a society, but there is large variation between countries in Gini. The formerly centrally planned countries in the East of Europe had very low values of the Gini Index, and private housing property did not exist. In such a social context, the individual motivation to be creative and to aspire to be economically productive are low, thus restricting economic growth (Kornai 1992). Extremely high levels of inequality are also thought to be harmful as they reduce intergenerational social mobility (Krueger 2012), partly through the operation of the vicious circle of inequality and segregation (van Ham et al. 2018). The negative effects of high levels of income inequality could be seen in South Africa under Apartheid, or in many countries in South America, and include political instability, high rates of poverty and crime, and residential segregation with gated communities for the rich.

Using country-level Gini Index values as harmonised by the World Bank (2020), we find South Africa to be the most unequal country among our case study countries, with Gini Index values exceeding 60 (see Fig. 1.2). In most middle-income countries among our case studies (often located in the Global South), Gini Index values exceed 40. In most high-income countries, Gini Index values are in the range of 30–40, reflecting more extensive income redistribution. Levels of income inequality are the lowest in Europe, with Belgium being the most equal country in our pool of countries with a Gini Index value of 27. However, there are important exceptions, for example, the level of income inequality is relatively high in the US, with a Gini Index value of more than 40, while the opposite is true for India and Egypt, with Gini Index values below 40. Not only the levels, but also change in inequality differs by

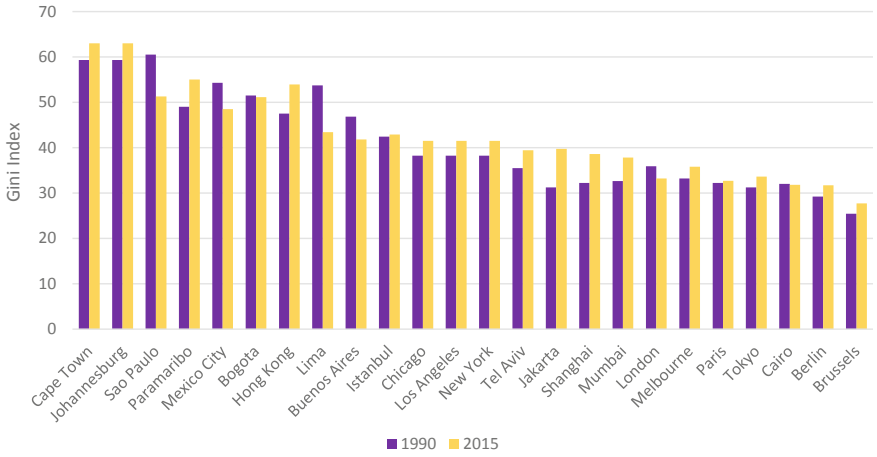


Fig. 1.2 Income inequality, 1990 and 2015. *Source* World bank. *Note* When the World Bank data for 1990 and 2015 was not available, we took the closest available years. Instead of 1990 we used data from 1989 for Paris, Mexico City, and Melbourne; 1991 for Berlin, Buenos Aires, Chicago, New York, Los Angeles, and London; 1992 for Bogotá and Tel Aviv; 1993 for Cape Town and Johannesburg; 1997 for Lima; average value between 1988 and 1992 was calculated for Brussels, average value between 1987 and 1993 was calculated for Mumbai and average value between 1987 and 1994 was calculated for Istanbul. When World Bank data was not available at all or incomparable for two data points, we used author-based data, this applies to Hong Kong and Paramaribo

country. While global income inequality started to rise in the 1990s, there are some exceptions such as South America where Gini Index values have decreased since then. In several countries, the level of inequality increased only a little or remained almost stable between 1990 and 2015 (most of Europe). The most systematic increase in income inequality is in Asia, with Hong Kong experiencing the most rapid growth of inequality together with South Africa.

1.4 Main Results in Five Conclusions

Based on the detailed study of 24 cities across the world, we have formulated five main conclusions on socio-economic segregation. Together these five conclusions led us to formulate a Global Segregation Thesis, which we discuss further at the end of this chapter. We will now provide a detailed overview of each of the conclusions and present supporting data from the case studies.

Conclusion 1. The occupational structure of most cities is professionalising.

The first conclusion is that the occupational structure of many cities is professionalising. This is an important conclusion, as it has been suggested that the changing occupational structure is strongly related to the changing social geography of cities (see

van Ham et al. 2020). The book "The Global City" by Sasia Sassen (1991) provoked a decades-long debate on whether the occupational structure of global cities is polarising or professionalising (see also Hamnett 1994; van Ham et al. 2020). Although there are some exceptions, generally speaking we observe an increase in the share of the Top socio-economic groups, and a decrease (or stabilisation) in the share of the Bottom socio-economic groups. This implies a general trend of professionalisation of the occupational structures also in most of our case studies. The professionalisation of the occupational structure leads to increasing shares of high-income workers, and many of these high-income workers have developed a preference for living in central cities (cf. Hamnett 2009).

Although there are some similar trends, the case study cities vary greatly in their occupational structure and are almost perfectly split into two groups coinciding with the country classification by income (see Appendix 3). In high-income countries, the Top socio-economic groups make up a significantly higher proportion of occupations, compared to the middle-income countries. While the Top socio-economic groups account for about 40% in Brussels, New York, and Melbourne, they do not exceed 15% in Jakarta, São Paulo, and Lima. Accordingly, the Bottom socio-economic groups account for at least 40% in Shanghai, Cairo, São Paulo, and Jakarta, and these groups form less than 15% in Los Angeles, Melbourne, and Paris. The highest share of the middle socio-economic groups is found in Paramaribo, Paris, and Tel Aviv (around 60%), while the lowest in Shanghai (14%). It has to be noted that the definitions of the three groups differ between case study cities, so care should be taken when comparing results. The definition of the Top socio-economic groups is more consistent than the definition of the two other groups. All cities experienced an increase in the share of Top occupations, except for Johannesburg, where the share remained stable, and Brussels, where it dropped slightly, but remained to be one of the highest among the case studies.

Conclusion 2. Segregation measured by the Dissimilarity Index has increased for most cities.

Analysing data from the 20 comparable case studies[2] reveals a large variety in segregation levels between the Top and Bottom socio-economic groups, with DI values ranging from 16 to 78 (see Fig. 1.3). In the year 2000/2001, only Brussels had a DI value below 20. In our study there are ten cities out of 20 with comparable data that have DI values higher than 40. Most South American and all three African cities belong to this group of cities, with Buenos Aires being most segregated of all cities included in the analysis. The only exception in South America is Mexico City, which has one of the lowest levels of segregation in this study. However, it has to be kept in mind that for Mexico City (and also for Buenos Aires) education was used instead of occupational status. And since income-heterogeneity is larger among educational groups compared to occupational groups, this might explain the relatively low-level of segregation in Mexico City.

[2]As mentioned before, we have made a selection of comparable case studies for analysis in this introductory chapter.

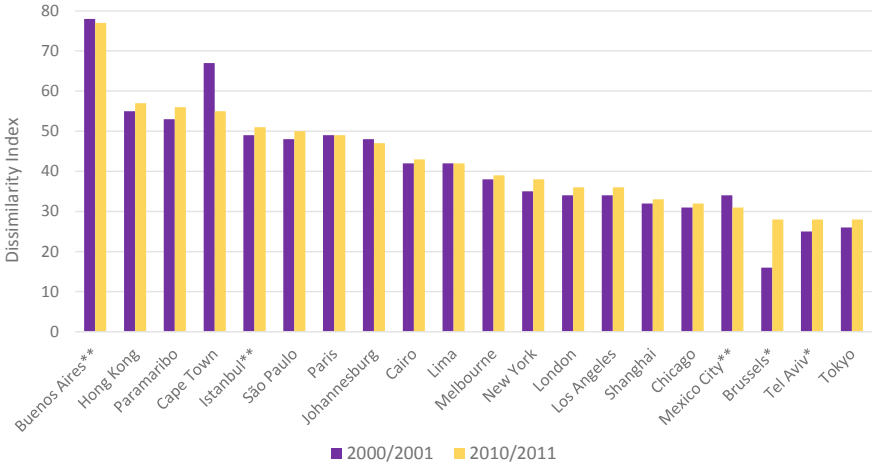


Fig. 1.3 Residential segregation between top and bottom socio-economic groups, 2000/2001 and 2010/2011. *Source* Individual chapters in this book, see Appendix 4 for more details). *Notes* *Top and bottom groups based on income; **Top and bottom groups based on educational attainment. Data for Paramaribo 2004 and 2012, Paris 1999 and 2015, Cairo 1996 and 2016, Lima 1993 and 2007, New York 2000 and 2013-2017, Mexico City 1990 and 2010, Tel Aviv 1995 and 2008

Figure 1.3 clearly shows that European cities do not necessarily have low levels of segregation as one might expect from their low levels of income inequality and the high levels of income redistribution in Europe. In fact, Paris is one of the most segregated cities in our study, with a level of segregation which is much higher than the Anglo-American cities, and comparable to Johannesburg in South Africa. The five cities with the lowest levels of segregation in this study are Tokyo, Tel Aviv, Brussels, Mexico City, and Chicago, which is a regionally very mixed group of cities. Interestingly, Hong Kong is one of the most segregated cities in this study, but this city is a-typical for Asia with its recent colonial past. All Anglo-American cities included into our study are modestly segregated.

While comparisons of levels of segregation between cities should be treated with some caution due to limitations in the comparability of data, the comparison of segregation levels over time within each city is more straightforward. Our results show that levels of segregation between the Top and Bottom socio-economic groups have increased (or remained stable in two cases) in most cities. However, these increases have been small for most cities, with the exception of Brussels. Segregation levels have dropped somewhat in four cities: Buenos Aires, Cape Town, Johannesburg, and Mexico City. Again, we should recall that the cases of Buenos Aires and Mexico City differ from the other cities because education is used as a measure of socio-economic status instead of occupation. Interestingly, in almost all cities in high-income countries levels of segregation have increased, while the situation in middle-income countries is a little more mixed.

The low level of segregation in Tokyo is striking, especially because it is so much lower than in many European cities. In many European cities there is a strong overlap between ethnic and socio-economic segregation due to the on average low incomes of migrants compared to natives (Andersson and Kährik 2016). The share of international migrants in Tokyo is very small compared to other global cities, and at the same time Tokyo is characterised by a low level of income inequality, and strong public sector involvement in the economy, the housing market, and urban planning. Tokyo is also a very densely populated compact city, providing few opportunities for residential separation. In this context vertical segregation may be more important than the sorting of different socio-economic groups into different neighbourhoods (Hirayama 2017).

In addition to the case studies, Chap. 2 analyses income data from 194 cities in 14 OECD countries to provide an overview of residential segregation in a comparative perspective. Not surprisingly, segregation levels between the Top and Bottom-income groups were found to be much higher compared to segregation levels between Middle- and Bottom-income groups. The main contribution of this chapter to the book is the comparison of segregation levels of multiple cities within the same country. The results show that there is a lot of variation in levels of segregation between cities within some countries. With other words, studying only one case study city per country does not do justice to the variety of segregation levels within countries. Although generally speaking the analyses of OECD data show a relationship between levels of inequality and levels of income segregation, the results also suggest that local circumstances can greatly affect how levels of inequality are translated into the social geography of cities within a country. This needs to be taken into account when comparing single city case studies between countries as these case studies are not necessarily representative for the rest of the country.

Conclusion 3. The higher the level of inequality, the higher the level of segregation.

Previous studies have suggested that it takes time before a rise in income inequality leads to higher levels of socio-economic segregation. Therefore, it is important to take into account a time lag when studying the relationship (Marcińczak et al. 2015; Musterd et al. 2017; Wessel 2016; Tammaru et al. 2020). The time needed for transmitting changes in income inequality to changes in residential segregation varies from city to city, because of other factors shaping segregation. For example, in market dominated housing systems with little public interventions in housing, changes in income inequality may translate quickly (within ten years' time) into income-based residential sorting. However, in a housing system with a high share of social or public housing, and with strong policy interventions, the time lag between a change in income inequality and a change in residential segregation becomes longer, extending well beyond ten years (Wessel 2016). It is also important to note that the relationship tends to hold in both ways; an increase in income inequality is followed by an increase in residential segregation later in time, and a decrease in income inequality is followed by a decrease in residential segregation later in time (Tammaru et al. 2020). Our analysis of the relationship between income inequality (measured by Gini and lagged 10 years) and the level of socio-economic segregation has been summarised

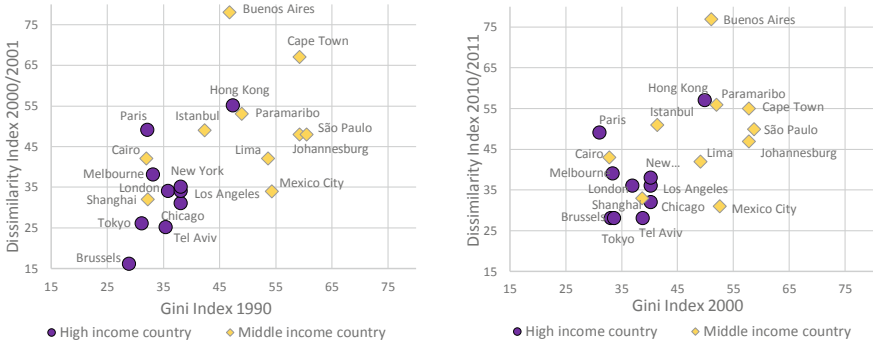


Fig. 1.4 Relationship between income inequality (lagged 10 years and) socio-economic residential segregation between Top and Bottom socio-economic groups. *Source* Individual chapters in this book and the World Bank

in Fig. 1.4. The graph on the left shows the relationship between the Gini Index measured in 1990 and the Dissimilarity Index as measured in 2000/2001, and the graph on the right shows the Gini Index measured in 2000 and the Dissimilarity Index measured in 2010/2011. The results show that there is a positive correlation between inequality and segregation and that this correlation is slightly weaker for the year 2010/2011 (0.529) compared to 2000/2001 (0.583). Off course there are outliers; Paris, for example, is much more segregated than expected based on the relatively low level of inequality in France. On the other hand, Mexico City is much less segregated than would be expected based on the inequality level in Mexico. These and other outliers show that the relationship between segregation and inequality is complex, and influenced by local circumstances. The data in Fig. 1.4 lead to further conclusions, which are discussed next.

Conclusion 4. There are large differences between high-income and middle-income countries that converge with time.

Figure 1.4 reveals that in the relationship between segregation and inequality there are separate clusters of high-income and middle-income countries. Generally speaking, middle-income countries combine high levels of inequality with high levels of segregation (particularly South American and South African cities), while high-income countries combine lower levels of inequality with lower levels of segregation. Of course, the pattern is not perfect, and again there are outliers. In 2010, the cities of Cairo and Shanghai, both from middle-income group of countries, show relatively low levels of inequality, and especially Shanghai also a low level of segregation. Mexico City on the other hand, shows a high level of inequality, combined with a very low level of segregation. And Paris, which is part of the high-income group of countries, combines a low level of inequality with a high level of segregation.

When comparing two graphs, it can be seen that the high-income country cluster moves upward because of a systematic increase in levels of inequality and segregation. While the changes in both income inequality and residential segregation are

more diverse for the middle-income countries, this suggests convergence between the high-income and middle-income countries. The trend towards convergence between higher income and middle and low-income countries warrants some more attention. Further increases in both income inequality and residential segregation are not very likely in cities that are already highly unequal and highly segregated. The overall modernisation of societies and professionalisation of the labour force tends to reduce differences in incomes and residential sorting. However, the main reason for convergence relates to changes taking place in cities located in high-income countries. It is notable that increases in residential segregation in high-income countries tend to be larger than predicted by their levels of income inequality. Paris is the most outstanding case in this regard, where a very high level of residential segregation between the Top and Bottom socio-economic groups is combined with a low level of income inequality. In Paris, a possible explanation is related to migration, where lower income migrant households tend to cluster in modernist housing estates (Lelévrier and Melic 2018). In Paris, but also in other high-income cities, it may also be the case that an increased emphasis on market forces in the housing market increasingly sorts households with different financial means into different neighbourhoods, despite overall low levels of income inequality.

Conclusion 5. The social geography of cities changes faster than levels of segregation measured city-wide.

The data from this book shows an overall picture of increasing levels of socio-economic segregation between 2000/2001 and 2010/2011, although segregation levels remained stable in some cities, and even dropped in others. Segregation was measured by using the Dissimilarity Index, and like many indices of segregation, it does not take into account the social geography of cities. In theory it is possible that over time the poor move to rich areas, and the rich to poor, while the overall measure of segregation remains stable.

Based on the case studies we can conclude that social geography of inequality is changing faster than measures of city-wide socio-economic segregation, as measured by the Dissimilarity Index. In many of the case study cities the Top socio-economic groups are concentrating in the centre and attractive coastal regions, and the Bottom socio-economic groups are concentrating on the edges of the urban region. In some cases, they are also concentrating in enclaves and gated communities outside the urban core. In all cases, the residential choices of the Top socio-economic groups are driving changes in the geography of segregation.

Beyond those general trends there are also many differences between the cities due to local circumstances, including historical, economic, and political factors, but also the physical geography of cities. There are some examples of cities in which the Top socio-economic groups concentrate in the central areas, and the Bottom socio-economic groups in the periphery. In Shanghai, for example, the Top socio-economic groups concentrate into the centre as well as into certain suburbs. Also in Tel Aviv, London, Chicago, Buenos Aires, Melbourne, Paris, Mexico City, and New York the Top socio-economic groups are concentrating in the central area of the urban region. In all these cities they are more residentially concentrated than the Bottom

socio-economic groups. We also observed in all these cities that the Bottom socio-economic groups increasingly live in the urban periphery. For example, in Berlin it was observed that child poverty is increasingly moving to the urban periphery, which is likely to increase inequality due to a lack of opportunity for these children as they grow up.

In Chicago, the city seems to be polarising geographically with an increasing residential division between the Top and Bottom socio-economic groups. In many other cities there is an increase of socio-economically mixed areas due to gentrification. This is the case in, for example, New York, Paris, and Mexico City. Los Angeles has a more geographically dispersed pattern of residential inequality than the cities mentioned above. This is due to the polycentric nature of the urban region, with concentrations of Top socio-economic groups in various parts of the city, gentrification in adjacent areas of rich enclaves, and a rise in the number of gated communities. Cities like São Paulo, Istanbul, Lima, and Hong Kong are also characterised by a concentration of the Top socio-economic groups in the central area of the city. At the same time, also gated communities for the high-income groups can be found in these urban regions.

Some cities, like Johannesburg, Cape Town, Paramaribo, and Cairo, show an opposite geography of residential inequality. In these cities the Bottom socio-economic groups are concentrating into the city centre and the periphery, and the Top socio-economic groups are concentrating in suburbs and gated communities. In Brussels the central area of the city is quite deprived and the outskirts are more prosperous; the Top socio-economic groups mainly concentrate in the peripheral areas (but also in some pockets in the central area), and the Bottom socio-economic groups concentrate in and around the centre in densely populated neighbourhoods. The cities of Tokyo, Mumbai, and Bogotá all show very distinct patterns of segregation. In Tokyo, the Top socio-economic groups live in the elevated areas in the West, and in the harbour area, and the Bottom socio-economic groups live in the lowlands in the East. In Mumbai there is a clear North-South division, with the Top socio-economic groups living in the South, and the Bottom socio-economic groups living in the North. And in Bogotá the Top socio-economic groups live in the North, and the Bottom socio-economic groups live in the South. For Jakarta, the spatial units were too large for an in-depth analysis of the geographical patterns of inequality.

Many cases reveal that residential areas in the city centres are getting more socio-economically mixed due to gentrification and expansion of the urban core. This is the case in, for example, Hong Kong, Mumbai, London, Berlin, and Paris. The fact that urban cores in these cities become more mixed might be a temporary phenomenon as in the course of the process of gentrification these areas become unaffordable for Bottom socio-economic groups, and become over-represented by more and more affluent households. Although this book predominantly studies socio-economic segregation, many case studies also mention the link between ethnic segregation and socio-economic segregation. The clear South-North division in Mumbai is strongly related to ethnic and religious segregation in the city. Segregation in Tel Aviv is also related to both ethnicity and religion. In London, Chicago, New York,

and Paris, socio-economic segregation is also strongly related to patterns of racial and ethnic segregation.

1.5 A Global Segregation Thesis

The central research question of this book was whether there is any evidence for a Global Segregation Thesis, or whether cities in different parts of the world show very distinctive patterns of socio-economic segregation? Taken together, the five main conclusions of this book provide support for what we call the Global Segregation Thesis, which is characterised by a global trend of rising levels of segregation, combined with a changing social geography of cities. Rising levels of segregation are caused by rising levels of income inequality, and although the link between the two is complex, it seems almost universal and globally applicable. At the same time the social geography of cities is changing, where high-income households increasingly live in city centres and other attractive areas, while lower income households move to the fringes of the city. This changing social geography is related to the professionalisation of the urban workforce, which leads to more higher income households, which have developed a preference for living in central parts of large cities. Levels of segregation have not gone up as much as could be expected based on rising levels of inequality, and this is possibly due to gentrification and the temporally socio-economic mixing of central city neighbourhoods. Over time, processes of gentrification will lead to further increases in levels of segregation. The combination of rising levels of inequality and professionalisation of the workforce is expected to lead to a further increase in segregation and more uneven landscapes of opportunity.

For most cities in this book, the most recent census data used was from 2010 or 2011, and data from the next (2020 or 2021) census will not be available for another 5 years. This means that the 2010/2011 census only started to capture the effects of the 2008 Global Financial Crisis. At the time of writing this introduction, the world is facing a new economic crisis related to the COVID-19 pandemic. Although it is impossible to know how long and deep this crisis will be, there are signs that the weakest in society will be hit the hardest. This is likely to lead to rising levels of inequality, and ultimately more segregation in cities. At the same time there are discussions on the future of cities and on the residential preferences of higher income households. These households might decide to leave their relatively small dwellings in densely populated areas and live in more spacious dwellings in suburban environments. Such a change might have dramatic effects on the social geography of cities and spaces of opportunity. Densely populated areas might increasingly become the domain low-income groups, while higher income groups once again suburbanise as they did decades ago. In the short run it can be expected that levels of socio-economic segregation continue to rise and that the social geography of cities continues to show a pattern of rich centres, with poor suburbs. In the long run cities are in constant flux, and the future of cities depends on many factors yet still unknown.

Future research on inequality and socio-economic segregation should focus on better understanding local variation in the relationships between the two. And most importantly, how different urban policies—area-based, people-based, and connectivity-based—can make a difference? It is also important to improve our understanding on how residential inequalities are produced and reproduced over different life domains (home, family, education, work) and across generations. Understanding the vicious cycle of segregation and inequality can lead to more effective policies aimed at improving access to opportunity. The professionalisation of the urban workforce and increasing educational levels leads to a higher share of high-income earners in cities, which initially leads to more social mix in many urban neighbourhoods. But in the longer run these trends might lead to higher levels of segregation as cities become more and more unaffordable for many people. It is therefore crucial to take a multi-scale perspective on cities (Petrović et al. 2018), studying large urban regions instead of cities. Finally, as global cities are increasingly multi-ethnic, the overlap between income inequality and ethnicity and race in many cities needs further attention. The most severe and persistent inequalities appear where different variables intersect, and these intersections require most attention.

Appendix 1: Guidelines for Authors, Data, and Methods

Each chapter should contain two parts: a compulsory part including an analysis of changes in the occupational structure, income inequality, and residential segregation; and a free part, which discusses the local context and other important factors related to segregation in the specific country or city. To define urban regions, all authors should use functional urban areas as defined by the OECD. Socio-economic groups are preferably distinguished based on occupational status, and classified into Top, Middle, and Bottom (or High, Middle, and Low for educational or income levels). The main measure of segregation to be used is the Dissimilarity Index. Chapters should preferably provide the city-level Gini index, and otherwise the national-level Gini index. To analyse the geography of segregation authors were asked to construct some standard maps using guidelines provided by the editors. For calculations of the Dissimilarity Index and the construction of maps, authors were asked to use small spatial units, preferably census tracts of around 5000 inhabitants. And authors were asked to analyse data from at least the year 2000/2011 and 2010/2011, but a longer period of analysis was welcome if data allowed.

A *functional urban area* consists of a city and its commuting zone (OECD 2013).

In this book *occupational categories* are used as a proxy for socio-economic status. Occupational categories are derived from the International Standard Classification of Occupations (ISCO) (ILO 2012) and they are directly comparable and available in all countries conducting censuses. People with different occupations do not only perform different tasks, but occupational attainment is also closely related to personal work income. A typical example of this classification, which applies to many cities,

is TOP: managers + professionals; MIDDLE: everything in between; BOTTOM: elementary occupations + plant and machine operators and assemblers.

The *Gini index* is the most commonly used measurement of inequality. It is the ratio of income distribution within a country or city, where 0 represents perfect equality with no income differences between individuals and 100 represents perfect inequality with one person earning all income.

Dissimilarity Index (DI) is used as the main measure of residential segregation between socio-economic groups, reflecting their relative distributions across neighbourhoods within the urban area. Value of DI varies between 0 and 100, which indicates the proportion of a group that would need to move in order to create a uniform distribution of population. 0 means that both groups are distributed in the same proportions across all neighbourhoods and 100 means that the members of two groups are located in different neighbourhoods—this is a total segregation. The Dissimilarity Index is calculated as follows:

$$DI = \frac{1}{2}\sum_{i=1}^{N}\left|\frac{a_i}{A} - \frac{b_i}{B}\right|$$

where a_i is the population of group A in the ith area, e.g., census tract; A is the total population in group A in the large geographic entity for which the index of dissimilarity is being calculated; b_i is the population of group B in the ith area; B is the total population in group B in the large geographic entity for which the index of dissimilarity is being calculated. The DI is the main measure of segregation in this book, but additional measures were used by some chapters:

Interaction or Exposure Index (B) measures the degree of potential contact or the possibility of interaction between the members of two groups within the neighbourhoods. The value of this index varies between 0 and 100 and it is the highest when the two groups have equal numbers and are spread evenly among neighbourhoods.

Entropy index (EI) measures the spatial distribution of multiple groups simultaneously. Value of EI varies between 0 and 100. It is equal to 0 when the composition of all neighbourhoods is the same, and it is equal to 100, when all neighbourhoods inhabit only one group.

In addition to the Dissimilarity Index between occupational categories, authors were asked to provide maps. The main reason is that similar measures of segregation can have completely different underlying geographies. Authors were asked to provide the following maps:

- *Location quotient (LQ) maps for the Top and Bottom occupational status groups.* The LQ is a way of quantifying how concentrated a particular group is in each neighbourhood compared to the average for the entire urban area. LQ greater than 1 indicates that the neighbourhood has a higher than average concentration of particular group.
- *Classification of neighbourhoods by socio-economic composition* based on the typology provided by Marcińczak et al. (2015). Some chapters adopted a slightly different approach and explained the modifications in their chapters.

- *Location of the Top socio-economic status groups,* which shows how many neighbourhoods house 20% of the Top group. The fewer neighbourhoods are needed to get to 20%, the more concentrated the Top group is. In theory, 20% of the Top group can live in one neighbourhood, which means that the group is very spatially concentrated. Even when the segregation index remains similar over time, the spatial location of the Top group could have changed.

Appendix 2: Summary Table of Data Used for Each Case Study City

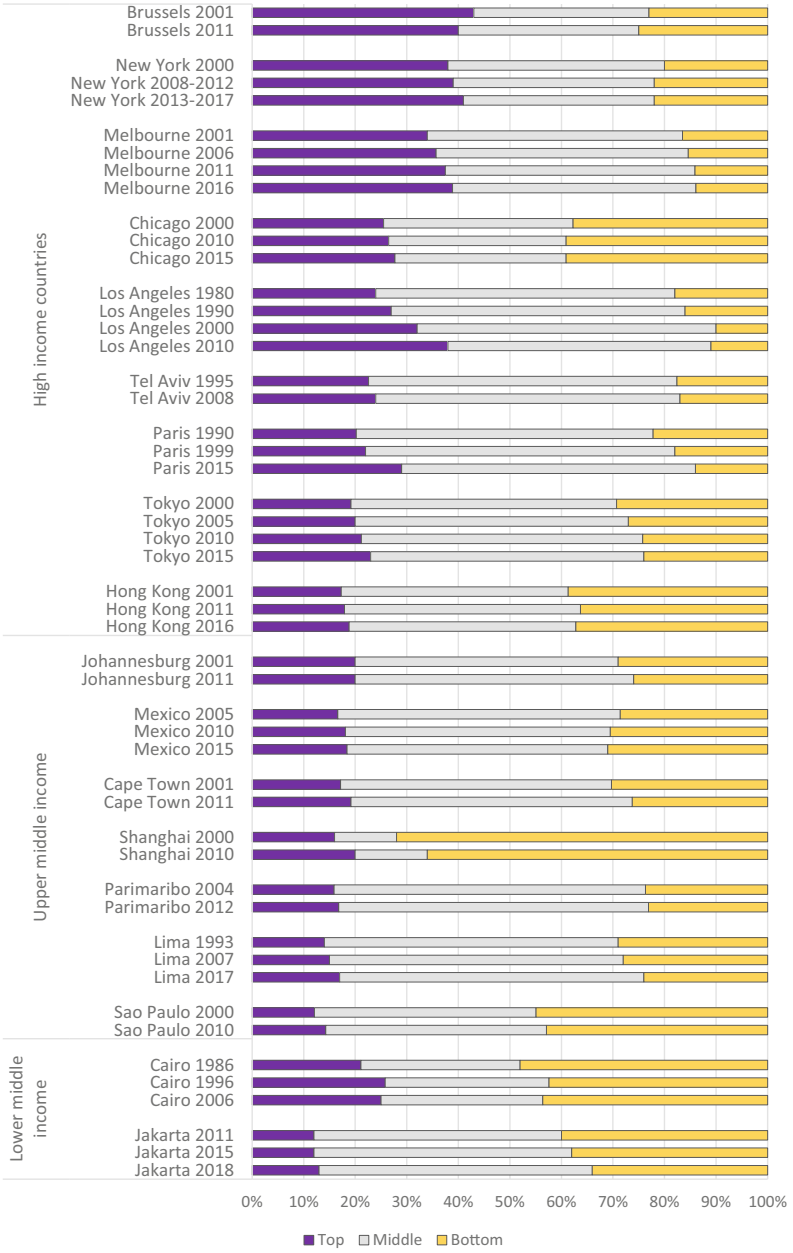
City	Population of an urban region, in mln	Average size of the spatial unit used in the analysis	Year of analysis	Main variable used	World Bank classification by income
Berlin	6.0	8,400	2007–2012–2016	Unemployment, child poverty, migration background	High income
Bogotá	6.8	Not provided	2005	Educational groups	Upper middle income
Brussels	2.5	2,834	2001–2011–2016	Income	High income
Buenos Aires	13.0	800	1991–2001–2010	Educational groups	Upper middle income
Cairo	20.4	8,250	1986–1996–2006	Occupational groups	Lower middle income
Cape Town	4.6	10,140	2001–2011	Occupational groups	Upper middle income
Chicago	9.5	4,000	1990–2000–2010–2015	Occupational groups	High income
Hong Kong	7.5	2,162	2001–2011–2016	Occupational groups	High income
Istanbul	15.0	15,600	2000–2010–2017	Educational groups	Upper middle income
Jakarta	31.6	750,000	2011–2018	Occupational groups	Lower middle income

(continued)

(continued)

City	Population of an urban region, in mln	Average size of the spatial unit used in the analysis	Year of analysis	Main variable used	World Bank classification by income
Johannesburg	15.0	2,158	2001–2011	Occupational groups	Upper middle income
Lima	9.5	5,443	1993–2007	Occupational groups	Upper middle income
London	9.0	1,400	2001–2011	Occupational groups	High income
Los Angeles	18.8	4,000	1980–1990–2000–2010	Occupational groups	High income
Melbourne	4.5	7,933	2001–2006–2011–2016	Occupational groups	High income
Mexico City	22.0	3,485	1990–2000–2010	Educational groups	Upper middle income
Mumbai	12.4	140,909	1991–2001–2011–2018	Class, religion, castes and tribes	Lower middle income
New York	17.0	4,000	2000–2008/2012–2013/2017	Occupational groups	High income
Paramaribo	0.4	3,611	2004–2012	Occupational groups	Upper middle income
Paris	12.5	2,500	1990–1999–2015	Occupational groups	High income
São Paulo	20.0	32,000	2000–2010	Occupational groups	Upper middle income
Shanghai	23.0	3,000	2000–2010	Occupational groups	Upper middle income
Tel Aviv	3.2	1,484	1995–2008	Income	High income
Tokyo	35.7	3,000	2000–2005–2010–2015	Occupational groups	High income

Appendix 3: Occupational Structure of Comparable Case Study Cities (*Source* Individual Chapters in This Book)



Appendix 4: Dissimilarity Indices Between Top and Bottom Socio-economic Status Groups, in All Years Provided by the Authors (*Source* Individual Chapters in This Book)

City name	1990	2000	2005	2010	2015	Average
Buenos Aires	79	78		77		78.0
Cape town		67		*55*		*61.0*
Paramaribo		53		56		54.5
Hong Kong		55		57	50	54.0
São Paulo		48		50		49.0
Paris	47	49			49	48.3
Istanbul		49		51	44	48.0
Johannesburg		48		47		47.5
Cairo	43	42			43	42.7
Lima	42		42			42.0
Melbourne		38	39	39	38	38.5
Mexico City	34	45		31		36.7
New York		35			38	36.5
London		34		36		35.0
Los Angeles	31	34		36		33.7
Shanghai		32		33		32.5
Chicago		31		32	33	32.0
Tokyo		26	27	28	28	27.3
Tel Aviv		25		28		26.5
Mumbai	24	24		23		23.7
Brussels		16		28		22.0
Jakarta				13	9	11.0

Note The years provided in the table and chapters may vary slightly, e.g. Cairo chapter provides data for 2016, not 2015

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Chapter 2
Residential Segregation Between Income Groups in International Perspective

Andre Comandon and Paolo Veneri

Abstract This chapter analyzes income data from 194 cities in 14 countries to provide an overview of residential segregation patterns in a comparative perspective. We use the dissimilarity index to measure segregation between lower income households and middle-income and higher income households. The results expand results consistent with existing research to a larger number of countries. Higher income households segregation from lower income households is significantly higher than for middle-income households. High-inequality cities are more segregated, on average, than low-inequality ones. It is in the deviation from these patterns, however, that the analysis contributes to a comparative research agenda. It highlights cities and countries that do not fit general trends and raises questions about the relative role of national and local factors in influencing levels of segregation, questions the case studies delve into in the rest of the volume.

Keywords Income inequality · Segregation · International comparison

2.1 Introduction

How do we make sense of income inequality and residential segregation in cities as different as Houston, Hong Kong, and Johannesburg? Finding common ground between cities in disparate national context has the potential to illuminate overlooked factors that influence segregation and suggest new directions for study. For example, Melbourne in Australia and Boston in the United States have much in common: near

The views expressed herein are those of the authors and do not necessarily reflect the views of the OECD and/or those of its member countries.

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identical population size, large immigrant populations in primarily white regions, sprawling suburbs, and similar levels of income inequality before redistribution. Yet, our data show that Melbourne is less segregated than not only Boston, but also nearly all American cities. Is Melbourne less segregated only because it is in Australia or are there characteristics unique to Melbourne and other Australian cities that set them apart? This chapter introduces the most comprehensive international database on segregation by income to date as a tool that can help elucidate such questions.

We use a sample of 194 cities in 14 countries to show the extent of variation in residential segregation by income (income segregation from hereafter) within and between countries. We focus on this difference because it provides crucial insights into the process of comparison. International comparisons compound the number of relevant explanatory factors: the role of government in the housing sector, history of discrimination, and economic structure are all likely to have significant influence on the degree of segregation in cities. Case studies, like the ones in the following chapters of this book, are ideal for analyzing how these factors intersect to shape the socio-spatial structures of a city. However, case studies tend to focus on primate cities and can never zoom out to measure systematic variation across borders. To understand the role and magnitude of these factors, and identify useful comparative cases, requires consistent data across countries. We take the first steps towards this kind of analysis.

The chapter consists of two main parts. First, we provide an overview of the theoretical and empirical literature on comparative segregation studies. The review highlights trends in international research and the potential (and limitations) of this kind of work. It also provides a foundation and scope for interpreting our empirical results. The second part is a descriptive analysis of income segregation data. We have been working on expanding the international coverage of comparable data to a diverse set of countries so that the work of adding layers of analysis and understanding can build upon it (Comandon et al. 2018). Figure 2.1 shows the location of cities and countries included in the sample. In nine of these countries, we have spatially small-scale data on income (or some close equivalent) for all large urban areas. In the other five, there is either only one large urban area in the country or we had access to data for a single city. We are still in the early stages of developing the international database, which limits the scope of the analysis to income. However, the results show the potential of these data and of expanding the database.

For each city, we calculate the dissimilarity index to summarize the metropolitan level of segregation in an intuitive and easily comparable measure. We measure residential segregation between the bottom and top income quintiles and between the bottom and middle-income quintiles. We include both measures to emphasize the dynamics of income inequality. Existing research shows that segregation of the highest income residents tends to drive overall segregation, leading to the implication that greater inequality will translate to greater segregation (Reardon and Bischoff 2011).

Consistent with this trend, we find that segregation between the middle and bottom of the income distribution is lower for all cities within a country and, on average, across countries. The national average segregation between the top and bottom is

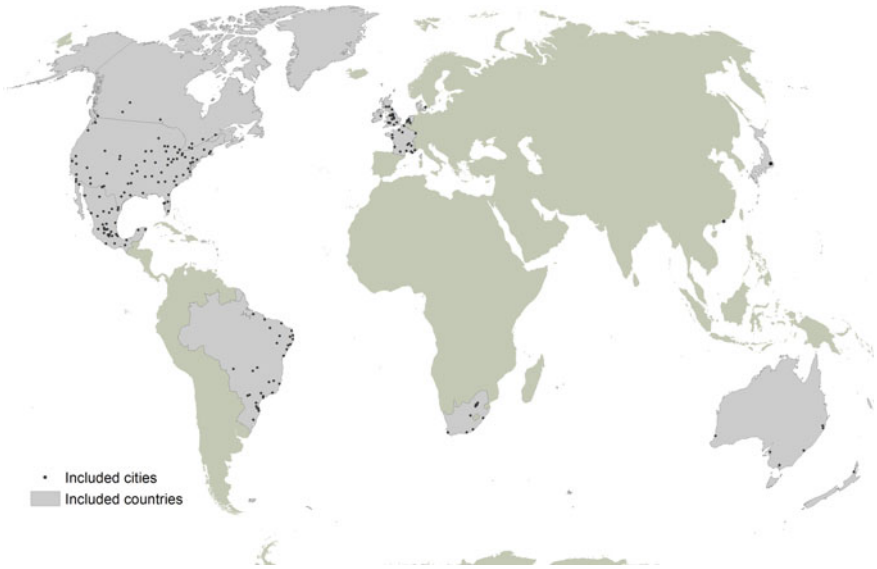

Fig. 2.1 Map showing the location of countries and cities included in the study

significantly higher in all countries except Mexico where it is near identical. We also find that greater income inequality does not necessarily translate to greater segregation, though cities of extreme disparities do fall into this pattern. Cities near the average level of inequality, span the entire spectrum of segregation levels. We conclude with a set of recommendation for future comparative research on residential segregation.

2.2 Challenges of Comparing Segregation Across Borders

Two types of challenges undermine the systematic international comparison of residential segregation in urban areas. The first challenge relates to interpreting the data that we have access to. Even though levels of segregation in two cities are similar, can we truly compare how a working-class household in, for example, Houston and Hong Kong, experiences spatial inequality in their city? The second challenge is purely empirical. The data required for comparison is collected and made available in different formats, with different coverage, and often there are no data available at all.

These challenges make the comparison of cities contentious and difficult, but it should not be abandoned. In this section, we review research relevant to the first challenge to frame our empirical approach to international comparison. It highlights the role of research this edited volume exemplifies as a path forward combining the complexity that case studies allow with larger scale data analysis. It also becomes

clear that large-scale data analyses lag in coverage and scope, issues relevant to the second challenge. The rest of the chapter will focus on the state-of-the-art concerning this challenge.

There is an astounding number of factors that make cities more distinct than, for example, countries. Countries, with few exceptions, fit within a system of nation states, have defined, stable borders and central governments. Cities, on the other hand, often have no clear-cut borders. They include municipalities, which have boundaries, and urbanized areas outside those boundaries. Municipal boundaries not only fluctuate, they also matter little for many urban infrastructure and processes (e.g., work commutes).[1] Furthermore, cities are embedded within distinct polities (sometimes at several governmental levels, as is the case in federal systems) that have authority over them, multiply the number of historical paths to urbanization, and tend to change more rapidly than other units of analysis.

This distinction of urban areas has spurred a flourishing theoretical debate about the nature of cities and their comparison. Key questions at the core of this debates include how we understand the relationship and ties between and within cities (Jessop et al. 2008), how to balance individual, experience and generalizable analysis (Robinson 2011; Storper and Scott 2016), and how do we choose and develop the methods for comparison (Abu-Lughod 2007; Dear 2005; Gough 2012; Robinson 2016). These strands have all grappled with the challenges of using the city as a unit of analysis. Answers range from the poetic nomadism of Simone (2010) who suggest bringing pieces of cities together to form a new, cohesive unit, to the data-driven use of machine learning to map every urban settlement down to the last house (Esch et al. 2017).

These debates have seeped into the study of segregation. Greater emphasis on the significance of spatial scale has given rise to re-assessment of the mechanisms of segregation (Fowler 2016; Schafran 2018; Trounstine 2018) and methodological innovation (Lloyd et al. 2014; Reardon et al. 2006; Petrović et al. 2018). The growing diversity of cities has displaced dominant binary narratives to be replaced with multifaceted analysis and greater scrutiny of the role of residential integration (e.g., Clark et al. 2015; de la Roca et al. 2014; Goetz 2018; Musterd 2003). The persistence of segregation and combination of forms of inequality has widened the lens to include multiple domains (van Ham and Tammaru 2016), including schools (e.g., Bischoff and Tach 2018), housing (e.g. Owens 2019), and infrastructure (e.g., Trounstine 2018). Here, too, answers tend towards the multiplication of methods rather than a coherent framework to study spatial inequality.

This expansion of the study of segregation does not translate easily to an international context. Ethnicity and race, for example, are critical dimensions of segregation that cross borders. They have, however, different meanings and influences depending on a country's history of racial oppression (Abu-Lughod 1980; Massey and Denton

[1]The US Census Boundary and Annexation Survey, for example, reported over 96,000 municipal boundary changes between 2001 and 2010, an average of three changes per municipality. Most of the changes are small but can change the configuration of a city as they accumulate.

1993; Telles 2006) and its colonial history (Nightingale 2012). As such, the interaction of race and class will have different undertones in Canada, the United States, and South Africa (e.g., Fong 1996; Johnston et al. 2007). In the multi-racial context that defines many large metropolises today, interactions between groups, their status within a nation (e.g., recent migrants), and the prevalent socioeconomic stratification can further complicate the picture. Quillian (2012), for example, showed that the interactions between three types of segregation—ethno-racial segregation, poverty segregation within ethno-racial groups, and segregation of higher income groups—contributed to the process of spatial concentration of poverty. Reproducing studies of this complexity and scope in multiple countries not only requires much data, it also requires an intimate understanding of how these factors interact in the local context. This edited volume takes a significant step in that direction by balancing local knowledge, geographical scope, and complexity.

Trounstine (2018) highlighted another dimension that needs systematic engagement. While researchers often summarize segregation as a single index, segregation operates within jurisdictionally defined units that have greater relevance for residents' well-being. She showed that levels of neighborhood racial segregation are going down in many regions of the United States, but is being reinforced at the municipal level with far reaching implications for access to critical services (see also Bischoff 2008; Fennell 2009). The chapters in Lloyd et al's (2014) edited volume make a similar point, though they emphasize how single-index summaries obscure much of the variation that gives segregation meaning. As Hwang's (2014) chapter demonstrates, and in a reversal of our initial question, two cities can be very similar in many respects, and yet have entirely different outcomes in terms of segregation.

Recent innovations in the field of segregation studies have advanced our understanding of spatial inequality in a small set of cities and countries. However, there is a long way to go for large scale comparative work to catch up to these refinements. Existing comparative studies tend to be regionally defined (e,g, Musterd et al. 2017; Tammaru et al. 2020 for Europe) or a wide-ranging selection of individual case studies that emphasize the distinct features of each (Maloutas and Fujita 2012). Some comparative approaches have focused on specific aspects, such as race (Fong 1996) or the role of different types of welfare states (Arbaci 2007). What is missing, including from this review, is the systematic integration of knowledge that does not derive from the hegemonic Anglo-Saxon framework of understanding. As access to data expands to include countries from outside the Global North, more needs to be done to interrogate the assumptions that decades of dominance by American scholarship embedded in the methods and in the analytical lenses that we use.

2.3 Method and Data

What we generally understand as cities are more accurately described as urban regions. Regions are the sum of urban areas that make up a relatively unified labor and housing market (Storper et al. 2015). They are the appropriate scale of study

for segregation because urban regions often represent regional housing markets. For example, when someone gets a new job in the Sydney central business district, they are not constrained to living in the city proper. They may elect or, in fact, only be able to afford to live in a distant suburb. Residential segregation is the sum of this process of sorting across administrative boundaries and should, therefore, be studied at the scale that matches the process.

The first step in comparing cities, then, is to establish their boundaries. However, even this step proves challenging. The norm is to use commuting patterns to estimate the extent of the regional market (OECD 2012). Basically, a functional urban area is the sum of all urban clusters where a substantial share (15%) of residents commute to the largest cities in the region. The lack of such data in many countries has led researchers to look for alternatives to achieve the consistency that is essential to robust results (Bosker et al. 2018).

For this study, we use the OECD harmonized database of Functional Urban Areas (FUA). The OECD database covers Australia, Canada, Denmark, France, Ireland, Mexico, the Netherlands, the United Kingdom, and the United States. For South Africa, New Zealand, and Brazil, which are not in the database, we use an alternative definition (based on administrative definition) closest to the scale of the region. We limit the sample to FUA and regions with a population over 500,000 people to ensure each city in the sample has sufficient data coverage in every country.[2] This gives us a sample of 194 urban regions in a total of 14 countries. In five countries, however, the data include only one city either due to data availability (Japan) or because the country has only one large FUA (Denmark, Hong Kong, Ireland, New Zealand).

For each of these countries, a further obstacle is the differences in data type, spatial scale, and data collection methodology. Some differences are easily, although not perfectly, remedied. For example, France collects income data as decile threshold values. Each tract is assigned Euro denominated values that correspond to each 10% of the population of the tract. For example, if the 10% of the population with the lowest incomes have income below €8500, that is the value reported in the data. The problem is that the values are not comparable across tract because the income is not relative to a fixed point. In contrast, all other countries define a set of income categories based on fixed ranges and report the number of households that fall within that range. In Canada, for example, the first of 15 income categories ranges from $0 to $5000. We address these differences through a mathematical transformation that uses the information about decile values to estimate how many households fall within income categories we defined.

More troublesome are the differences in the spatial scale of small spatial areas, and their coverage. Ideally, we would have data reported at a consistent scale, with full geographic coverage of the region, and based on the full census of the population. Much of our work has been devoted to identifying the differences in data and correcting them where possible. Throughout, we refer to the baseline geographic unit as the tract. This is the neighborhood-scale unit the United States Census Bureau uses

[2]Some countries, such as France and Canada have restrictions on the minimum population within a unit for it to be included in the publicly available database.

and has an equivalent in most countries in our sample. We summarize the data format in Table 2.1.

Some countries have rules about the minimum number of households that must be in a tract before the data can be released (due to privacy concerns). This often makes the coverage sparser outside the urban core of a region. In these cases (France, Canada, and the Netherlands), we complement the tract data with the next smallest administrative unit, which ends up being about the same size in terms of population, though not geographically. Differences between countries are more difficult to bypass. In some cases, a full range of spatial scales are available, and we can pick the one most consistent with the average size of the tract in other countries. However, we are sometimes stuck with a spatial unit that is either larger or smaller than the tract. For example, the two smallest administrative units in Australia, SA1 and SA2, straddle the tract size. SA1 is smaller, the equivalents of a few square blocks. SA2 works in some dense areas but is too large for the lower-density suburbs.

Differences in the spatial scale used to calculate segregation indexes will have an impact on the calculated values. The difference in unit of analysis areas in our sample is not so large that it would lead to the reinterpretation of the broad patterns that we describe (Wong 2004; Manley et al. 2019). The countries for which the scale of the geographic unit is of greatest concern are Brazil and South Africa. The two countries have the highest levels of segregation and the small scale of their units may bias the estimates upward. However, the results are consistent not only with other methods that minimize the effect of scale (Comandon et al. 2018), the two countries also have some of the highest levels of income inequality and, in the case of South Africa, a history of violent segregation that substantiates the high observed levels.

Differences in the timing of the census add another concern. In cross-sectional studies like this one, time is an issue only to the extent that levels of segregation have likely changed in the intervening years (i.e., we do not integrate comparison between years), thus undermining the comparison. Mexico, Japan, and the Netherlands are the only country with data pre-dating 2010. Mexico, in particular, is problematic because the country and cities have changed more rapidly than most other countries in our sample. Results from countries where longitudinal data are available (e.g., United States) confirm that even in countries with more stable urbanization rates, large changes occur (Comandon et al. 2018). Cases like Mexico illustrate the limitation of relying on census data which tends to evolve substantially over 10-year periods. However, changes, on average, tend to not change overall interpretation, especially for national trends (Monkkonen et al. 2018).

As part of the data summary, we include the income definition and the method of data collection. Differences in income definition are relatively benign. The main differences relate to whether total income is reported or after-tax income, and to the composition of income. Generous income redistribution programs and higher tax rates will alter the income distribution from pre-tax to after-tax. However, redistributive programs should not shift the income distribution so much that the relative position of households changes drastically (i.e., a household in the bottom quintile of the pre-tax distribution is unlikely to end up in the middle quintile of post-tax distribution). We therefore assume this difference is negligible for our purposes. As

Table 2.1 Summary of source and key measures

Country (year)	Census authority	Neighborhood average number of households	average neighborhood area	Income type	Number of income bins	Lowest and highest income categories	Sampling rate
Australia** (2015)	Australian Bureau of Statistic	134	1.57	weekly household income expressed in bins	15	negative to 1 4000 and up	100%
Brazil (2010)	Instituto Brasileiro de Geografia e Estatística	206	5.18	Household minimum wage multiplier (mw)—converted to Real	10	0 to 1/4 minimum wage (mw) 20 mw and up	Variable (from 50 to 5%) based on municipality size
Canada (2016)	Statistics Canada—National Household Survey	2007	4.25	Yearly total Household income	19	0 to 4999 250,000 and up	25%
Denmark (2013)	Dansk Demografisk Database	1674	18.79	Household income	5	0 to 149,999 800,000 and up	100% triangulated with tax records
France (2014)	Institut National de la Statistique et des etudes economique	1318	5.62	Income in euros for each decile—converted to bins	11	0 to 10,000 100,000 and up	40% over 5-year period
Hong Kong (2011)	Census and Statistics Department	1455	0.18	Total monthly household income	11	0 to 4,000 40,000 and up	99% based on monthly rotational design
Ireland (2011)	Central Statistics Office	98	0.77	Socioeconomic classes	9	Unskilled managerial	100%

(continued)

Table 2.1 (continued)

Country (year)	Census authority	Neighborhood average number of households	average neighborhood area	Income type	Number of income bins	Lowest and highest income categories	Sampling rate
Japan (2005)	Statistics Bureau of Japan	717	0.55	Household income	5	0–3 million and 10 million and up	Based on size of city, averages 10%
Mexico (2000)	instituto nacional de estadistica y geografia	654	0.48	Household income	12	Negative to 1 50,001 and up	100%
Netherlands (2008)	Centraal Bureau voor de Statistiek	1637	2.82	National income quintile	5	Lowest quintile Highest quintile	100%
New Zealand (2013)	Stats NZ	906	3.07	Total household income	6	0 to 20,000 100,001 and up	100% with around 15% non-response rate
South Africa (2011)	Statistics South Africa	189	1.08	household income	12	Negative to 1 2,457,601 and up	100%
United Kingdom (2011)	Office for National Statistics	109	0.37	Socioeconomic classes	7	Routine occupation higher managerial	100%
United States (2015)	American Community Survey	1681	27.63	B19001	16	0 to 9999 200,000 and up	8% over 5-year period

* NA indicates that the data was obtained through means other than publicly accessible databases
** data requires registration with the provider

a verification, we use the Canadian data to calculate segregation indexes for both total and after-tax income and find a near-perfect correlation.

Of greater consequence are the differences in cost of living of each region. The comparison of households in the bottom income category in Buffalo, New York with those of San Francisco, California is distorted by large differences in the cost of living between these two cities. The median home, for example, costs 6 times as much in San Francisco than in the Buffalo region. While we cannot entirely account for these differences, we adjust the index in every city to calculate segregation between local income quintiles rather than set income categories that remain the same in all locations.

Income quintiles allow us to divide the population into meaningful categories. We use three quintiles for comparison. The bottom quintile includes households who are in the first 20% of the income distribution, meaning that 80% of the population has higher household incomes than they do. These are people that are severely constrained in terms of where they can live within the urban region and have incomes much below the regional median. The middle quintile are households between 40 and 60%. This category includes the median and represents the middle-class. Finally, the top quintile are those with income higher than 80% of the population and have the greatest choice in where to live.

We use a relatively crude method to pick the quintile thresholds. We estimate the income distribution for the entire region and pick the income categories closest to the quintile threshold.[3] For example, the first/bottom quintile of the income distribution of New York is $23,200. It falls within the income category bounded by $20,000 and $25,000; therefore, we use all households with income below $25,000 in every tract as the bottom quintile; if the quintile value were to fall closer to the lower bound, we would use all households in and below the $20,000 category. The results are an approximation of income quintile, but one that, on average, is close enough to separate the population into relevant categories.

The last cause of concern is the method of data collection. Census offices tend to collect a comprehensive set of data on the full population and then collect a more extensive survey on a subset of the population. Income data usually comes from the more extensive survey (exceptions include Australia, which has comprehensive coverage). Overall, the countries we include tend to have higher sampling rates, making the United States the case of greatest concern. The use of samples to collect this information means that all reported numbers are estimates that come with margins of errors. In small tracts and in places with small total population, these margins of errors can be large enough to completely undermine the reliability of segregation indexes like the Dissimilarity Index (DI) (Napierala and Denton 2017). Issues with the sampling strategy and sample size can be corrected to some extent, using simulation techniques, for example, but the type of data we use reduces such concerns.

[3] We use the *binequality* package in R to estimate the best parametric function to fit to the distribution before estimating the quintile cut-off values and choosing the bin closest to the cut-off (von Hippel et al. 2016).

The concerns about margins of error tend to stem from the underrepresentation of a group of interest. However, since we are interested in income classes, we can expect a relatively even distribution throughout the region. Furthermore, our strategy aggregates income groups to obtain quintiles, which further reduces the incidence of tracts with little to no representation. As an additional attempt to put to rest some of these concerns, we use a method Reardon et al (2018) developed to correct for the bias in ordinal segregation indexes that comes from the sampling method. This is not the same index, but the magnitude of the correction should parallel what we would find for the DI. The correction for income data in the United States is up to 10% of the estimated value, but much smaller in Canada, which has a sampling rate of 25% (in contrast to around 8% in the United States, see Table 2.1 for an overview of sampling rates).

Like the rest of the book, we used the Dissimilarity Index (DI) as our measure of segregation. We used the *dissim* function in the "seg" package in R to calculate the index for every city in the sample (Hong et al. 2019). We ran the operation for the bottom and middle quintile, and the bottom and top quintiles. The dissimilarity index has many shortcomings (e.g., Napierala and Denton 2017; Reardon et al. 2006), but remains useful as an intuitive indicator of a city's spatial structure. In interpreting the index, however, it is important to keep in mind that there is no such thing as no segregation, nor is the absence of segregation desirable (Ellickson 2006). There is a level of segregation that would always be present purely by virtue of the distribution of the housing stock and the impossibility of restricting people's residential choice (Sander and Kucheva 2016). Massey and Denton (1993) have therefore proposed a generally agreed upon rule of thumb for what constitutes low (0.2–0.3), medium (0.3–0.5), and high levels (>0.5) of segregation. In our interpretation, however, we rely more on relative levels than on the values themselves.

2.4 Results

The sets of DI values show that residential segregation between the top and bottom income groups is much higher than between the bottom and the middle-income group (henceforth, we compare other income groups with the bottom category as the reference point, i.e., we refer only to top DI and middle DI to indicate how segregated they are from the bottom group). The average middle DI is 0.26 compared to 0.48 for the top. Figure 2.2 shows these differences in magnitude across and within countries. Variation in top DI (excluding single city countries) across countries is also larger than it is within any country. The difference between the highest and lowest national median top DI is 0.42 which is much more than the countries with the largest range of about 0.25. In contrast, variation between country medians for middle DI is 0.09 and the widest national range in Brazil at about 0.25, six countries with ranges above 0.09.

Individual cities highlight these differences. The lowest top DI is Tokyo at 0.2 compared to the high of 0.73 in Tshwane. The same comparison for middle DI

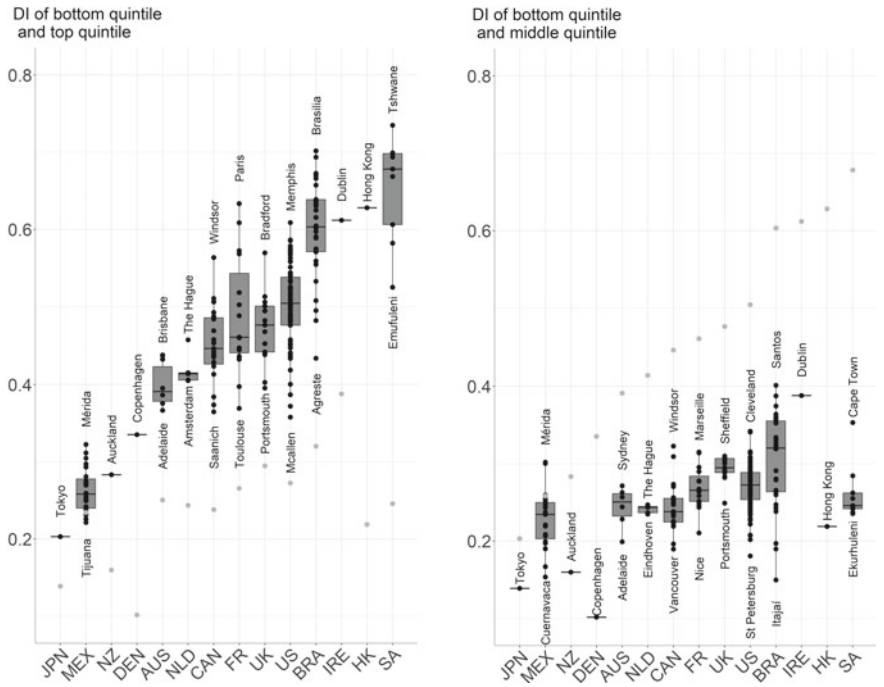

Fig. 2.2 Box plots showing the variation in segregation levels between bottom and top income quintile (left panel) and bottom and middle-income quintile (right panel). The light gray points indicate the median DI for the other comparison group (i.e., in the left panel, they show the median value of the country in the right panel)

between Copenhagen (0.1) and Santos (0.4) shows that overall smaller range of variation. It should also be noted that the principal cities of many countries are absent from the extremes. Large economic centers tend to concentrate extremes of wealth and poverty (e.g., Paris) but, in most cases, the largest economic centers (e.g., Toronto, New York, Johannesburg, and London) are closer to the national median.

In comparing top and middle DI, we note that the relationship is unstable. Mexico is the only country where the median top DI falls within the range of middle DI. In other words, it is the only country without a significant shift between middle and top DI. South Africa, by contrast, has the highest median top DI and one of the lowest middle DI. The extremely skewed income distribution in South Africa paired with a history of institutionalized racial segregation has created cities of large wealthy enclaves surrounded by areas of relatively mixed middle and lower incomes (Murray 2011).

The lack of correlation between national top and middle segregation levels is replaced with greater stability in relative position of individual cities. The correlation between cities' top DI and middle DI segregation is 0.63. Figure 2.3 illustrates the relationship between middle and top DI. The figure plots the rank of cities according

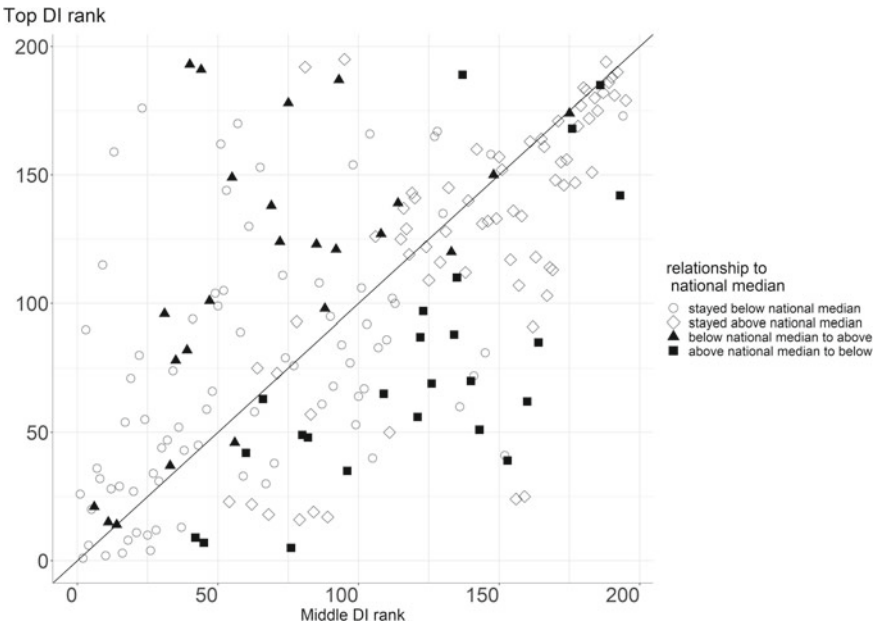

Fig. 2.3 Plot of top and middle DI rank for every city. The cities are ranked from lowest DI (i.e., rank 1) value to highest (rank 196). Points on or near the 45-degree line are cities that have the same rank for both types of segregation. Cities above the line have a higher top DI rank than middle DI rank, cities below the line are the reverse. Each symbol represents a type of relationship between individual city DI and national median, either staying higher/lower than the national median or moving up or down relative to the other cities in the country

to their top and middle DI, giving an overview of the stability of their relative position. The 45-degree line represents no difference in rank. Many cities are close to this line, indicating that cities with lower middle DI tend to also have lower top DI. In addition, most (three quarter) cities remain either below or above the median national level, as shown by the white symbols.

There is, however, substantial movement in a subset of cities. In Brazil, Florianópolis is one of the least segregated cities between the lower and middle quintiles, but one of the most segregated cities when comparing the top and bottom groups (from rank 182 to 37). Norte/Nordeste Catarinense displays the opposite relationship, its rank shifts down from third highest middle DI to 54 for top DI. Similar trends are present in the United States and in the entire sample, which is split nearly in half between cities moving up and down the ranks.

As noted in the case of South Africa, the level of inequality has the potential to significantly affect segregation. Figure 2.4 shows the estimated city-level GINI as well as the national level (the two are strongly correlated).[4] The bivariate regression

[4]The estimation of the income distribution of every city allows us to also estimate the GINI coefficient. We take advantage of the built-in function to extract this measure at the same time. We

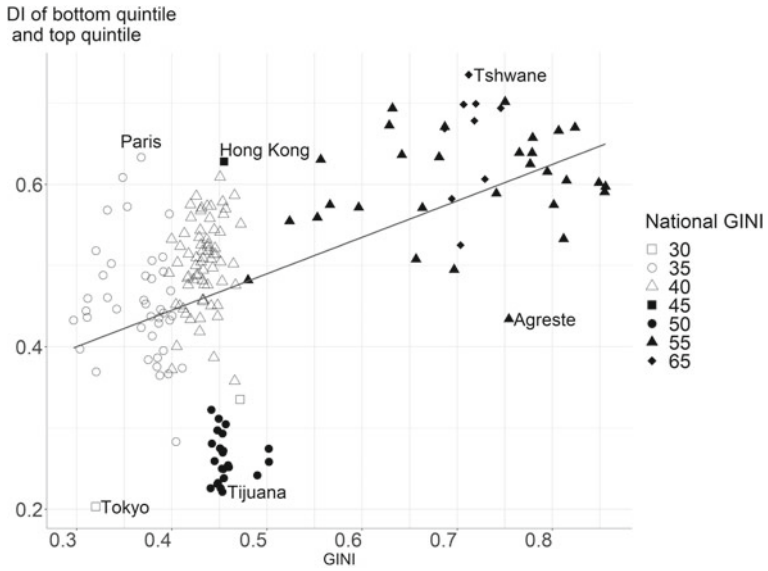

Fig. 2.4 Plot of top DI and GINI coefficient for all cities with income data (excludes UK, Ireland, and the Netherlands). The symbols are the national GINI coefficient rounded to the closest multiple of 5

line shows a positive relationship between the two. However, the cluster of high-inequality cities (Brazil and South Africa) seem to drive the overall trend. For cities and countries with GINI coefficients below 5, the relationship is more ambiguous. Hong Kong and Tijuana have similar levels of income inequality but the top DI in Hong Kong is nearly three times as high as that of Tijuana. There is also significant national clustering. The dots above Tijuana are Mexican cities that display a similar relationship of high-inequality and low segregation. This may be a result of the unique dynamics of movement between central city and periphery in the Mexican context (Monkkonen et al. 2018).

Finally, the data also shed light on how we understand cities in comparative perspective. This data will gain greater meaning once paired with more detailed contextual analysis. The high levels of segregation in Brazil may not come as a surprise, but the method points to factors other than income inequality. How we defined cities matters. In the Brazilian context, and in South Africa to a lesser extent, the region encompasses and concentrate the extremes of the country. Some of the regions, such as Manaus, Brazil, include great hinterland areas that have often been marginalized in the process of rapid urbanization (Kanai 2014). This combines with the landscape of urban inequality in the urban core to create a layering with no direct parallel in the well-established cities of Europe and North America.

retrieved the national GINI coefficients from https://data.worldbank.org/indicator/. We round the values to create fewer categories than there are countries and avoid overwhelming the plot with symbol levels.

2.5 Discussion and Conclusion

Now that we examined the data, we can come back to the questions we opened with. Despite the lack of contextual data about individual cities and countries, there is much we can infer from the observed patterns. We learn that income inequality, certainly high-inequality, correlates with residential segregation between income groups but leaves much variation unexplained. Many cities with similar levels of income inequality, even within the same country, have segregation levels at the opposite ends of the spectrum. While differences in segregation are not as large within countries as they are between countries, our data suggest that both need to be studied in conjunction. Therefore, it is not just a matter of understanding the difference between Melbourne and Boston as cities within countries with different political economy, it also matters that segregation levels in all Australian cities are similar while in the United States they vary from Australian to Brazilian levels. This relationship between inequality and segregation raises important substantive and methodological questions for between-country and within-country comparisons.

The case of Mexico, for example, stands out on its own because of the prevalent low levels of segregation by income but raises additional questions in comparison to other middle-income, high-inequality countries such as South Africa and Brazil. South Africa shares more with Mexico when limiting the comparison to middle-income segregation when both countries have lower levels of segregation. It may be that Mexico's data limitation fails to capture the translation of high inequality into spatial patterns of separation or that Mexican cities developed in such a way that the isolation of wealthy households that defines South African cities has not taken hold to the same extent.

Elucidating these questions has implications for policies aiming to reduce segregation. There is too little evidence to speculate as to the importance of national welfare systems on explaining the differences in within-country variation. Some countries, like France, have a more centralized system of urban governance and comprehensive redistributive systems, yet, the range of income segregation levels resembles more closely that of the Unites States than the Netherlands. This can be interpreted as evidence that differences between cities are more important than national-level differences. The lower average level of segregation in higher income equality countries may point in the other direction. Here too, however, important deviations prevent straightforward inference.

A key aspect of explaining deviations from general relationships is history. Single country studies have revealed important processes that persistently shaped segregation. In the United States, for example, scholars have showed how the migration of black people out of the South led to the creation of modern residential racial segregation. Where the social hierarchy was institutionalized in the South under slavery and Jim Crow laws, the rest of the country lacked such rules to establish white dominance and relied instead on the systematic spatial separation of black migrants (Logan 2017). To this day, southern cities have lower levels of segregation than the rest of the country. Nightingale (2012) showed that a similar process operated in South

Africa where residential segregation was unnecessary until a large black labor force developed in urban centers. The data we presented can serve to conceptualize historical processes more broadly to include the implications of different starting point of urbanization, colonial relations, and changing economic relations (e.g., centered on labor and property).

One promising area of study is the integration of economic geography into the study of segregation. As cities take on different roles in relation to their international peers and national competitors, the pressures on urban structures will be different. A large-scale data analysis would allow for the modeling of urban system to consider sub-national labor market trends and the accompanying migration patterns. It would also open the possibility of studying the role of different historical trajectories of cities. The period in which urbanization takes place, and the set of events that shapes the life of a city matter, but studying such phenomena as cases studies can lead to self-fulfilling analysis if one chooses cases based on the outcome one wishes to study (Abu-Lughod 2007). The trends in urban research and segregation studies point to fruitful complementarities between case studies and large-scale data analyses.

Many questions we have suggested point to the importance of data spanning several time periods for future research. The only country for which we have access to reliable data over time for the entire country is the United States. Even in that case, issues of comparison over time are non-negligible (Reardon et al. 2018). Countries are improving their data collection methods with every census and we hope that as time passes, the scope of comparison will only increase.

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Part II
Africa

Chapter 3
Income Inequality, Socio-Economic Status, and Residential Segregation in Greater Cairo: 1986–2006

Abdelbaseer A. Mohamed and David Stanek

Abstract Greater Cairo is a primate, monocentric metropolis with significant socio-economic disparities among its population and neighborhoods. This chapter examines the relationship between income inequality, the welfare regime, centralized governance, settlement type, housing policies, occupational status, and socio-economic segregation. Using data from the 1986, 1996, and 2006 censuses, we report the dissimilarity index to demonstrate the distribution of residents in the Greater Cairo Region by occupational status, we show patterns of socio-economic segregation based on the distribution of the population by categories of occupations across census tracts and employ the location quotient to compare the concentration of the top/bottom groups in each census tract relative to the city average. The results show that growing economic inequality does not necessarily result in greater socio-economic segregation. The results also suggest that social class contributes to residential clustering. While the poorer strata of the Greater Cairo Region were pushed to the periphery and the older urban core, affluent inhabitants were more likely to settle voluntarily in segregated enclaves to isolate themselves from the general population.

Keywords Greater Cairo · Socio-economic status · Residential segregation · Housing policies · Income inequality

The original version of this chapter was revised: In the figure 3.3 missed out correction have been incorporated. The correction to this chapter is available at https://doi.org/10.1007/978-3-030-64569-4_27

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3.1 Introduction

Urbanization and social inequality have been on the rise in Egypt since the mid-1970s when President Anwar Sadat (1970–1981) initiated a series of reforms beginning with the 1974 *infitah* (open-door) policy to reduce state welfare spending and expand the private sector through state support and foreign direct investment (Ben Nefissa 2011: 180). In 1991, under President Hosni Mubarak (1981–2011), Egypt adopted the Economic Reform and Structural Adjustment Program with the support of the World Bank, European Union, and African Development Bank (ADB 2000). These neoliberal policies contributed to the urbanization of the Greater Cairo Region (GCR) and increased social inequality in several ways. Reduced state welfare funding and agricultural mechanization encouraged economic migrants to seek work in the GCR. Some Egyptians emigrated to neighboring Gulf countries to work in the booming oil sector. They sent remittances to their families who, in turn, invested in land and construction to satisfy an increased housing demand (Sims 2010; El Kadi 2009). At the same time, the state withdrew from social housing construction and engaged in land speculation of its own, leaving a largely unregulated private market to provide housing for the growing population of the GCR. Housing demand pushed speculators to build on the urban periphery, turning large tracts of productive (and scarce) agricultural land into densely built, informal housing settlements, which are now home to poor and middle-income Cairenes alike (UNCHS 1993; Sims 2010). International real estate investment concentrated in the GCR's central business district and along the Nile's "Gold Coast", as well as in a series of new satellite cities that catered to mobile, urban elites.

In 1979, the government adopted a deliberate urban decentralization strategy to relieve some of the congestion and pollution brought about by the urbanization of GCR (Tadamun 2018). By 2008, the development of new urban communities, such as the 6th of October City and Sheikh Zayed City, set apart from the urban fabric on the desert plains, had transformed the GCR from a compact, monocentric metropolitan region into a discontinuous, polycentric, dispersed urban structure (Taubenböck et al. 2009). This rapid expansion has provided opportunities for higher income Egyptians to leave central Cairo. At the same time, poorer communities have concentrated in undesirable, underserved, and often unsafe areas, also known as "poverty pockets," where chances of upward mobility and opportunities are limited (Tadamun 2018). This chapter explores the factors that have influenced the socio-economic spatial divisions in GCR. A city's socio-spatial division is a function of many factors including context, institutional power, welfare regimes (Arbaci 2007), ethnicity, commodification of housing, and people's residential preferences (Marcińczak et al. 2015). Research from the United States and Western Europe has shown that economic inequality can result in (socio)economic segregation, the uneven spatial distribution of households based on income, occupation and/or educational attainment (Burgess 1925; Massey 1979b; Schteingart 2001). Singerman and Amar (2006) show that, in addition to economic inequalities, social inequalities reinforce socio-spatial segregation. Several authors including Gilbert (1992) have suggested that social class is

replacing ethnicity as the basis for the social urban geography. While many studies have looked at poverty in Egypt (e.g., World Bank 1990; Korayem 1994; El-Laithy 1996; Sabry 2010), poverty in relation to spatial justice and unemployment in the GCR (Shawkat 2013; Nassar and Biltagy 2016; Tadamun 2018), and the patterns of low-income housing in GCR (Harris and Wahba 2002), no rigorous research has been conducted on the intersection of economic inequality and residential segregation of socio-professional groups in the GCR.

This work focuses on post-socialist Greater Cairo (1986–2006) as a monocentric city and uses occupation as an indicator of social status to study the distribution of socio-economic groups across the region. Using Marcińczak's et al. (2015) approach with publicly available data, we answer the following questions: To what extent is there residential segregation of occupational groups in the GCR? Can socio-economic inequality explain residential segregation? To what extent can the welfare regime and the characteristics of housing provision explain segregation trends in the GCR?

3.2 The Social Geography of GCR

With the exception of its recent history, the GCR had a compact, monocentric urban structure that followed Burgess's (1925) concentric zone model that theorizes how economic and political forces influence the distribution of social groups within the city. The model suggests that cities evolve in successive rings around the central business district (CBD). The first ring, widely visible in the developing world, is made up by deteriorating housing formerly occupied by higher income families and is called the "zone of transition", or what Stokes (1962) refers to as "slums of despair." This zone is followed by three successive rings of housing ranging from high-density poor-quality working class housing, to lower density high-quality housing for the elite. Change occurs in this model through the invasion-succession process in which a group of people or type of land use arrives and comes to dominate an area previously occupied by another group (Kendall 2013).

An important criticism of Burgess's model is that many settlements on the periphery of contemporary megacities are not higher class neighborhoods, but what Stokes calls "slums of hope"[1] which are problematic, but not as dire as the inner-city "slums of despair". While the differentiation between slums in the urban core and those in fringe areas looks outdated and prejudiced, authors like Harris and Wahba (2002) confirm its usefulness and validity for the GCR.

Rural–urban migration has been a dominant force in shaping the socio-spatial structure of the GCR. The limited availability of publicly subsidized housing and the high cost of formal market-rate housing forces lower income residents to live in either older, affordable neighborhoods often with substandard housing or in informal

[1]In this instance, we apply Stokes's use of the word "slum" to the informal settlements, or *ashwaiyaat,* of Cairo although they are technically dissimilar. See footnote 2 below.

Table 3.1 Summary statistics for the GCR, 1986–2006

	1986	1996	2006
Population	8,666,478	12,600,000	15,628,325
Residential buildings	1,108,250	1,387,388	1,751,742
Housing units*	3,432,070	4,923,790	7,107,363
Owned units (%)	35.3	49.1	52.7
Rented units (%)	44.6	44.5	41.4
Other (%)	16.0	6.0	6.0
Population of informal settlements (%)	49.0	43.2	43.1
Vacant residential buildings (%)	15.4	7.0**	10.1**
Share of managers and professionals (%)	21.1	25.8	25.0
Gini index	NA	33.7	37.8

Source World Bank 2007, CAMPAS 1986, 1996 and 2006
* Housing units converted into workplaces are not included.
** As defined in the 1996 and 2006 censuses, "vacant" did not include vacant apartments within a partially used block of apartments and is therefore severely undercounted.

settlements[2] built on illegally occupied land (Harris and Wahba 2002). Informal housing is the only option for rural migrants of limited means, and low-income families who have little, if any, education and support themselves through the informal economy (Sabry 2010). The influx of migrants resulted in a fragmented pattern of planned settlements, where government regulations and planning prevail, and informal settlements, where land markets are unregulated (Sobreira 2003).

3.3 GCR as a Case in Point

Greater Cairo is Egypt's primate city and it continues to grow rapidly (Jefferson 1989). With a population of over 20 million people as of 2016 (CAPMAS 2016), the GCR accounts for 22% of Egypt's 95.8 million people, 50% of Egypt's commercial activities, more than 40% of the country's public investments, 43% of public-sector jobs and 40% of private-sector jobs (UH-HABITAT 1993; Ben Nefissa 2011; Sims 2010). The population of the GCR increased by almost 7 million people between 1986 and 2006 (see Table 3.1). Population densities of inner-city districts declined while densities in peripheral districts increased, often in the form of unplanned urbanization (El-Kadi 1987 in Fahmi and Sutton 2008). By 2006, 53% of residents owned their homes and only 5.1% of the households lived in publicly built or financed dwellings (Sims et al. 2008 in Sims 2010).

[2]Informal settlements or *ashwaiyaat*, which translates to 'haphazard', generally refer to unplanned and unregulated communities. These also include typical slum areas of deep poverty, dilapidated housing, and limited service availability.

Informal settlements are a dominant typology in GCR's housing landscape. Home to low- and middle-income Cairenes alike, official estimates show that 43% of housing in the GCR is in informal settlements (CAPMAS 2006), but this is likely an underestimation (Sabry 2010). The slums of Cairo, the dilapidated, make-shift, poorly serviced, and unsafe neighborhoods, house Cairo's poorest residents and are scatted throughout the city. El-Laithy (2001) estimates that the incidence of poverty in the GCR was about 8.4% in 2000, a 2004 World Bank study estimates poverty rates at 4.6%, but as with the extent of informal settlements, poverty rates are likely to be underestimated (Sabry 2010).

Vacancies are another dominant feature of the GCR's housing market. In 1986, there was a 15% residential vacancy rate in the GCR in part due to the refusal of owners to rent their apartments under rent-control laws (Raymond 2001). By 2006, official figures show that 10.1% of the housing units in the GCR were vacant flats (CAMPAS), but this number is more due to a change in the definition of "vacant" than improvements in the vacancy rate (see note to Table 3.1). Unofficial estimates put the figure at more than 30% (Moussa 2007) as landlords, especially in the higher income neighborhoods of the GCR, were unable to find renters who can afford "normal" market rents (Fahmi and Sutton 2008).

Importantly, explaining the spatial distribution of residents has been approached in various ways by different scholars. While some studies focus on individual preferences (e.g., Lewis et al. 2011), others concentrate on one or more dominant factors such as polarization of the social structure, institutional power, and economic inequality (Marcińczak et al. 2015). In this study, we examine how income inequality, welfare regime politics, the centralized system of urban governance, settlement type, and housing policies contribute to the GCR's socio-spatial division.

3.4 Factors Influencing Residential Segregation in GCR

As stated above, to explain geographies of socio-economic residential segregation in Greater Cairo, this study employs a multifactor approach and takes conventional indicators that have been frequently used in previous studies, such as income inequality and socio-economic/occupational status (Darden et al. 2010; Marcińczak et al. 2015; Massey 1979a), welfare regime politics (Arbaci 2007), centralized urban governance (Brown and Chung 2008; van Kempen and Murie 2009), settlement type (Parham 2012), and housing policies (Reardon and Bischoff 2011).

3.4.1 Income Inequality

According to World Bank studies, the Gini coefficient of income for Egypt was 30.1 in 1995 and rose to 31.8 by 2015. According to the 1997/98 UNDP report on Egypt, the Gini index for Cairo governorate in 1995 was 33.7 (Abu-Lughod 2004) and jumped to

40.0 by 2016 making the metropolis the most unequal area in the country (CAPMAS 2016). As compared with other cities in developing countries such as Johannesburg, South Africa (Gini index of 72.4), Cairo's Gini index is modest. However, one might argue that Egyptians base their perceptions of inequality on the gap between their expectations for the government and the government's performance rather than on the gap between their own income and the income of others.

3.4.2 Welfare Regime Politics

It is argued that the type of welfare regime influences social segregation (Murie and Musterd 1996 in Mustered and Ostendorf 1998). Differences in welfare state arrangements mediate global economic pressures, thus contributing to significant local differences (Musterd and Ostendorf 1998). Using Fenger's (2007) classification of welfare states, Egypt falls into the post-socialist developing welfare type (Fenger 2007) with the highest expected levels of segregation (Arbaci 2007). According to the World Bank estimates, Egypt has a high mortality rate, low life expectancy, high inequality, high inflation, and low state social spending on health and education. For example, the infant mortality rate was 19.4 per 1,000 births in 2016, while life expectancy was 71.5 years. The unemployment rate and inflation rate were 21.4% and 13.8%, respectively.

3.4.3 Centralized Urban Governance

Urban governance in Egypt is highly centralized (Ben Nefissa 2011; Tadamun 2018). Officials appointed by the President at the governorate level allocate public money and set priorities for urban planning, services, and development. The governance structure allows for significant corruption which encourages skilled persons to engage in socially unproductive activities (i.e., extracting bribes) and reduces economic output (Tanzi and Davoodi 1997, as cited in Ghalwash 2014). In other words, centralized governance implies that personal connections matter and service delivery and the quality of neighborhoods are tied to those connections, thus reinforcing existing spatial inequalities. It also leaves lower income households with little opportunity to engage in the decision-making process about their communities, reinforcing spatial inequalities among neighborhoods.

Further complicating the governance of the GCR is that it includes five autonomous provincial governorates: Cairo, Giza, and Qalyubia, 6th October and Helwan, for which there are no GCR level coordinating government bodies, hindering the development of coordinated plans and policies for the urban agglomeration as a whole (Ben Nefissa 2011), and this lack of coordination prevents the government from addressing the spatial inequality of the GCR region in a meaningful way. This

poorly coordinated metropolitan planning leads to differences in opportunity structures (e.g., differences in housing segments in different parts of the GCR), thus contributing to socio-spatial segregation (van Kempen and Murie 2009).

3.4.4 *Settlement Types: Formal and Informal*

Perhaps the most influential factor of socio-economic segregation in GCR is settlement type, where higher income groups are over-represented in planned areas and middle- and lower income groups are over-represented in informal unplanned areas. Cairo's first planned area, the nineteenth-century CBD, is situated between the old city, located about 2.5 km east of Nile, and the so-called "Gold Coast", a narrow strip of the most valuable real estate in the CBD that extends from Qasr El-Nil to the south and Zamalek Island to the north. From the CBD, formal Greater Cairo expanded along both sides of the Nile as well as along railroads that extended from the Ramses Railroad Station in downtown north through Shubra El-Kheima, south to Helwan, and east to Suez (UNCHS 1993). In the early 1900s, several affluent, planned suburbs were established including Zamalek Island west of downtown, Heliopolis, 10 km east of downtown, and Maadi, 12 km to the south. Over the early twentieth century, the urban fabric of GCR filled in the gaps between downtown and these suburban enclaves. The south-eastward development of the city was hindered by the great cemetery of Cairo and the Muqattam Hills (see Fig. 3.1).

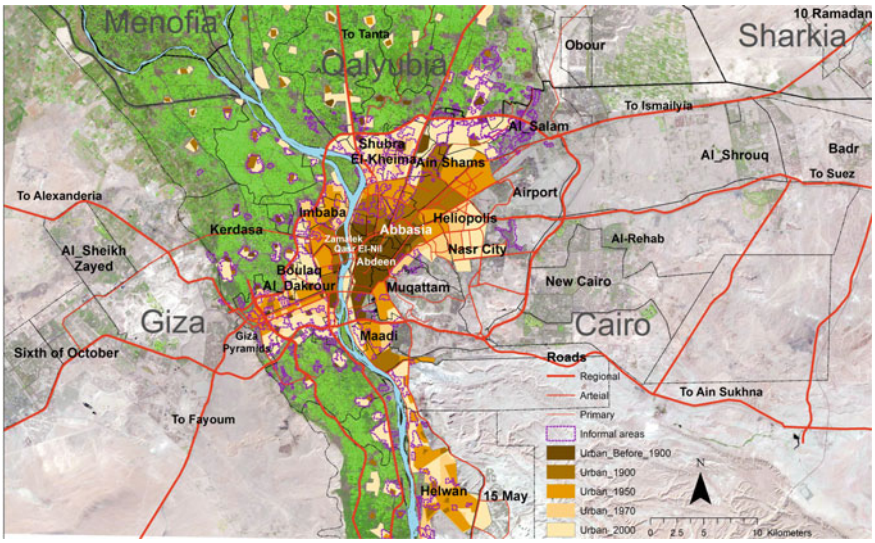

Fig. 3.1 Urban evolution of Greater Cairo from before 1900 to 2000

Beginning in the 1960s, the GCR experienced heavy urbanization as a result of migration from rural areas driven by job opportunities. Newcomers were mostly young single men with modest needs, which encouraged them to share rented units or rooms in the older neighborhoods with a deteriorating housing stock, aka, the "slums of despair." After accruing considerable savings, some migrants bought land and built informal settlements well beyond the formal areas on the peripheral farmlands to the north and west of the city where land was cheap (Fahmi and Sutton 2008; Kipper and Fischer 2009). Increased migration and urbanization during the 1980s and 1990s stimulated further demand for housing—a demand which planned areas could not accommodate—and informal settlement expansion pushed land prices on the urban periphery incrementally higher (Kipper and Fischer 2009). Meanwhile, the government exacerbated the housing crisis by encouraging both speculative land acquisition and investing in large-scale, for-profit luxury housing (Salma and Shawkat 2017; Tadamun 2018).

3.4.5 Housing Policies

National housing policy has had a significant influence on socio-economic segregation in the GCR. The vestiges of the socialist era policies reinforce historic disparities in the urban fabric while present day policies create new ones. As can be seen in Fig. 3.2, during the 1940s, the Egyptian government adopted rent-control legislation

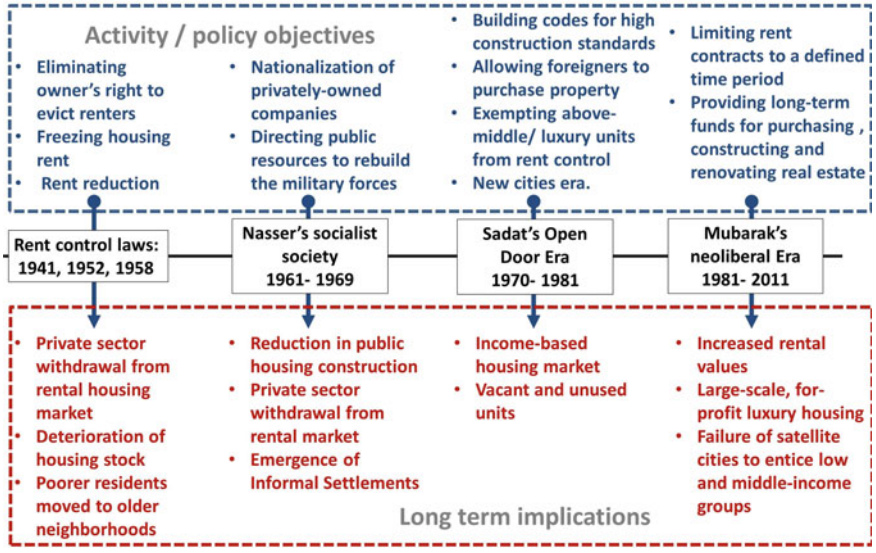

Fig. 3.2 National Housing Policies and Their Influence on Spatial Segregation, 1941–2011 (*Source* authors based on The World Bank (2007); Fahmi and Sutton (2008))

to reduce rents for lower income families. Freezing rent prices discouraged private investors to supply formal housing for rent. Furthermore, insufficient rent revenues discouraged private owners to maintain existing housing units and this, in turn, led to a deterioration of the housing stock. With the industrialization policy under the state-sponsored socialism of the Nasser era, specifically in the 1950s, the government reduced rents gave renters the right to complain about maintenance and partially provided subsidized housing to the poor. During the 1960s, the state vastly reduced the construction of public housing and infrastructure gave tenants the right to inherit rental units, and directed most of the national income to military purposes. This policy widened the gap between supply and demand, further encouraged informal development, and contributed to the deterioration of rental stock (World Bank 2007; Fahmi and Sutton 2008).

In 1979, the government adopted a strategy to relieve central Cairo of congestion and pollution by supporting the construction of car-dependent, planned "new urban communities" in the desert, a policy that continues today (Hegazy and Moustafa 2013). In these formal areas, the government prohibited microeconomic activities such as retail shops, workshops, and street kiosks which generate employment and investment opportunities for lower income residents (Sims 2014). Low- and middle-class families could neither afford the cost of housing nor the cost of commuting such long distances, thereby ensuring that the satellite cities would be elite spaces within the expanding region (Sims 2014; Salma and Shawka 2017; Tadamun 2018). The government has tried to support subsidized social housing projects (*Iskan Igtema'ey*) in the new urban communities for low- and middle-income households, but because of bureaucratic opacity (Sims 2014), and income requirements that exceed the average incomes of even upper middle-class households (Salma and Shawkat 2017), this program has contributed to further socio-economic segregation in the city (Tadamun 2018).

Given the high costs of subsidized housing and the exclusionary nature of the new urban communities, low- and middle-income residents relied on the informal private sector for housing and the only available land on which they could build was the agricultural land that surrounds the city. Unfortunately, the informal private sector was unable to satisfy the increasing housing demands of the population due to rising construction costs, the incessant inflation of land prices (UN-HABITAT 1993), and the large devaluation of the Egyptian pound over the period from 1989 to 1991 (Mohieldin and Kouchouk 2003). Ultimately, the informal private sector withdrew from its key role as the main supplier of affordable housing for lower income groups and focused on higher end housing (Salma and Shawkat 2017). As of 2016, GCR had about 4.7 million vacant housing units, which is roughly equivalent to the *total* number of housing units in 1996 (CAPMAS 1996, 2016).

3.5 Landscape of Residential Segregation in GCR, 1986–2006

This study relies on publicly available data from the General Office of Physical Planning (GOPP) and the Central Agency for Public Mobilization and Statistics (CAPMAS). As information aggregated to the tract level, we use census tracts to define the *shiyakha*, or neighborhoods. Tract boundaries for the selected study periods are nearly unchanged and do not require data harmonization for pre-2006 census tracts.

The urban agglomeration of the GCR is comprised of the whole governorate of Cairo and, except for some scattered towns, urban Giza, and urban Qalyubia (Harris and Wahba 2002). In 1986 there were 486 tracts, with an average population of about 5,500 each. In 1996, the number of tracts increased to 509 with an average population of about 7,000, and in 2006, there were 553 tracts with a mean population of 8,250. In order to control for differences in tract sizes and populations, we standardize the data by transforming counts into rates/ratios. Z-scores are also used for normalizing scores on the same scale.

We use occupational data from the 1986, 1996, and 2006 censuses to study socio-economic segregation in the GCR. The 1996 and 2006 data include the nine occupational categories as defined by the International Standard Classification of Occupations (ISCO) and the 1986 census includes seven, where the lowest three elementary occupations are merged into one category. To mirror socio-economic disparities at a micro-scale, we adopt the aggregation method of Marcińczak et al. (2015) in which the original ISCO classifications are grouped into three socio-spatial categories: top, middle, and bottom. Managers (1) and professionals (2) comprise the top socio-economic category. Associate professionals (3), clerks (4), and service and sales workers (5) form the middle socio-economic category. Skilled agricultural, forestry, and fishery workers (6); craft and related trades workers (7); plant and machine operators and assemblers (8), and elementary occupations (9) fall into the bottom socio-economic group (see also Azhdari et al. 2018). Following Marcińczak's (2015) method, we then find the percentage of employed residents in each tract that fall into the high, middle and low group to classify the census tracts of GCR into six categories: high, middle-to-high, mixed, low-to-middle, low, and polarized (see Table 3.2).

While occupational status is a major indicator of income, prestige, educational attainment, and health-related behaviors, it is an insufficient and sometimes unreliable indicator of socio-economic status (SES) on its own. A disadvantage is that job status as well as skill and education requirements for certain types of employment change over time. For example, a teacher may have had a higher social status in 1986 than in 2006. Moreover, income and lifestyle, as indicators of occupational status, are context-sensitive and subject to cultural preferences (Berkman and Macintyre 1997; Marcińczak et al. 2015). Finally, SES indicators often exclude individuals engaged exclusively in the informal economy as their activity is not captured in government data sets (Krieger et al. 1997). This is particularly problematic in the GCR where

Table 3.2 Tracts types according to shares of socio-spatial groups

Tract Occupational Status Category	Top (%)	Middle (%)	Bottom (%)
High	≥50	<30	<30
Middle-to-high	25–49	25–49	<25
Middle	<30	≥50	<30
Mixed	25–49	25–49	25–49
Low-to-middle	<25	25–49	25–49
Low	<30	<30	≥50
Polarized	≥30	<25	≥30

Source adapted from Marcińczak et al. (2015)

informality is widespread and undercounted (Sabry 2010). Taking this possible limitation of the data into account, we use occupational composition statistics as they are the most reliable available indicator of SES at the *shiyakha* level within publicly available datasets.

We investigate patterns of socio-economic segregation at two stages. We use the dissimilarity index (*D*) for all occupational groups to measure the overall evenness in spatial distribution of each occupational group as compared to the rest of the population. Because socio-economic segregation is commonly lower than ethnic segregation, Marcińczak et al. (2015) consider values between 0.2 and 0.4 as moderate and above 0.4 as high. In the second stage, location quotient (LQ) is employed to compare relative concentrations of the top and bottom ISCO categories in a tract against the metropolitan concentration.

3.6 Spatial Distribution of Occupational Groups

The composition of the workforce in the GCR has shifted modestly between 1986 and 2006. The bottom occupational category made up nearly half of the workforce in 1986 and fell to about 44% in 2006 while the top occupational group increased from 21 to 25% over the same time period. The middle occupational category remained unchanged at 31%. Unskilled workers form the smallest share of jobs in the GCR, whereas most of the economically active populations of the city are from the bottom socio-economic group (CAPMAS 1986, 1996 and 2006). Also, 25% and up to 30% of residents are in the top and middle occupation categories, respectively. Furthermore, the three broad categories of workers are unevenly distributed in the three censuses. Overall, occupational structure between 1986 and 2006 implies that the bottom of the labor market (i.e., low-skilled jobs) is relatively shrinking while the top and middle are growing (Fig. 3.3 left).

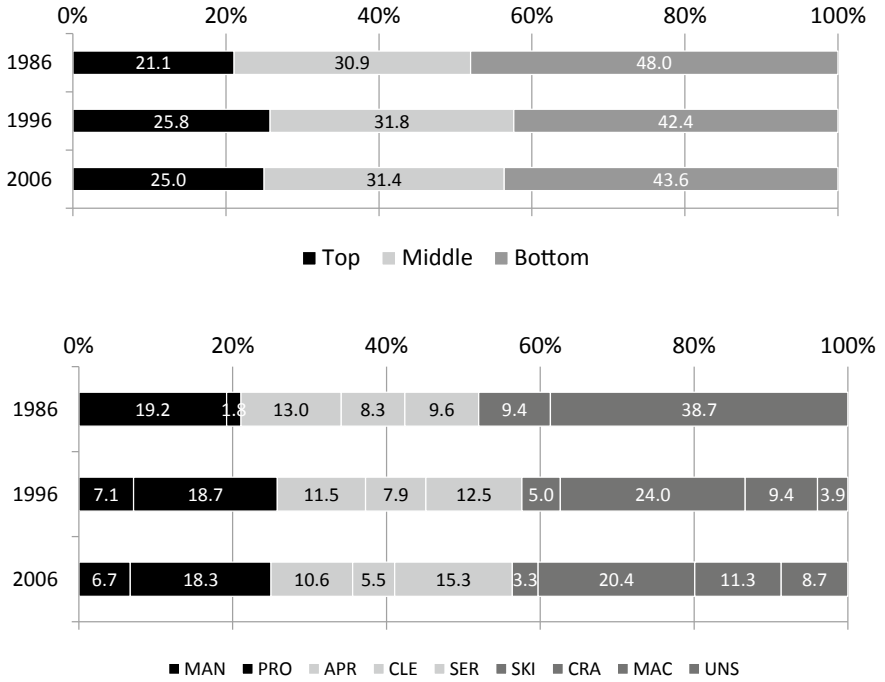

Fig. 3.3 Distribution of occupational groups and change over time

Research on the occupational structures of mostly western cities has shown tendencies of labor forces in advanced capitalist societies toward either social polarization (Sassen 1991), where growth in both high-income and low-income occupations is accompanied by a decline in middle-income occupations or professionalization, where significant growth in high-income and middle-income technical jobs and professional jobs balance out a stagnation or decline of middle- and low-income, semi- or unskilled jobs (Hamnett 1994, 1996). This data suggests that the GCR has not experienced either social polarization or professionalization.

Looking at the individual occupational categories, the GCR has seen a significant expansion of service and sales workers between 1986 and 2006, from 9.6 to 15.32%, due to the expansion of the tourism sector in Egypt (Richter and Steiner 2008). This was offset by the loss of skilled agricultural, forestry, and fishery jobs (9.3 to 3.3%) over the same period due to the expansion of informal settlements into agricultural land. While the combined manager and professional categories grew between 1986 and 2006 (21.1–25%), the supporting occupations—clerks and associate professionals—declined from a combined 21.3–16.1%, contrary to what is expected in the social polarization/professionalization literature (see Pratschke and Morlicchio 2012). As expected with the liberalization of the economy, craftsmen and trade workers have declined from 24 to 20.3% between 1996 and 2006, but traditional industrial jobs and unskilled labor have increased (Fig. 3.3 right).

Table 3.3 Indices of dissimilarity (multiplied by 100) between occupational groups in GCR

1986	MAN	PRO	APR	CLE	SER	SKI	CRA	MAC	UNS
MAN		14	21	22	26	73	35	35	33
PRO	24		26	28	35	75	43	43	41
APR	20	42		9	16	70	23	22	30
CLE	31	48	19		14	69	22	21	30
SER	29	48	19	17		65	14	16	22
SKI	56	69	52	49	45		66	61	63
CRA								15	24
MAC	40	59	24	21	18	45			27
UNS									

1996	MAN	PRO	APR	CLE	SER	SKI	CRA	MAC	UNS
MAN									
PRO	10								
APR	23	24							
CLE	20	21	8						
SER	28	31	18	18					
SKI	77	78	74	76	74				
CRA	42	45	28	31	25	65			
MAC	41	44	25	29	25	62	12		
UNS	34	36	23	24	20	65	18	18	

2006	MAN	PRO	APR	CLE	SER	SKI	CRA	MAC	UNS
MAN									
PRO	10								
APR	23	24							
CLE	20	21	8						
SER	28	31	18	18					
SKI	77	78	74	76	74				
CRA	42	45	28	31	25	65			
MAC	41	44	25	29	25	62	12		
UNS	34	36	23	24	20	65	18	18	

MAN = managers; PRO = professionals; APR = associate professionals; CLE = clerks; SER = sellers and service workers; SKI = skilled agricultural, forestry, and fishery workers; CRA = crafts men; MAC = machine operators; UNS = unskilled workers
NOTE The last three lower ISCO categories in the census of 1986 are grouped in the CAPMAS dataset

Table 3.4 Indices of dissimilarity (multiplied by 100) between top, middle and bottom groups in GCR

	1986	1996	2006
TOP - MID	26	27	24
TOP - BOT	43	42	43
MID - BOT	21	20	25

Tables 3.3 and 3.4 summarize dissimilarity indices for all original ISCO occupational categories as well as between the Top, Middle, and Bottom groupings for the years 1986, 1996, and 2006. Overall, the results of DIs indicate that the top and bottom social categories are more spatially separated than the middle socio-economic categories in GCR. Moreover, the DIs for managers and professionals fluctuated slightly but in general remained steady, whereas the level of residential separation of skilled workers rose sharply between 1996 and 2006. Furthermore, those in middle and elementary occupations increased slightly in general.

3.7 Neighborhoods' Leading Specializations

In this research, we employ LQ data at the scale of the *shiyakhat* to understand each tract's demographic distinctiveness. LQ for managers and professionals ranged from 0.03 to 3.75, and those for the bottom group varied from 0.07 to 2.21 (Fig. 3.4).

LQs for managers and professionals were found in relatively similar proportions in 1986 and 2006. The easternmost neighborhoods, as well as tracts on the western bank of the Nile River, had the highest values accounting for over twice the metropolitan share of top social class employment. These are the areas where the most educated and highly skilled people are located. On the other hand, bottom occupational groups are largely concentrated in fringe areas in Giza and Qalyubia. Specifically, they clustered

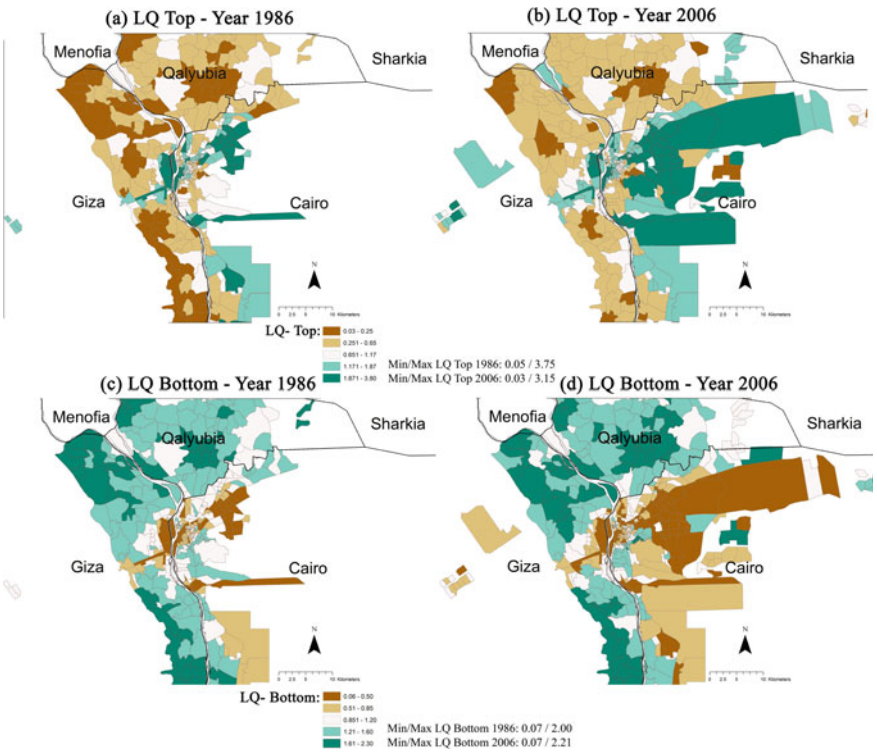

Fig. 3.4 Location quotient maps for the Top and Bottom occupational groups in GCR

to the North, adjacent to the industrial area of Shubra El-Kheima, to the South, in the industrial areas of Helwan and Tora, to the west, for example in Kerdasa and Markaz Al-Giza, and to the east, in Mansheit Nasser over the Muqattam hills. Interestingly, such areas are less urbanized and largely informal.

3.8 Patterns of Socio-Economic Intermixing

The classification of tracts by shares of different socio-economic groups shows a geography of neighborhood socio-economic intermixing in the GCR (see Fig. 3.5 and Table 3.5). The results of this analysis confirm that the spatial segregation of the city is predominantly a result of formal/informal settlement patterns, policy, and mobility. First, the number of exclusively high SES neighborhoods and low-SES neighborhoods are increasing due to the expansion of the city into formal, newly constructed settlements in the eastern desert (new high SES tracts) and into informal settlements on the periphery of the urban fabric (new low-SES tracts). Second, the percentage of the population in the low-to-middle category has declined significantly

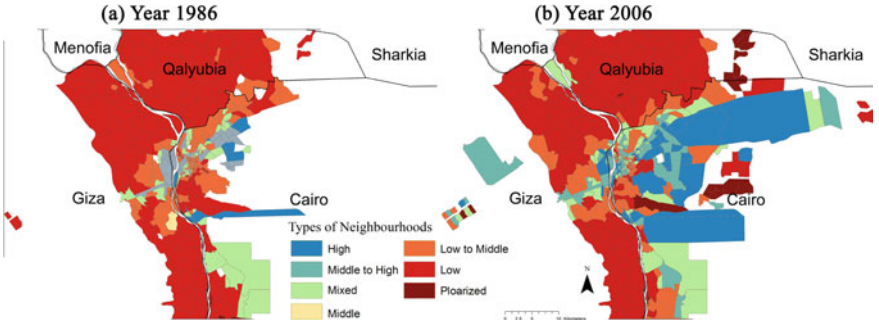

Fig. 3.5 Classification of neighborhoods by socio-economic composition in the GCR

Table 3.5 Percentages of population in tracts by socio-economic composition

	1986	2006	1986–2006 (change)
High	2.44	6.77	4.33
Middle-to-high	11.14	11.77	0.64
Middle	0.23	0.0	−0.23
Mixed	15.03	16.74	1.71
Low-to-middle	38.81	29.98	−8.83
Low	32.31	33.05	0.73
Polarized	0.05	1.70	1.65

between 1986 and 2006. Third, the polarized neighborhood type in which higher class professionals intermingle with lower class professionals has appeared in newly constructed areas.

Overall, low and low-to-middle SES tracts are the most common tract types, housing more than 60% of the GCR's residents. In both 1986 and 2006, low-SES tracts were located on the urban fringe where land and housing are cheaper and informal settlement patterns dominate. These are the areas where predominantly poor rural migrants and newcomers working at the urban core settle. Low-to-middle tracts were incrementally closer to the CBD than low tracts. There are also some smaller pockets of low-SES tracts surrounding downtown that were more prominent in 1986 but lessened by 2006.

In 1986, high and middle-to-high SES tracts were clustered around the CBD on both sides of the Nile and along the northeastern rail line, and by 2006, dominated the sprawling, low-density tracts of the eastern desert, including the new urban communities of Al-Rehab, Al-Shrouq, and New Cairo. These areas correspond to the GCR's formal parts.

Absent in 1986, polarized SES tracts appeared in 2006. Studies from North America and Europe show that such neighborhoods are a consequence of growing income inequality and an outcome of gentrification (Galster and Booza 2007 in Marcińczak et al. 2015). This is not the case in the GCR. The polarized tracts are in

areas where lower income households may find affordable housing before services to the region are improved and higher income households with access to private transportation can take advantage of the suburban characteristics of the area. These areas are also sites of newly constructed, poorly serviced housing for residents displaced by construction projects in the deteriorated, inner portions of the city (Tadamun 2018).

These results reinforce the above analysis that socio-economic segregation is taking place in the GCR, where residents at opposite ends of the socio-economic spectrum are occupying areas increasingly distant from one another. There are higher concentrations of high and middle-to-high SES tracts downtown and along the highways that stretch into the eastern desert. Low and low-to-middle tracts dominate the informal periphery. Mixed and middle-to-high SES tracts are increasingly concentrated around the urban core, suggesting some hints of early stages of gentrification.

In order to further illuminate the spatial location of the top occupational group we divide the total number of people in the top group in the whole GCR in five quintiles, with a color scheme that goes from dark brown (for the first quintile) to light brown (for the fifth quintile) (Fig. 3.6). The results show how many tracts we need to make up the first 20% of the top group; and then to the next 20%, and so on. The fewer the tracts we need to get to the top 20%, the more spatially concentrated the group is.

In this study, neighborhoods with higher numbers of the top group are almost nonexistent over a period of several decades neither in older districts, slums of hope, nor in the peri-urban areas; rather, the first 20% of the top group live in very few neighborhoods nearby major urban centers and on the outer urban periphery, which means that the group is very spatially concentrated.

For example, in 1986, the first 20% of the top group were concentrated in twelve neighborhoods westwards and north-eastwards of central Cairo. In 2006, more clusters of upscale districts have been highlighted in all directions, particularly eastward in the desert land around the city, forming a donut shape with GCR's lowest quintile living in the older housing stock of the center, a pattern consistent with Burgess's monocentric model (1925). Today, these clusters have an ever-growing number of

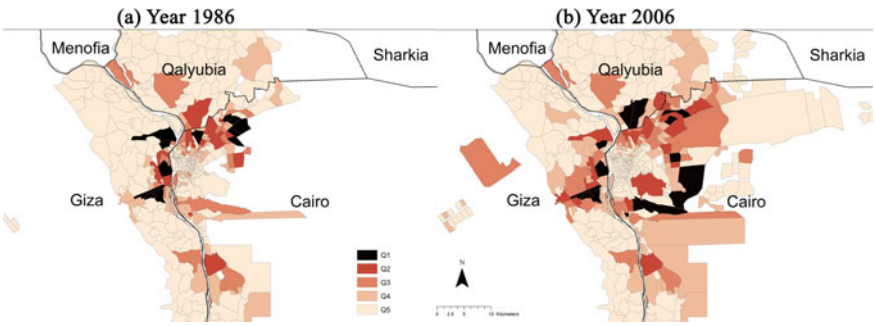

Fig. 3.6 Location of the top occupational group in GCR

upscale venues such as expensive shopping malls and supermarkets that target only individuals with higher purchasing power.

3.9 Conclusions

This chapter examined the role of income inequality in explaining socio-economic residential segregation in the GCR. Using occupational data from 1986, 1996, and 2006 censuses, we measured metropolitan and neighborhood segregation indexes based on shares of SES. To study the dominant occupations in specific neighborhoods, we computed LQs to top and low social classes. Results from our study lead to several conclusions that are discussed in the light of the three questions that guided the analysis.

The first question asked: to what extent is there residential segregation of occupational groups in the GCR? While the overall scale of segregation under neoliberalization is on the low side, the profile of socio-economic intermixing reveals that the poorest groups were more segregated from the wealthy minority than from the middle-income residents. Specifically, the Dissimilarity Index between top and bottom groups was 0.43 in 2006. This level is much higher than those found in North American and Western European cities (mostly range between 0.1 and 0.35) (see, e.g., White 1987; Marcińczak et al. 2015).

In addition, the local patterns of socio-economic intermixing also demonstrate that GCR is highly segregated. The dominance of large clusters of low and high SES tracts reveals a sharp socio-spatial division. Likewise, LQ values show that specific occupational groups are strongly represented in some tracts than others. Overall, it may be true, as Sims (2010: 3) has argued, that ostentatious wealth coexists "side by side with extreme poverty".

The answer to the second question—"Can socio-economic inequality explain residential segregation?"—is that while socio-economic inequality is a prerequisite for socio-economic segregation, the link between the two variables is modest. In other words, greater economic inequality does not necessarily result in clear-cut socio-spatial divisions. Although this is in line with the results seen in Eastern European cities, we acknowledge inherent limitations in our dataset in terms of selected study periods and focusing exclusively on one single case.

Third, we asked: To what extent can the welfare regime and the characteristics of housing provision determine segregation trends in the GCR? The answer is that both the welfare regime and housing policies contribute in residential settlement patterns. There is much evidence that the Egyptian government reduced expenditures on education and social protection and on building public housing. Neoliberal policies aimed to optimize government revenues but steered residential segregation as well. The chronic lack of adequate and affordable housing in many parts of the city has resulted in the concentration of low-income households in undesirable and sometimes dangerous locations where land is cheap and jobs are scarce.

In spite of their bad conditions, the inner city housing stock, as well as informal settlements at the urban fringe, contains about 40% of GCR population (CAPMAS 2006). Low-income households were in favor of these areas because of two reasons: the advantages of affordability and geographic location nearby jobs. Put differently, searching for a decent affordable price for all residents resulted in some intriguing trends in patterns of socio-economic segregation. However, we acknowledge the contextual factor which makes GCR atypical of other cities in the global south. Continued socio-economic polarization may threaten social cohesion, stability, and security.

Finally, we acknowledge that occupational status may be insufficient and sometimes unreliable indicator of socio-economic status (SES) on its own. Additional indicators such as educational level may well be added to explore the relationship between social class and residential segregation further. We also hope to replicate the analysis using the final 2016 census findings when CAPMAS releases them.

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Chapter 4
Social Inequality and Spatial Segregation in Cape Town

Ivan Turok, Justin Visagie, and Andreas Scheba

Abstract Cape Town is widely considered to be South Africa's most segregated city. The chapter outlines the history of social stratification and spatial segregation, including the coercion of colonial and apartheid governments to divide the population by race. Since 1994, the democratic government has lacked the same resolve and capacity to reverse this legacy and integrate the city. The chapter also analyses the changing socio-economic and residential patterns between 2001 and 2011 in more detail. It shows that the extent of segregation diminished between 2001 and 2011, contrary to expectations. It appears that affluent neighbourhoods became slightly more mixed and people in high-status occupations spread into surrounding areas. Some low-income neighbourhoods also became slightly more mixed by accommodating middle class residents. Further research is required to verify and explain these findings.

Keywords Socio-economic segregation · Labour market inequalities · Social mobility · Apartheid city · Residential desegregation

4.1 Introduction

Cape Town is South Africa's (SA) oldest and second largest city. The municipal area covers an extensive territory of 2,461 km^2 with a population of 4.6 million in 2020. The population grew by 2.6% per annum between 2001 and 2011. This is slower than Johannesburg, but faster than other cities in SA. The city's population

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growth has been influenced by its economy. Between 2001 and 2011 jobs increased more slowly than in Johannesburg, but faster than elsewhere, making Cape Town a relatively attractive destination for migration (Turok and Borel-Saladin 2014). Cape Town also has a different demographic make-up from the rest of the country, with coloureds outnumbering black Africans.[1] The population is slightly better educated on average than the rest of SA.

Cape Town's social composition and fractured spatial form bear the strong imprint of its colonial and apartheid history. For three centuries the city was managed to favour a privileged minority at the expense of the indigenous majority, based on the colour of their skin. Between 1948–1994, racial discrimination was taken to extreme as the apartheid regime forced different ethnic groups to live in separate places, with different institutions and infrastructure. This was supposed to prevent inter-racial contact under the pretext of 'separate development'. National laws governing the economy, society and built environment systematically favoured white households and disadvantaged blacks. The result was that race became synonymous with socio-economic status (or 'class'). Whites became increasingly better-off than Indians/Asians, followed by coloureds and then black Africans (Statistics SA 2019).

These odious policies were abolished in 1994, but many scars remain. Gaping urban inequalities continue to impact people's well-being and life chances. The subjugation of blacks was so far-reaching that efforts to undo the damage have had muted effects (World Bank 2018a). Economic growth and state-sponsored affirmative action have done little to erase the social and spatial divides. Social class continues to be intertwined with race, even if the relationship is less direct than it used to be. Wide social and spatial gaps inhibit mutual understanding and trust, and undermine policies to draw people together behind a common purpose, such as tackling the coronavirus crisis. SA's Gini coefficient is the world's highest at 0.65, essentially unchanged since 1994 (Statistics SA 2019).

This chapter analyses segregation between different socio-economic groups. It differs from earlier studies focused on racial segregation (Christopher 2000; Parry and van Eeden 2015). Socio-economic status offers a different lens on spatial differentiation. Although the legal basis of racial segregation has been removed, many tangible effects remain and are slow to change precisely because social stratification is still bound up with race. Deep inequalities across both dimensions are compounded by spatial divides to undermine economic inclusion, social progress and racial integration.

Socio-economic status is intimately related to people's occupation, income and wealth (i.e. their labour market position). This drives residential outcomes today, as households are distributed across the city according to their market power, or ability to buy into neighbourhoods with different attributes, infrastructure and housing types.

[1] We use the racial terminology common in SA in this chapter: black African, coloured, Indian/Asian and white. The term black is used to refer to everyone excluded from the white group privileged under apartheid. These terms, like any racial classifications, are problematic social constructs from a particular era. They continue to be used to monitor progress since democracy. According to the 2011 census, the largest population group in Cape Town was coloured (42.4%), followed by black Africans (38.6%), whites (15.7%) and Indians/Asians (1.4%).

A steep property price gradient inhibits most people's ability to move into more desirable areas. Residential patterns are also influenced by the activities of the state, both in providing low-income housing and in selling public land. Individual lifestyle preferences are relevant too, and affected by stage in the life cycle, family characteristics and cultural backgrounds.

4.2 Determinants of Residential Patterns

The analysis begins with the powerful historic role of the apartheid state in shaping the city's structure. We then consider contemporary economic forces through the property market, followed by the recent tendency of state-subsidised housing to reproduce segregation.

4.2.1 Racial Segregation: 1950s–1980s

Cape Town is a famously divided city, with affluent, leafy suburbs offering exceptional amenities and picturesque mountain and coastal settings, juxtaposed against austere and inhospitable dormitory settlements on the treeless sand-plains of the Cape Flats. At the heart of the city is the vibrant City Bowl, a natural amphitheatre that concentrates enormous wealth, surrounded by the stunning slopes of Table Mountain. A patchwork of intensely crowded informal settlements is barely tolerated in various parts of the city. These unauthorised shanty-towns reflect poor people's efforts to access city opportunities without paying for formal accommodation.

Cape Town's unusual topography and status as a biodiversity hotspot have other consequences for access to housing and segregation. Special nature reserves intended to restrict house-building cover more than 40% of the municipal area. The mountain also shapes the road and rail networks, which have historically guided property investment and acted as barriers between race-based neighbourhoods. The Atlantic Seaboard attracts super-rich international homebuyers and tourists, which inflates house prices throughout the market.

The city's physical footprint expanded most in the second half of the twentieth century, when the economy was booming and the southern and northern suburbs became the preferred residential areas for the white middle and upper classes. Population density declined by about 50% between the 1950s and the 1980s (City of Cape Town 2018). This was when racial ideology was most pernicious and the state directly shaped the city's form. Previous growth was slower and segregation by race was not all-pervasive. During the colonial era, the community was highly stratified and unequal, and white settlers exploited indigenous groups and slaves brought in from Asia and elsewhere in Africa (van Rooyen and Lemanski 2020). Discrimination and subjugation were widespread, but the city was not rigidly demarcated by race. In the early twentieth century, public health concerns (infectious diseases) provided

the pretext for dispossessing most black Africans of their prime land and housing in the urban core and relocating them beyond the urban fringe. This laid the legal and political foundations for intensified segregation policies after the second world war.

The National Party won the 1948 general election and launched a spate of laws to entrench white supremacy using explicit spatial instruments, such as urban planning. People were rigidly classified by race and physically separated through a combination of controls and distinct institutions. The notorious Group Areas Act assigned people to particular places kept apart by buffer strips. The racial hierarchy was entrenched by allocating large central areas to whites, peripheral sites to black Africans and spaces in between to coloureds. Implementation destroyed well-established coloured communities and forced the removal of approximately 150,000 people to townships on the Cape Flats by the end of the 1960s. District Six in the City Bowl was most affected, with 55,000 residents forcefully displaced (van Rooyen and Lemanski 2020).

The impact was compounded by separate local authorities created for different areas, and separate schools, healthcare and public transport systems. This redistributed resources from working-class communities to the well-endowed white suburbs, and deepened the regressive effects of racial segregation (Mabin 2005). For example, the education system for whites was vastly superior to that for blacks, with better-equipped teachers, smaller classes and a more advanced curriculum. It is hard to overestimate the lasting impact on contemporary society.

The Cape was declared a 'coloured labour preference area', which inhibited in-migration by black Africans and explains the distinctive demographics today. Population movements were strictly controlled by pass laws. By the early 1990s, Cape Town was the most segregated city in the country, and less than 6% of the population lived outside the areas designated for their race, such as domestic workers (Christopher 2000).

Two immense districts on the Cape Flats—Mitchells Plain and Khayelitsha—demonstrate the force of the apartheid state. Mitchells Plain was created in the 1970s as a coloured township for middle- and low-income families, 25–30 km from the CBD. Many residents were victims of forced removals. It was laid out with neighbourhood precincts, basic public facilities and wide arterial roads. There was no effort to develop local industrial estates, employment centres or small business units, let alone to restore the social fabric of dislocated communities. Many precincts soon deteriorated with rising unemployment, gangsterism, drug abuse, physical decay and shack housing. The current township population is around 300,000.

Khayelitsha was created during the 1980s for black Africans and envisaged as the 'solution' to two problems facing Cape Town: the rapid increase in rural migrants from the Eastern Cape and overcrowding in other townships. Thousands of people were forcefully relocated to inferior housing and open land, 30–35 km from the CBD. There was even less effort to create local jobs, a commercial centre or public amenities, ensuring that this would become a major poverty trap. The current population is well over 400,000, with high levels of food insecurity, hardship, crime and informal housing. High transport costs and arduous journeys add to the burden people face in accessing jobs elsewhere in the city.

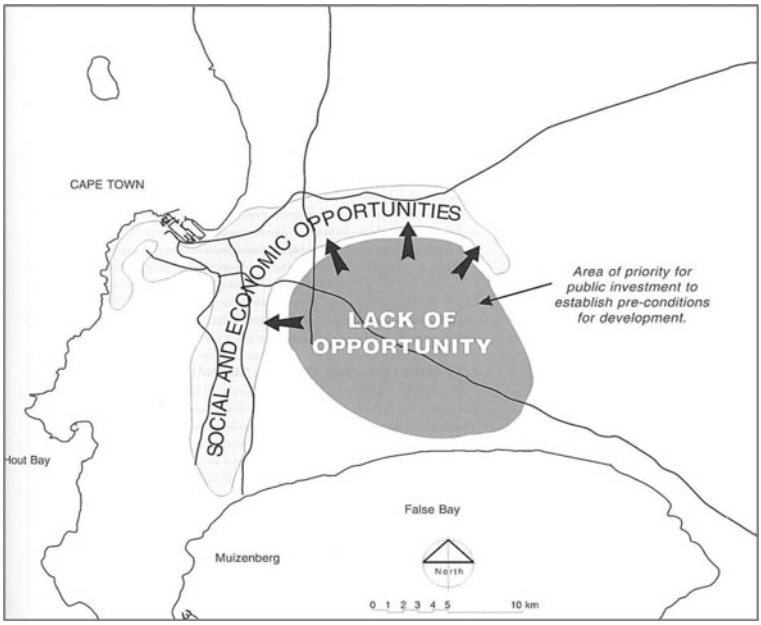

Fig. 4.1 Cape Town's uneven development. *Source* David Daniels conference presentation, April 1993

The stark challenge facing the post-apartheid government was illustrated by a map used by a senior planner from the city during a presentation in 1993 (Fig. 4.1). It shows the skewed concentration of opportunities in the historic core, with over 80% of all the jobs in the city, despite housing only 37% of the population. The Cape Flats is portrayed as a desert, with black communities locked out of job-rich locations and suburbs with good schools and quality services. The four arrows are poignantly unidirectional, indicating the imperative for the democratic government to enable Cape Flats residents to access the resources in the core. There is no hint of potential resistance from the suburbs to a more inclusive, integrated city. The other telling feature is the label pointing to the priority investment needs of the Cape Flats for economic and human development.

4.2.2 Market-Led Development: 1990s–2020

In practice, the post-apartheid government did not address the distorted form of SA cities with much determination. Apartheid legislation was withdrawn and institutions reorganised, but there wasn't an equivalent commitment to push through a new vision for integrated cities. One reason was the stagnant economy following international sanctions and the turmoil of the transition. So the resources—public

or private—weren't readily available to invest in major public infrastructure and catalytic projects for urban restructuring. The victorious political party was an amalgam of ideologies, and the government—a compromise of different interests. The general mood and leadership disposition were towards reconciliation rather than retribution or restitution. Many progressive policies were approved, but not matched by concrete action (Statistics SA 2019). Institutional practices were often conservative and poorly coordinated across government, and bureaucratic inertia prevailed over calls for transformation.

The new generation of local political leaders lacked experience to formulate a coherent response to their divided cities and towns, and to challenge vested interests. There was an implicit political settlement with white middle- and upper-class households not to disrupt their lifestyles if they accepted democratic rule and continued to pay their taxes. The end of apartheid also coincided with a broader global ideological shift away from planning and state intervention towards the market and a lean state. This further discredited the spatial planning profession (already tainted from its role under apartheid) and creative thinking around urban compaction and integration.

Private investors and developers had a relatively free hand to do as they pleased. They could deliver tangible products and jobs, so decision-makers supported almost any kind of property development. Parliament passed the Development Facilitation Act that streamlined regulatory procedures and enabled municipal objections to be bypassed. Many conventional free-standing houses, shopping malls and business complexes were built at low densities in the suburbs and beyond (Turok et al. 2019). They were targeted at the (white and coloured) upper and middle classes, because demand was strong from the increase in white-collar workers, managers, public officials and professionals, supported by bank lending. Some took the form of gated estates and elite enclaves with privatised security arrangements to restrict access to ordinary citizens.

The private sector built about 10,000 housing units a year in Cape Town during the late 1990s and 2000s. The economic slowdown from 2008 onwards reduced this by a third. These suburban developments contradicted the new municipal spatial plans that envisaged densification, infill development and mixed land-uses so as to encourage urban integration, more efficient land use and better access to public transport for workers from the townships (City of Cape Town 2018). But there was no political appetite to negotiate concessions from developers, who naturally focused on unencumbered greenfield sites: "there continues to be sprawling development towards the edge of the city" (City of Cape Town 2018, p. 217). Key locations included the northern suburbs, west coast, Kuils River and Mitchells Plain, with smaller pockets in the southern suburbs and Somerset West. The public sector often had to fund the infrastructure, even though developers profited from the uplift in land values. The outward drift diverted public investment from upgrading and intensifying underperforming industrial and residential areas surrounding the central city.

A distinctive feature of Cape Town is the strength of the CBD as the principal economic node with approximately 200,000 jobs. Other SA cities have experienced an exodus of property investors and occupiers to satellite centres in the suburbs (Turok et al. 2019). Institutional property owners took early action in partnership with the

municipality to prevent 'crime and grime' from causing business relocations. The unique qualities of the City Bowl foster a mixture of diverse activities—tourism, leisure, business and professional services, government functions and higher education—that feed off each other to spur growth and investment. This has coincided with a shift in fashion within the housing market towards apartments in well-located, well-managed areas. The city's historic core has been the biggest beneficiary. Figure 4.2 shows the concentration of apartments in and around the CBD, followed by the main transport corridors in the southern and northern suburbs. The distribution of free-standing houses is quite different.

Yet, the commercial success of the CBD has inflated property prices and promoted gentrification in surrounding working-class districts, causing the displacement of poorer households. The shortage of affordable housing forces clerical and hospitality workers, shop assistants, security staff and cleaners to undertake lengthy commutes from the townships. Meanwhile, the transformation of Johannesburg and other city centres has improved access to jobs and low-income housing for black working-class communities. A final point is that across all of Cape Town's economic nodes, the growth in labour demand and earnings has not been sufficient among lower ranking occupations to lift these groups out of poverty, to narrow the income distribution or

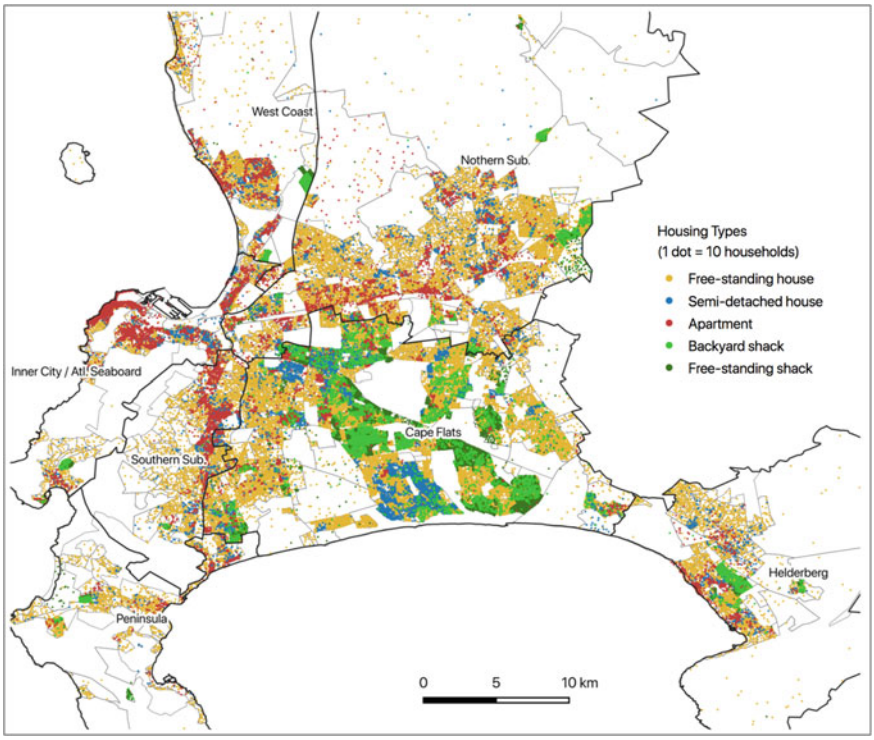

Fig. 4.2 Different housing types, 2011. *Source* Census 2011, small area layer

to encourage private housing developers to broaden their product range to meet the majority's needs for affordable accommodation.

4.2.3 State-Led Housing: 1990s–2020

The government has acted with unusual resolve to provide housing directly, using fully subsidised contractors. Apartheid denied blacks the right to own property in the cities and stopped building them houses to discourage urbanisation. This caused serious overcrowding and gave rise to many squatter settlements. The 1994 government saw decent housing as the key to reducing squalor and restoring dignity and respect. Housing was treated as part of a 'social wage', along with welfare grants and free basic services. Households below a certain income were promised a free housing unit on its own small plot.

Direct state provision gave the government control over the quantity of housing it could deliver, without relying on the vagaries of private developers. Ambitious targets were set and broadly met. About 5,000 government houses have been built in Cape Town every year since the early 2000s, amounting to a quarter of all housing supplied, and almost half of the formal supply (City of Cape Town 2018). This could have changed the city's physical growth pattern if it was carefully targeted.

There have been undoubted benefits for households moving out of shacks or overcrowded family homes through improved privacy, protection from the weather, internal services, children's safety and an asset for security. However, the state has borne the full cost, letting the banks and private developers off the hook. Most houses have been built on the outskirts to economise on the land. Large greenfield sites have enabled mass construction of standardised units. A separate production process for private sector housing has kept the occupiers far apart. This has avoided NIMBY resistance, but contradicts the goal of racial diversity and integration.

Most government housing in Cape Town has been built around the periphery, in Delft, Khayelitsha, Mitchells Plain, Kraaifontein and Somerset West. This is far from jobs, good schools, training colleges and other opportunities for advancement. The municipality estimates that poor households spend up to 40% of their disposable income travelling to work, which "inhibits upward socio-economic mobility and deepens household dependency. These features are common to many SA cities but tend to be more acute in Cape Town" (City of Cape Town 2018, p. 215). Many households are trapped in marginal locations because they are not allowed to sell their homes for eight years and have not received their title deeds (Turok 2016). Many build shacks in their backyards to generate rental income (Scheba and Turok 2020). Their concentration on the Cape Flats is shown in green in Fig. 4.2.

A National Treasury review concluded that housing policy: "reinforces the legacy of apartheid and relegates the poor to areas that are far from economic opportunity" (GTAC 2016, p. 1). There is public land available within Cape Town's historic core that could be developed for affordable housing. Some are large parcels that

could accommodate tens of thousands of dwellings, including Culemborg, Ysterplaat, Wingfield, Youngsfield and Denel. There has been insufficient determination to release these strategic assets in the public interest (Turok 2016). Civic activists have begun to target empty buildings, golf courses and undeveloped land to protest at the inertia (Turok et al. 2019).

4.3 Inequality in the Labour Market

4.3.1 Data and Methods

The labour market has a major influence on housing patterns. Employment and occupation data were drawn from the 2001 and 2011 Censuses—the most accurate and most recent source of neighbourhood information. Occupations were coded according to the SA Standard Classification of Occupations (SASCO).[2]

The municipal boundary is used to define the extent of Cape Town. This approximates to the functional labour market area because it includes settlements beyond the continuous built-up area. This reflects the political imperative post-apartheid to incorporate outlying suburbs, commuter belts and dormitory townships with the core city in order to permit effective strategic planning and resource redistribution ('one city, one tax base'). A minor technical issue is that some enumeration areas shifted between years, so the internal configuration of maps between 2001 and 2011 is slightly different if one looks at specific sub-places very closely. This doesn't affect broad spatial trends. A few sparsely populated sub-places were excluded from the analysis, taking the number of sub-places to 858 in 2011.[3] Sub-places range in geographical size with larger, more sparsely populated sub-places generally located on the periphery. The median population in 2011 was 10,140 persons and the median area was 0.542 km^2.

4.3.2 Occupational Structure

The growth rate and structure of a city's economy determine the demand for labour, and therefore the occupations of the local workforce. This includes the distribution

[2]Detailed occupation data for Census 2011 was released in late 2017, thoroughly cleaned with no incomplete information. The occupation data for 2001 included 7% of all responses as 'undetermined'. The effect of such differences in data management between the Censuses is unclear. The problem is fairly common in analysing cross-sectional household data which spans lengthy periods. We omit undetermined responses for greater consistency between years when estimating the results in the figures and tables that follow.

[3]Sub-places with less than 10 economically active persons are arguably too small for a sensible classification by occupation and hence were omitted.

of income, job security, ability to obtain home loans, and therefore the demand for housing. SA has a very dispersed occupational structure with a very wide range of earnings (Statistics SA 2019). Highly qualified people in high-status jobs command a sizeable premium over those with fewer skills in lower ranking positions.

Table 4.1 and Fig. 4.3 show the broad occupational changes in Cape Town between 2001 and 2011. The ranking classifies almost a fifth of all jobs in the 'top' occupational category. This assessment is very similar to the World Bank's (2018b). They add that the top skill quintile earns almost five times as much as low-skilled workers. This is a powerful driver of unequal demand for housing and attractive neighbourhoods in the city. Real wage growth in SA has been skewed towards high skills over the past two decades (Statistics SA 2019; World Bank 2018a). This has widened income inequality and is bound to have affected spatial divides within cities.

Table 4.1 also indicates sizeable growth in the number of workers in the top occupations between 2001 and 2011. This reflected very strong growth among legislators, senior officials and managers (their numbers more than doubled), and weaker growth among professionals. A similar pattern is evident in Johannesburg. It is striking that the rate of increase in senior officials and managers was faster than for any other

Table 4.1 Changes in the occupation structure of Cape Town, 2001–2011

	Major occupation group	2001	2011	Change	% change (%)
Top	Legislators; senior officials and managers	65,901	149,445	83,544	127
	Professionals	85,269	108,020	22,751	27
Middle	Technicians and associate professionals	100,638	136,224	35,586	35
	Clerks	129,961	191,474	61,513	47
	Service workers; shop and market sales workers	107,380	223,591	116,211	108
	Skilled agricultural and fishery workers	8,191	10,344	2,153	26
	Craft and related trades workers	110,918	154,238	43,320	39
Bottom	Plant and machine operators and assemblers	75,086	65,523	−9,563	−13
	Elementary occupations	188,842	281,608	92,766	49
Undetermined		66,815	0		
Total		939,001	1,320,467	381,466	41

Source Census 2001 and 2011; authors' own estimates

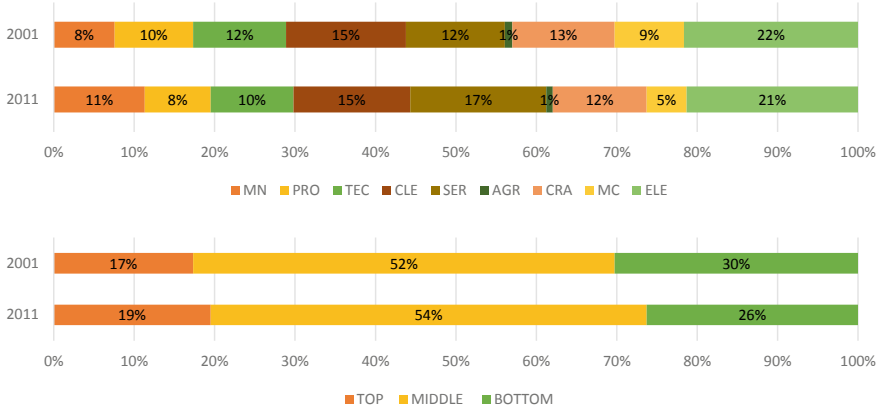

Fig. 4.3 Changes in the share of occupations in Cape Town, 2001–2011. *Source* Census 2001 and 2011; authors' own estimates

occupation. It was partly a reflection of strong growth in the public sector during this period, as the administration expanded alongside demands for additional service delivery from an enlarged local population.

Table 4.1 also shows the strong growth in mid/low-level service occupations, including retail sales, wholesale and hospitality, which offer limited opportunities for progression into better-paid jobs. The only job losses were among plant and machinery operators and assemblers, reflecting the impact of deindustrialisation. Manual jobs in manufacturing have conventionally provided important routes out of poverty for working-class communities. Jobs in elementary occupations (including security staff and domestic workers) increased slightly faster than the average. They tend to be low paid and offer poor prospects for advancement. Table 4.1 provides some evidence of labour market polarisation, with the strongest growth among high- and low-skilled occupations. The rate of unemployment (narrowly defined) remained close to 25% over the period (World Bank 2018b). Low paid and unemployed groups invariably struggle to compete in the housing market and end up in unsatisfactory and informal accommodation, unless they can get government housing.

SA's economy experienced moderate growth during the 2000s, but it has faltered since the 2008 global recession. Total employment in Cape Town increased from 939,000 in 2001 to 1,320,000 in 2011. This partly reflected population growth and the demand for additional consumer goods and services, along with extra public services. Growth in tradable goods and services (arguably more productive sectors) was weaker. So, Cape Town's compound annual employment growth rate was 3.5%, compared with Johannesburg's 4.8%.

4.3.3 Index of Dissimilarity

An important question arising from a city's occupational profile is how directly this translates into residential patterns of social privilege and disadvantage. A city with a polarised labour market will not be highly segregated if many of its neighbourhoods are socially mixed. Table 4.2 presents the dissimilarity index (DI), which captures the degree of residential segregation between occupations in 2001 and 2011. The cells in the bottom-left part of the table show the DI values for 2001 and the cells in the top right show the values for 2011. The estimates include a category for the unemployed, because the sheer scale of joblessness cannot be ignored. However, the unemployed are excluded in the subsequent figures and tables as well as in the DI values for the top, middle and bottom occupations in Table 4.2. The Johannesburg chapter follows the same approach.

Table 4.2 reveals that Cape Town was extremely spatially divided by occupation in 2001. The DI values imply that 67% of residents in the top occupations in 2001 would have had to move in order to achieve an even distribution of top and bottom occupations across the city. The equivalent number in Johannesburg was only 48%. This is a huge difference between the two cities, with Cape Town far more socially segregated than Johannesburg. Cape Town's polarised labour market was matched by a partitioned city with the social make-up of different neighbourhoods being quite distinctive.

Table 4.2 Indices of dissimilarity (multiplied by 100) between major occupations in Cape Town, 2001–2011*

		DI 2011												
		MN	PRO	TEC	CLE	SER	AGR	CRA	MC	ELE	UNE	TOP	MID	BOT
DI 2001	MN		16	21	24	36	38	44	51	53	63			
	PRO	15		27	32	44	45	52	59	60	69			
	TEC	22	28		13	26	30	34	39	45	56			
	CLE	33	40	16		22	25	27	33	41	51			
	SER	38	43	25	23		29	16	25	22	36			
	AGR	62	66	55	53	40		28	32	38	48			
	CRA	55	60	40	30	25	41		17	20	31			
	MC	64	69	49	39	33	48	17		27	34			
	ELE	65	69	54	47	32	34	26	30		25			
	UNE	72	76	62	56	42	42	35	36	18				
	TOP												33	55
	MID											39		27
	BOT											67	34	

Notes *MN* Managers; *PRO* Professionals; *TEC* Technicians; *CLE* Clerks; *SER* Service and sales workers; *AGR* Skilled agricultural workers; *CRA* Crafts and related trade workers; *MC* Plant and machine operators; *ELE* Elementary occupations

Source Census 2001 and 2011; authors' own estimates

Table 4.2 shows that professionals were the most segregated group, and consistently more so than senior officials and managers. The same applied in Johannesburg, albeit not to the same extent. Furthermore, the difference between top and middle occupations was larger than the gap between middle and bottom occupations in both cities in 2001. Therefore, the high-status groups tended to be separated off in enclaves from everyone else, rather than the low-income groups. Among the low-status categories, unemployed people were consistently more segregated from other groups than anyone else. They were more likely to be confined to settlements with other unemployed people. This is unsurprising considering their weak economic position, as explained above.

An important and original finding from Table 4.2 is that the level of segregation in Cape Town appears to have declined between 2001 and 2011. By 2011, the DI values imply that 55% of residents in the top occupations would have had to move to eliminate segregation—a big reduction over the decade from 67% in 2001. The apparent desegregation occurred across the board. It was not confined to particular occupations. This is surprising considering that the labour market seemed to become more polarised. A steep house price gradient also made it difficult for lower income groups to move into more desirable suburbs. Johannesburg's DI score between top and bottom occupations was 47% in 2011, so the level of segregation hardly changed. Summing up, there was noticeable desegregation in Cape Town during the 2000s, although it remained more segregated than Johannesburg. The two cities seem to have experienced quite different tendencies.

High but falling levels of segregation in Cape Town are borne out upon closer inspection of the DI scores in Table 4.2. The residential difference between pairs of occupations diminished in almost every case. Further evidence is available in most of the maps shown below. The desegregation trend appears to be consistently stronger than in Johannesburg. The veracity and reasons for this need further investigation. Assuming it is correct, part of the explanation may be that Cape Town was much more segregated to begin with, so there has been a degree of 'catch-up' underway.

4.4 Socio-economic Segregation

4.4.1 Occupational Location Quotients

Initial evidence of spatial segregation from the DI matrix in Table 4.2 is carried forward into maps of location quotients (LQ) for the top and bottom occupations in Figs. 4.4 and 4.5, respectively. Sub-places within Cape Town with a LQ score above (below) 1 highlight where an occupation was over-(under-)represented. For example, a LQ score of 2.5 implies that an occupation was 2.5 times more concentrated in that particular sub-place compared to the city-wide average. Hence, areas

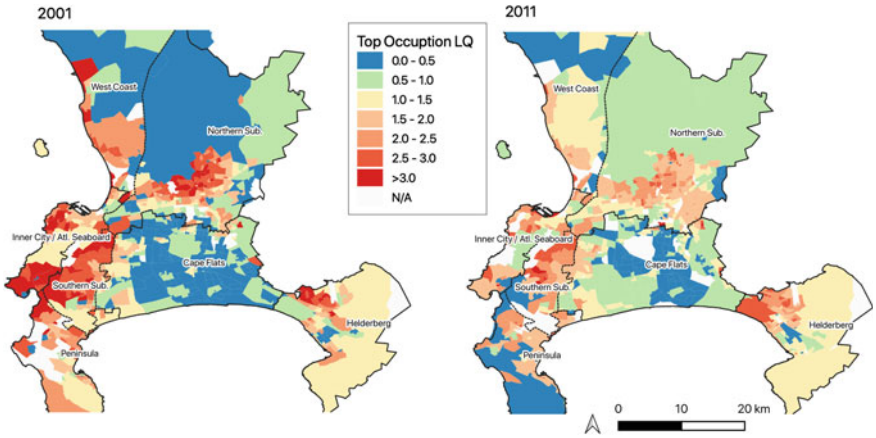

Fig. 4.4 Location quotient of top occupations in Cape Town, 2001–2011. *Source* Census 2001 and 2011; authors' own estimates

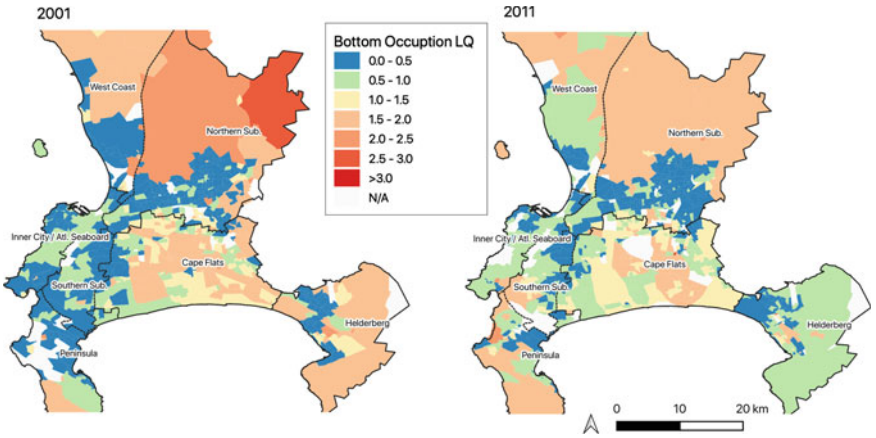

Fig. 4.5 Location quotient of bottom occupations in Cape Town, 2001–2011. *Source* Census 2001 and 2011; authors' own estimates

shaded dark orange and red (LQ > 2) on the map highlight where there is a disproportionate concentration of those occupations, whereas areas shaded blue reflect under-representation (LQ < 0.5).

Figure 4.4 shows how individuals in top occupations (i.e. managers and professionals) were clustered within neighbourhoods in Cape Town's historic core and suburban corridors. In 2001, this included almost all the Southern Suburbs, most of the City Bowl, the Atlantic Seaboard and the Northern Suburbs. Other important nodes included Somerset West in the south-east, and Milnerton and Bloubergstrand along the West Coast. All these areas remained affluent in 2011, although the degree

of concentration of top occupations diminished, i.e. changing from mostly red in 2001 (LQ > 3) to orange in 2011 (LQ > 2). A few adjacent areas also seemed to increase their share of people in top occupations (especially in the Northern Suburbs and Helderberg).

It could be that the strong increase in people in senior positions (shown in Table 4.1) contributed to the spatial deconcentration by spreading into surrounding neighbourhoods. This could have been prompted by shortages of the existing stock and restrictions on new house-building in well-off areas, perhaps reflecting higher land prices, NIMBY resistance or locals displaced by international buyers. Obtaining planning approval in the southern suburbs, City Bowl and Atlantic Seaboard is notoriously difficult. Another explanation could be that affluent households moved out of older, detached properties in neighbourhoods showing signs of decay and into modern properties, gated communities or apartments elsewhere. If they were replaced by households with slightly lower incomes, this would contribute to the spatial deconcentration of the rich. Neighbourhoods in the south such as Wynberg, Muizenberg and Mowbray, and the Voortrekker Road corridor in the north, have experienced such changes in recent years. This could coincide with life cycle changes, such as older people moving into flats when their children leave home and being replaced by younger families.

Workers in less-skilled occupations tended to live in peripheral locations. Clusters of blue-collar workers dominated townships on the Cape Flats, along with some smaller settlements to the north of the city. Low-skilled groups seem less concentrated than high-status occupations, with LQs all below 2.5. This is partly because there are simply more of them, so they cannot be so physically concentrated. In addition, the number of low-skilled workers living in the vicinity of affluent suburbs has increased where informal settlements or townships exist nearby, such as Imizamo Yethu and Hangberg near Hout Bay, Masiphumelele and Ocean View near Sun Valley, and Dunoon and Joe Slovo Park near Milnerton. There are not many of these settlements, so demand to live in them is high because of their access to suburban jobs. Domestic workers, gardeners and security guards living in their own quarters on the sites of affluent households could also increase low-wage workers in the suburbs. Of course, the co-existence of different income groups in the same sub-places does not mean much actual social mixing or integration occurs.

4.4.2 Socio-economic Status

The concentration of people in the top, middle and bottom occupations can be used to rank neighbourhoods according to their socio-economic status (SES). Our SES ranking is based on the proportion of individuals in each category and follows a similar approach to the Johannesburg chapter. Figure 4.6 divides the city into sub-

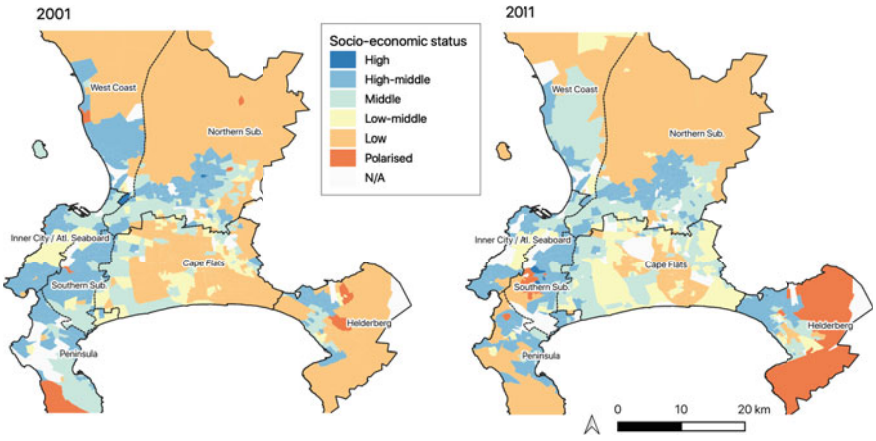

Fig. 4.6 Socio-economic status of neighbourhoods in Cape Town, 2001–2011. *Source* Census 2001 and 2011; authors' own estimates

places with a high, high-middle, middle, low-middle or low SES.[4] Polarised SES is a residual category with considerable socio-economic mix.

Figure 4.6 confirms the highly segregated character of Cape Town, with a stark divide between the historic core and the Cape Flats. The status of most neighbourhoods appears to have been stable over time, with two exceptions. First, some parts of the Cape Flats changed from low to low-middle SES, or from low-middle to middle SES. Examples are Pelican Park, Blue Downs and Mitchells Plain. This appears to have come about partly through new housing schemes, both private and government-subsidised. Other heavily populated places remained as low SES, particularly Khayelitsha, Philippi and Delft. Second, selected parts of the Southern Suburbs apparently shifted from high to low or polarised SES. The extent of this phenomenon seems to be overstated on the map by the inclusion of sparsely populated sub-places around the mountain and by the strong growth of a few informal settlements and townships, as mentioned above.

The earlier discussion of Fig. 4.4 suggested that people in high ranking occupations became slightly more dispersed in 2011 than in 2001. This is less apparent when SES is considered (Fig. 4.6). It seems that the status of the most prestigious neighbourhoods was not diminished, even if the gap with other parts of the city did narrow slightly.

Very few areas had a polarised SES. They included agricultural areas east of Helderberg and the Groot Constantia Wine Estate in the Southern Suburbs. There is little or no actual residential mixing in these places. Segregation prevails through

[4]SES categories were defined as follows: High SES (top >= 40%; middle <= 60%; bottom <= 20%), High-middle SES (top >= 25%; middle >= 25%; bottom <= 25%), Middle SES (top <= 35%; middle >= 50%; bottom <= 35%), Low-middle SES (top <= 25%; middle >= 25%; bottom >= 25%) and Low SES (top <= 20%; middle <= 60%; bottom >= 40%). Polarised SES is a residual category.

gated communities for the rich and housing compounds and informal settlements for farm workers. Poor communities here may live closer to affluent residents than in most suburbs, but they are kept apart by high walls and access controls.

4.4.3 Distribution of the Top Socio-economic Group

Figure 4.7 shows the absolute size and concentration of people working in well-off occupations across the city. Sub-places were divided into five quintiles depending on their share of individuals in the top occupational category. In 2001, the top 2% of sub-places with the highest concentrations of managers and professionals contained 20% of this group. This included a sizeable cluster in the Southern Suburbs (Rondebosch, Newlands, Claremont and Wynberg), a few neighbourhoods around the City Bowl (Gardens and Sea Point) and the Northern Suburbs (Pinelands, Edgemead, Tableview and Durbanville). The pattern was very similar in 2011, although it increased slightly to 2.5% of all sub-places, including affluent neighbourhoods in Hout Bay, Milnerton and Brackenfell.

A big contrast with Johannesburg is the CBD. Cape Town's City Bowl has become an increasingly desirable residential location for high income earners, as explained earlier. Its diverse amenities and growing traffic congestion for suburban commuters have added to its attractions as a place to live, work, study, visit and play (Turok et al. 2019).

Changes in the distribution of sub-places in the second and third quintiles were more noticeable. Several areas in the Cape Flats (such as Mitchells Plain) and around Somerset West seem to have moved up in status. Casual observation suggests that this could be linked with gradual upgrading of selected neighbourhoods in the former

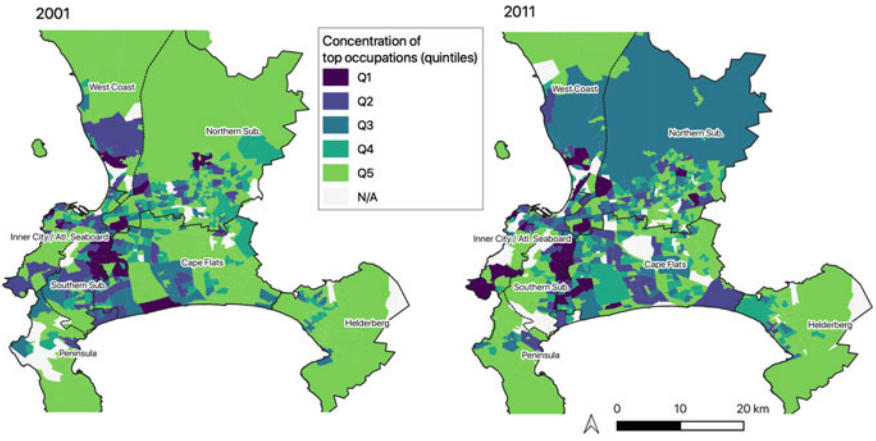

Fig. 4.7 The concentration of the top socio-economic group in Cape Town, 2001–2011. *Source* Census 2001 and 2011; authors' own estimates

and new private housing in the latter. A few large sub-places on the city's northern periphery also raised their status. This has a visible effect on the maps, but the real impact is quite limited because most areas were very sparsely populated in 2001 and a few middle income housing projects and wine farms that opened during the following decade could have had this effect.

4.5 Conclusion

Cape Town remains sharply divided by socio-economic status. Social inequalities continue to be aligned with race, although the causes have shifted from apartheid controls to the economy and labour market. The scale and nature of employment growth have not been sufficient to lift many people out of poverty and into better-off social strata. Geography reinforces social divides through the gulf in opportunities available to residents of different neighbourhoods. Townships on the Cape Flats are literally worlds' apart from the southern and northern suburbs, where the contours of affluence remain the same.

Despite the economic, social and spatial barriers to change, there appears to have been a noticeable reduction in the degree of segregation between 2001 and 2011. This is more substantial than in Johannesburg. The index of dissimilarity and location quotients both indicate that the extent of socio-economic segregation diminished. On the one hand, it appears that the concentration of top occupational groups was somewhat diluted as some of them spread out into surrounding neighbourhoods. On the other hand, a number of lower income neighbourhoods seemed to move up in status.

It is important to validate this analysis with further investigation. Other economic and social trends suggest increasing polarisation and a steeper social gradient between the suburbs and townships, yet the statistical analysis presented here indicates a narrowing of the gap. It is unclear whether the decline in segregation is a real phenomenon, or more of a construct arising from the indicators and spatial units used to measure it. The apparent desegregation needs additional analysis, including the application of different socio-economic indicators and the use of different sized spatial units. Drilling deeper should help to identify which neighbourhoods and social groups have been most affected, and by how much conditions have changed.

In addition, it is vital to improve understanding of the reasons for these shifts and the detailed mechanisms involved. Research and policy concerned with spatial segregation tend to focus on changes in land-use and the built environment, particularly the housing stock. This is highly visible and relatively easily measured. The assumption is that new housing developments are the main driver of change. Sometimes this is extended to include the conversion, upgrading, extension or redevelopment of existing buildings, in recognition that the social make-up and number of households in a neighbourhood are affected by in situ property dynamics and not simply new greenfield investments.

This analysis is important and needs to be extended to investigate the less visible social processes underway within and between neighbourhoods, including detailed forms of household movement, household formation and in situ occupational mobility, upwards and downwards. Unfortunately, the information available on these trends is limited. Changing patterns of segregation are bound to be the outcome of a complex interplay between alterations to the built environment and intricate social shifts. For example, new house-building may set in train long filtering chains that affect multiple households and neighbourhoods in unexpected ways. A better grasp of these dynamics is essential for more effective policies to tackle spatial divides. There are few more important research agendas in SA today.

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Chapter 5
Income Inequality and Socio-economic Segregation in the City of Johannesburg

Richard Ballard and Christian Hamann

Abstract This chapter analyses income inequality and socio-economic segregation in South Africa's most populous city, Johannesburg. The end of apartheid's segregation in 1991 has been followed by both continuity and change of urban spatial patterns. There is a considerable literature on the transformation of inner-city areas from white to black, and of the steady diffusion of black middle-class residents into once 'white' suburbs. There has been less analysis on the nature and pace of socio-economic mixing. Four key findings from this chapter are as follows. First, dissimilarity indices show that bottom occupation categories and the unemployed are highly segregated from top occupation categories, but that the degree of segregation has decreased slightly between the censuses of 2001 and 2011. Second, the data quantifies the way in which Johannesburg's large population of unemployed people are more segregated from top occupations than any of the other employment categories, although unemployed people are less segregated from bottom occupations. Third, over the same period, residents employed in bottom occupations are less likely to be represented in affluent former white suburbs. This seemingly paradoxical finding is likely to have resulted from fewer affluent households accommodating their domestic workers on their properties. Fourth, although most post-apartheid public housing projects have not disrupted patterns of socio-economic segregation, some important exceptions do show the enormous capacity of public housing to transform the spatial structure of the city.

Keywords Johannesburg · Apartheid · Socio-economic segregation · Townships · Suburbs

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5.1 Introduction

The City of Johannesburg is the largest of eight metropolitan municipalities in South Africa with respect to population size and economy. It sits within a broader city-region of 15 million people in the province of Gauteng, including the metropolitan municipalities of Tshwane to the north and Ekurhuleni to the east. The municipal jurisdiction of Johannesburg measures 1,648 km^2 and includes urban, peri-urban and agricultural land uses. The population of Johannesburg grew by about 3% per annum between the 2001 and 2011 national census counts (from 3.2 to 4.4 million people). In line with national population composition, the majority of Johannesburg's population is black[1] (78%). The second-largest population group, whites, constituted 12% of Johannesburg in 2011. Indians and Coloureds[2] make up 6% and 4% of population, respectively. Education outcomes are improving; for example, the proportion of adults who have not been to school has fallen between 2001 and 2011 and the proportion of adults with tertiary education has increased. The average annual household income in Johannesburg (adjusted for inflation) increased by 2% per annum between 2001 and 2011 (Statistics South Africa (Stats SA) 2012a), but increases are highly uneven between population groups and across space.

Johannesburg was subject to intensive social and spatial engineering since its origins as a gold mining town in 1886. Given the emphasis that apartheid (1948–1994) placed on racial segregation, many analyses of spatial transformation in Johannesburg have focused on the endurance or breakdown of racial segregation (Beavon 2004; Christopher 1994; Crankshaw 2008). This chapter examines residential segregation between socio-economic groups rather than the more familiar focus on racial segregation. In doing so, we do not seek to claim any primacy of socio-economic segregation, but rather to consider the relationship between various kinds of social and spatial stratifications and the drivers of dominant residential patterns. In fact, it is not possible to separate social and spatial inequalities from each other or from racial segregation in the South African context. In the post-apartheid era, legal drivers of racial segregation have been abolished, but actual patterns of racial segregation are slow to change precisely because of various forms of socio-economic segregation and stratification. Furthermore, even where racial desegregation does occur, these processes do not necessarily disrupt socio-economic segregation.

[1] Statistics South Africa records data against four main population groups. Respondents self-identify as black, coloured, Indian/Asian or white.

[2] Whereas the term coloured in North America is a dated synonym for African Americans, in Southern Africa the meaning is quite different. It came to refer to mixed ancestry populations who were (in Apartheid's convoluted racial classifications) neither European (white) nor bantu (black), although they could have a heritage of both.

5.2 Drivers of Dominant Residential Patterns

5.2.1 Racial Segregation

Johannesburg is a city of extremes, with densely populated working class townships[3] (such as Diepsloot, Alexandra, Soweto and Orange Farm) juxtaposed against some of the richest neighbourhoods in Africa (Sandton and surrounding areas). Although apartheid formally ended in 1994, a century of white minority rule continues to affect many urban patterns. Apartheid's policies of racial segregation resulted in the division of residential areas between four different race groups: black, white, Indian and coloured. This shaped where new migrants to cities could settle and whether people could migrate to cities at all (many black people were forced to stay in rural 'homelands'). These policies also caused the relocation of large numbers of established urban residents. In the 1950s, for example, about 72,000 black people were moved from established areas of Johannesburg to the new settlement of Soweto on the south-western periphery of the city (Christopher 1994). Notwithstanding desegregation in many Johannesburg suburbs since the fall of apartheid, the overall population distribution and associated socio-economic patterns are tenacious (Fig. 5.1). By 2019, Soweto contained about 1.8 million people or a third of the city's population (Quantec 2018). Soweto, along with other townships, remains almost entirely black and poor relative to northern suburbs.

During the apartheid era, the white minority government tried to create a strong overlap between race, socio-economic status and space. Until 1980, better paying job categories were mostly reserved for whites, resulting in an income ceiling for black employees. Much more was spent on the education of white children than of other city dwellers (Seekings and Nastrass 2005). Until the 1980s, most black people could not own property in urban areas, including the homes they lived in. These and many other policies ensured that spaces intended for black residents were also working-class spaces, with their residents having less capacity to earn and acquire assets than white residents of white-designated areas. As a result, there has been considerable inertia to these patterns beyond the repeal of discriminatory policies in the 1980s and early 1990s. Nowadays, black residents are no longer prohibited by law from living in former white suburbs. However, poorer residents of the city are financially excluded from more expensive areas. Since low-income earners are overwhelmingly black, and since expensive areas are often those that were historically designated for white use, some of apartheid's patterns continue.

Since the end of apartheid, some kinds of urban growth have produced entirely new black working-class settlements or have extended or intensified longer established townships. With racialized restrictions of urbanisation being lifted in 1986, a period of catch-up urbanisation saw many people migrate from rural areas and

[3]The common name for settlements established under apartheid for black residents, although Diepsloot and Orange Farm began much later than the others and are largely post-apartheid settlements.

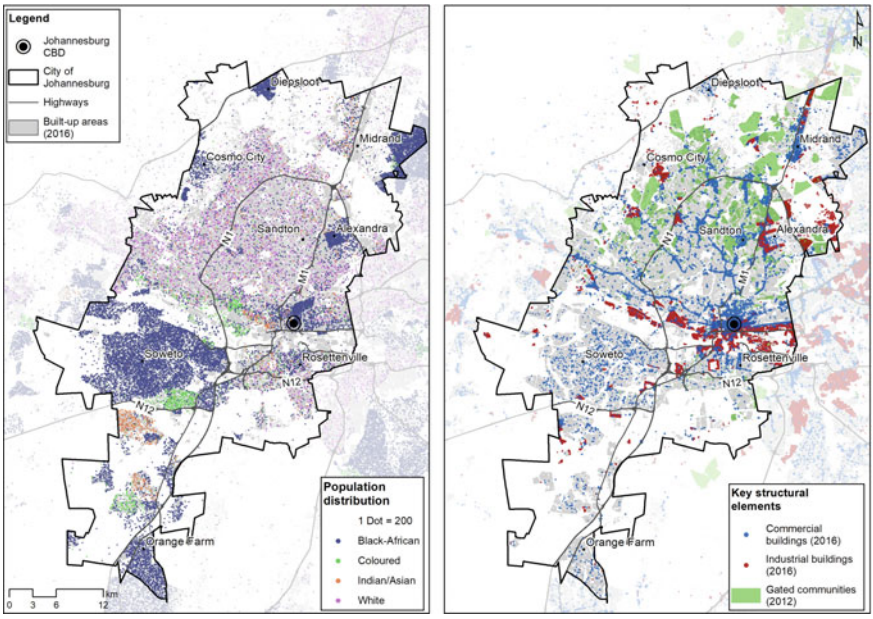

Fig. 5.1 The City of Johannesburg: Distribution of population groups (left) and the distributions of commercial and industrial buildings and gated communities (right). *Data sources* StatsSA (2011a, b), AfriGIS (2013), GeoTerraImage (2016)

smaller towns to larger cities (Turok 2014). Existing townships densified primarily because established residents living there built additional informal structures on their properties for rent. Some migrants settled in informal settlements, often alongside existing townships, or in entirely new settlements such as Orange Farm and Diepsloot. These relatively new settlements now contain hundreds of thousands of overwhelmingly black low-income earners. Since major economic opportunities are located in central areas (Fig. 5.1), large flows of commuters travel from these dormitory spaces to places of employment each day (Budlender and Royston 2016; Mohulatsi 2019).

It is important to qualify this impression of townships in two respects. First, apartheid-era townships do include some middle-class areas and some townships are better off than others. Therefore, although they do not exhibit racial diversity, townships have a socio-economic mix within and between them. Second, the apparent lack of ethnic diversity in 'black' areas is misleading in that these are extremely cosmopolitan spaces with a diversity of languages and nationalities (Hamann and Ballard 2017).

5.2.2 Housing

Since the end of apartheid, the state has built new settlements as a way of addressing the housing demand. Households earning below R3,500 per month ($241 in March 2019 prices) qualify for government housing. This often takes the form of a detached two-room 'low-cost house'. In the first two decades of democracy, the state delivered about 3.7 million of these houses nationally[4] (The Presidency 2014). With an ongoing flow of new migrants to cities, and the division of households into smaller sizes, many people who qualify to be given government houses have yet to receive them. Others do not qualify because they earn above the threshold or are migrants from other countries. As a result, 18% of dwellings in the province are informal dwellings, and a further 24% are unplanned-for backyard structures (Hamann 2018).

Although there have been instances of urban infill projects that break up apartheid patterns, both in terms of race and class, most government-provided housing has not done this (Charlton 2014). In 2013, the Johannesburg municipal government launched a programme called Corridors of Freedom which intends to densify and diversify residential neighbourhoods along Bus Rapid Transit routes, although this has yet to have a major impact (Ballard et al. 2017). Other housing projects involve upgrading settlements by clearing existing informal settlements and rehousing some of the residents in formal accommodation on the same site or elsewhere. However, the most common form of government-funded housing has been the development of new greenfield settlements with hundreds or thousands of units. Concerns that this approach will produce homogenous low-cost settlements, and therefore perpetuate segregation, resulted in a policy change in 2004 that promoted settlements with a higher mix of housing types, including fully subsidised, partially subsidised, and private (mortgage funded) homes (Department of Human Settlements 2004). A prominent example of this new generation of 'human settlements' is a 12,500-unit settlement called Cosmo City on the north-western boundary of Johannesburg (Haferburg 2013).

While such settlements focus on social mixing, they do not achieve racial diversity as they are almost entirely black, given the nature of the housing backlog produced by apartheid. Such settlements do achieve some income mixing to a certain level, albeit with small-scale segregation between different kinds of housing within a settlement. However, the upper range of income in such settlements does not overlap substantially with the income ranges of more affluent suburbs. In 2014, the state announced plans to fund many more large-scale settlements of this kind, and given the shortage of land in established urban areas, they would likely occur on peripheral greenfield sites (Ballard and Rubin 2017). Private developers are also building low-density suburbs on cheap peripheral land for entry-level black home buyers (Butcher 2016).

Some apartheid spaces were comprehensively transformed, such as inner-city tower blocks and many low-rise central neighbourhoods. These areas were once reserved for white residents but became racially mixed in the 1980s and then became

[4]Housing delivery figures were not available at the city level.

primarily black by the 1990s. The white residents that had once lived in inner-city areas left because they were following work and lifestyle opportunities in the North, and also because of what they regarded as undesirable changes to inner-city neighbourhoods (Beavon 2004). Some buildings were abandoned by owners and occupied by economically marginal residents. As a result, conditions deteriorated, not least because electricity, water and sewerage were cut off when municipal accounts were no longer being paid (Murray 2008). Since the 2000s, developers began refitting some inner-city buildings for highly controlled working-class rental accommodation (Mosselson 2017). These spaces are diverse in terms of language, ethnicity and nationality if not race (almost all residents are black). In terms of class, inner-city areas are a mix of lower- and middle-class residents.

5.2.3 Suburbs

As noted above, suburbs with more affordable housing stock, like those close to the inner-city, experienced complete transitions from majority white to majority black populations. The activity of slumlords in some parts of such suburbs has suppressed their average income by allowing overcrowding of units and by underinvesting in general maintenance. Meanwhile, affluent northern suburbs once reserved for white residents have largely retained their expensive positions in the property hierarchy. Newer suburban housing stock for the middle- and upper-market tends to be 'gated', ranging from high-end golf estates to more modest 'townhouse' clustered development. This new housing stock is generally built on land adjacent to former white suburbs, for example, on smallholdings on the northern and western suburban fringe, but is also inserted into the suburban footprint when large suburban plots are redeveloped into denser clustered housing (Todes et al. 2017).

Many areas with expensive properties are dominated by white people, given their stronger buying capacity. However, since the white population only constitutes 12% of the city, it offers limited demand and there are many black, Indian and coloured residents with equally significant purchasing power.[5] The removal of job reservation policies and the training of black nurses and teachers created a nascent black middle class in the 1980s (Crankshaw 1997). After the political transition in 1994, the upward mobility of some of the black population significantly reshaped social and spatial hierarchies (Seekings and Nastrass 2005; Crankshaw 2008). Those who did not stay in middle-class parts of townships moved to middle-class areas elsewhere in the city. As a result, suburbs once designated for white occupation are now some of the most racially integrated parts of the city. Many new cluster housing developments are also racially integrated (Chipkin 2012).

[5] According to the census the white population is ageing. There is also evidence of affluent white people migrating to Cape Town or even emigrating. Therefore as new professional jobs emerge they are taken up by individuals from other race groups who can then afford to live in more expensive suburbs.

However, these processes of racial diversification within former white suburbs may be reinforcing broader patterns of socio-economic segregation (Kracker Selzer and Heller 2010). One analysis shows that the average household income in townships are not growing as fast as the provincial average, while many affluent areas are growing at a faster rate (Hamann and Cheruiyot 2017). The transfer of more affluent residents out of townships and into suburbs may account, in part, for this spatial divergence of average incomes. Former white suburbs also attract the overwhelming majority of private commercial and retail investment (Fig. 5.1).

Ironically, former white suburbs have lost a kind of race and class diversity that was integral to apartheid. Before democracy, many low-income black workers lived in 'white' suburbs as domestic workers on their employers' properties. Much of this accommodation has now been converted to rental accommodation (Falkof 2016), and many new cluster housing developments do not build 'servants' quarters' as would have once been standard in suburban housing. Domestic workers now are more likely to commute from townships. In 2019, the municipality of Johannesburg introduced an inclusionary housing policy to oblige developers of gated communities, cluster housing and apartments to incorporate more affordable options in their plans. This does not apply to the vast number of developments already built or that have already been given approval, so is yet to have a diversifying effect on the city.

While race and class are being, to some extent, untethered from one another in patterns of segregation in Johannesburg, it would be too simplistic to say that class is replacing race, since the historical processes of class formation were so comprehensively racialized. Even to the extent that racial integration is taking place through the upward mobility of some of the black population, the high levels of socio-economic inequality raise the important consideration of socio-economic segregation. In this chapter, we examine inequality and segregation of occupations following the broader methodologies of this volume in order to generate comparable findings.

5.3 Inequality in Johannesburg

5.3.1 Data Sources

In this chapter, occupation data is presented per sub-place in the City of Johannesburg for 2001 and 2011, the two most recent census dates. There are 804 sub-places in Johannesburg. Sub-places with zero population in either 2001 or 2011 were excluded from the analysis along with one other sub-place that is not a contiguous polygon and is geographically very large. The remaining sub-places vary somewhat in terms of geographic size but constitute loosely defined functional neighbourhoods. Sub-places had an average economically active population (i.e. all those aged between 15 and 65 years) of 2,158 people in 2011, ranging from one to 35,949 people. The major occupation categories, captured in the census by Statistics South Africa (Stats SA), are shown in Table 5.1. All employed, economically active respondents were

Table 5.1 Changes in the occupation structure in Johannesburg, 2001–2011

	Major occupation group[a]	2001	2011	Change	% change (%)
Top	Legislators; senior officials and managers	85,291	179,621	94,330	110.6
	Professionals	113,535	159,502	45,967	40.5
Middle	Technicians and associate professionals	104,439	145,056	40,617	38.9
	Clerks	146,649	232,979	86,330	58.9
	Service workers; shop and market sales workers	137,764	336,264	198,500	144.1
	Skilled agricultural and fishery workers	5,456	6,650	1,194	21.9
	Craft and related trades workers	117,674	210,206	92,532	78.6
Bottom	Plant and machine operators and assemblers	71,636	58,563	−13,073	−18.2
	Elementary occupations	218,441	392,740	174 299	79.8
Undetermined[b]		77,482	9,560	−67,922	−87.7
Total		1,080,368	1,733,152	652,784	60.4

Data source Quantec (2014, 2016) (Quantec packages and distributes various economic and demographic datasets in South Africa, including boundary reallocated census data from Stats SA.)
[a]Definitions are provided by Stats SA (2012b)
[b]The 'Undetermined' category was excluded from the totals for the rest of the analysis

asked two questions to determine their occupation—one about the kind of work that the respondent does and the other about the main task or duty in their daily work (Stats SA 2011a). These questions were used to code occupations according to the South African Standard Classification of Occupation (SASCO).

5.3.2 Changes in Occupational Structure

In Johannesburg, the workforce increased by 60% between 2001 and 2011 (Table 5.1). Similar changes are evident in other metropolitan municipalities in South Africa. Increases are the largest in Johannesburg, followed by the other two metropolitan municipalities in Gauteng where the workforce increase by 55% and 51% in Tshwane and Ekurhuleni, respectively. In Johannesburg, the biggest change is seen in the number of people employed as service workers or shop and market sales

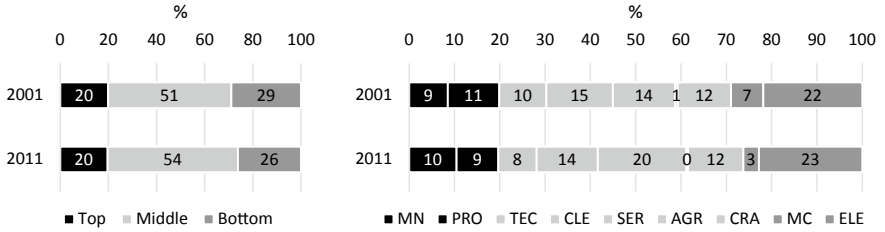

Fig. 5.2 Changes in the share of major occupations in Johannesburg, 2001–2011. *Data source* Quantec (2014, 2016)

workers (144% increase). As Beall et al. (2002) note, service sector jobs bifurcate into well paid and poorly paid. Sellers are likely to be employed in the fast-growing retail sector but the job opportunities in this sector remain unevenly distributed in the urban space. Most formal sector retail facilities are in the suburbs north of the Johannesburg Central Business District (CBD) along with suburban office nodes and there are proportionally fewer retail and office facilities in townships and the south of the city (Fig. 5.1; Beavon 2004).

The number of legislators, senior officials and managers also increased significantly (by 110%), as a result of the development of various strong business nodes (like Sandton) and the swelling ranks of the public sector. Changes in the occupational structure further reflect the decreasing importance of manufacturing, as also observed in previous studies (Rogerson and Rogerson 2015; Seekings and Nastrass 2005). Plant and machine operators are the only occupational group that declined (by 18%). However, the number of people employed in elementary occupations has increased. Taken together, the share of top occupations has remained the same between 2001 and 2011, while the share of middle occupations increased by 3% and the share of bottom occupations decreased by 3% (Fig. 5.2). Figure 5.2 also shows the breakdown of each major occupation and reveals that the share of service workers increased by 6% while the share of machine operators declined by 4%.

5.3.3 Income Inequality

South Africa's Gini coefficient during apartheid was estimated to have been between 0.58 and 0.68, making it one of the most unequal countries in the world. According to Seekings and Nastrass (2005: 188) "inequality in South Africa was higher at the end of the apartheid period than in, even, most other middle-income countries". Apartheid's racialized income distribution continues to influence mean income. Nationally, the average income of white household heads was 4.8 times the average for black household heads in 2014–15 (Stats SA 2017). However, the upward mobility of some of the black population, particularly since the 1980s, means that inequality was no longer just driven by differences in income between races, it was increasingly driven by

intra-racial income inequality. In 2008, Crankshaw predicted that "the major spatial and class division in the post-Fordist spatial order [of Johannesburg] may become characterised by a division between a racially desegregated middle class, on the one hand, and a largely black working class on the other" (Crankshaw 2008: 1695, also see Beall et al. 2002).

Crucially, unemployment has increased since the mid-1970s, and in the province of Gauteng, the unemployment rate was 32% during 2011 (Stats SA 2011b). This is the result of economic restructuring that has followed the exhaustion of gold mines and the restriction of manufacturing by international competition. We agree with Seekings and Nastrass (2005) that inequality is no longer just the result of differences in wages, but also a result of the differences between the employed and unemployed. It is important to note here that unemployment varies significantly between population groups. Black people are overrepresented in the ranks of the unemployed, while white people are underrepresented.

Post-apartheid income inequality has fluctuated. In Johannesburg, a sharp increase in income inequality was evident between 1995 and 2001 (from 0.54 to 0.58), followed by minor increases until about 2005 (to 0.6), and decreasing thereafter to 0.58 in 2014 (Quantec 2015). The trends in Johannesburg are similar to the national trends, but income inequality in Johannesburg is slightly lower than national levels. Johannesburg also has lower levels of income inequality than the two adjacent metropolitan municipalities. This is influenced, amongst other factors, by the strong economy of Johannesburg relative to other cities in South Africa and by the largely urban population. By way of international comparison, income inequality in Nairobi (Kenya) is 0.59, Sao Paulo (Brazil) is 0.55, Mexico City (Mexico) is 0.49, and Moscow (Russia) is 0.45 (UN Habitat 2016).

5.4 Socio-economic Segregation in Johannesburg

Trends and patterns in statistics over time help to set the scene for our understanding of socio-economic inequality, but the spatial dimensions and patterns of these statistics are valuable in understanding socio-economic segregation. In this section, we provide various calculations that illustrate socio-economic segregation, mostly between the top and bottom occupation groups (managers and professionals versus machine operators and elementary occupations). Analysing these patterns over time highlights how the socio-economic structure of Johannesburg has shifted and what prospects there are for future socio-economic integration.

5.4.1 Dissimilarity Index

We calculated Dissimilarity Index (DI) values (as explained in the introduction of this book) between all the major occupations as well as the top, middle and bottom

Table 5.2 Indices of dissimilarity (multiplied by 100) between major occupations in Johannesburg, 2001–2011

		DI 2011												
		MN	PRO	TEC	CLE	SER	AGR	CRA	MC	ELE	UNE	TOP	MID	BOT
DI 2001	MN		13	26	27	43	37	50	54	44	63			
	PRO	12		29	31	47	41	55	59	49	67			
	TEC	22	26		12	27	33	35	39	32	46			
	CLE	37	41	18		22	31	30	33	28	41			
	SER	48	51	32	24		38	18	21	17	28			
	AGR	54	56	49	48	44		41	45	39	51			
	CRA	58	61	42	31	26	39		15	14	20			
	MC	64	67	47	37	31	46	15		21	18			
	ELE	42	44	31	30	22	34	21	28		26			
	UNE	70	72	53	42	36	50	20	13	33				
	TOP												39	47
	MID											42		18
	BOT											48	20	

MN Managers; *PRO* Professionals; *TEC* Technicians; *CLE* Clerks; *SER* Service and sales workers; *AGR* Skilled agricultural workers; *CRA* Crafts and related trade workers; *MC* Plant and machine operators; *ELE* Elementary occupations; *UNE* Unemployed

occupation groups (Table 5.2). As an important contextual consideration, we also included unemployment as an additional DI calculation, but to remain within the scope of the book we did not further investigate unemployment in the rest of the analysis. According to the DI values, top-bottom segregation and middle-bottom segregation decreased slightly but top-middle segregation decreased more substantially (see summary figures in the lower right corner of Table 5.2). Segregation between most occupations decreased, on average by 5%. The increase in service workers is clearly associated to lower segregation levels with all other occupations (an average 6% decrease). On the other hand, segregation between managers and elementary occupations increased slightly (by 2%) and segregation between professional and elementary occupations increased by 5%.

These indices of dissimilarity between top, middle and bottom occupations are necessarily for employed people. As Table 5.2 shows, unemployed people are much more likely to be segregated from top occupations than any of the other occupations, although even here the degree of segregation between unemployed and top occupations had decreased slightly by 2011.

5.4.2 Location Quotient

In this section, we analyse the spatial concentration of the top and bottom occupations by using the location quotient (LQ) measure of segregation (as explained in the introduction of this book). Figure 5.3 shows that very few sub-places represent situations where the mix of occupation groups in the sub-place is similar to the mix for the city as a whole (light grey sub-places). Turquoise-shaded areas in the upper maps of

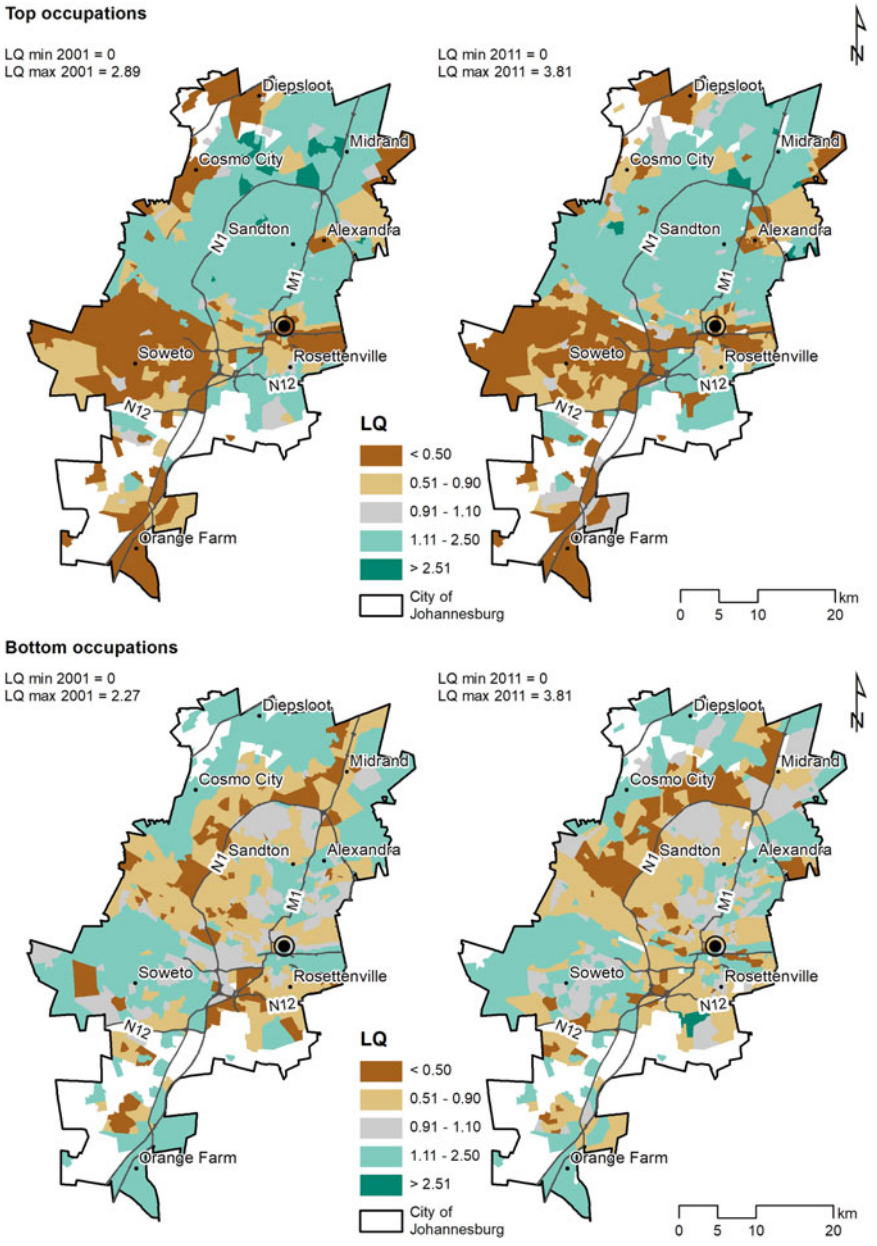

Fig. 5.3 Location quotient of top and bottom occupations in Johannesburg, 2001–2011. *Data sources* Quantec (2014, 2016)

Fig. 5.3 are those in which top occupations are overrepresented while areas shaded brown in the upper figures are those in which top occupations are underrepresented. The highly clustered overrepresentation of top occupations (LQ higher than 1.10) in 2001 and 2011 is apparent in much of northern Johannesburg, and some isolated parts of southern Johannesburg. By contrast, the Johannesburg CBD and townships, such as Diepsloot, Soweto and Orange Farm show an underrepresentation of top occupations in 2001 and 2011. By 2011, the underrepresentation of top occupations decreased slightly in some areas, particularly in Soweto, Cosmo City and north of Orange Farm. Their significant underrepresentation directly east of Sandton is due to the presence of the working-class township of Alexandra. From 1912, black people were able to own land in the 'freehold' settlement of Alexandra, and as the city grew north, Alexandra became an unusual case of a centrally-located township.

In the lower two maps, turquoise-shaded areas are those in which bottom occupations are overrepresented, while brown is where they are underrepresented. Those employed in bottom occupations are less spatially clustered than those employed in top occupations, but they are overrepresented on the fringes of the city and in townships like Soweto and Diepsloot (Fig. 5.3). The residential population of the Johannesburg CBD shows a slight underrepresentation of bottom occupations in 2001, increasing in 2011. Given that the CBD population is also highly underrepresented by top occupations, it is likely that the CBD provides affordable homes and easy access to middle occupations such as technicians, clerks, service workers and trades workers. In 2001, bottom occupations were slightly overrepresented (LQ between 1.11 and 2.5) in some suburbs surrounding Sandton. These concentrations around Sandton would include domestic workers that lived on the properties of middle- and upper-class employers. As anticipated above, we see evidence for the reduction of this employment category in these suburbs by 2011 as such workers now commute from townships and other settlements. The increasing underrepresentation of bottom occupations is even more striking in the arc of suburbs west of the N1 highway. These suburbs contain many new cluster housing developments for middle- and upper-class home buyers but provide limited accommodation for domestic workers.

5.4.3 Classification of Neighbourhoods by Socio-economic Composition

The socio-economic status (SES) of neighbourhoods can be determined by the proportion of occupations that are considered top, middle or bottom occupations. For the neighbourhood classification in Fig. 5.4, the classification used by Marcińczak et al. (2015) was altered slightly and two categories were added afterwards to allow for the unambiguous classification of all sub-places in Johannesburg. The neighbourhood types that were slightly adapted include High SES (top >= 50; middle <= 35; bottom <= 35), Middle SES (top <= 35; middle >= 50; bottom <= 35) and Low SES (top <= 35; middle <= 35; bottom >= 50). Thereafter, the remaining uncategorised

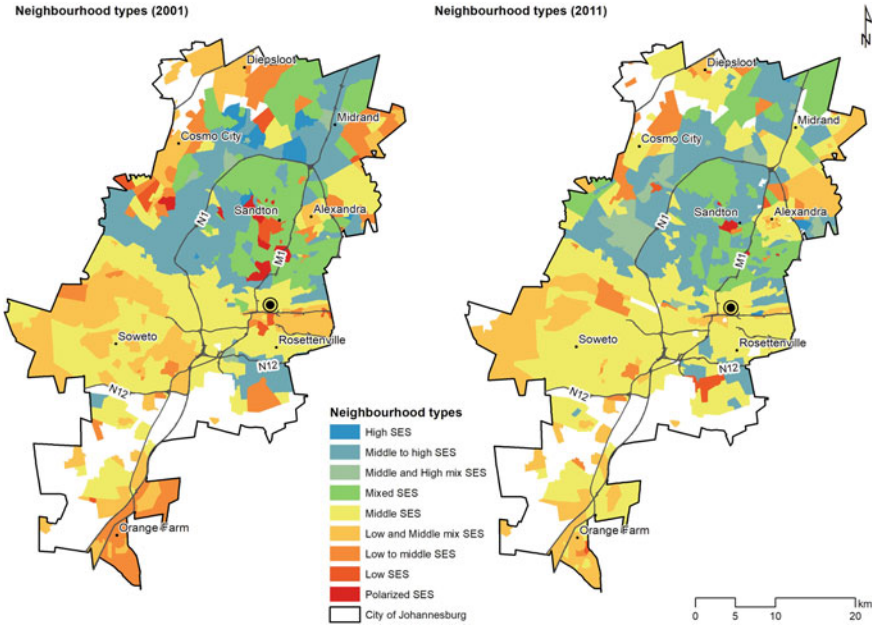

Fig. 5.4 Neighbourhood types in Johannesburg, 2001–2011. *Data sources* Quantec (2014, 2016)

sub-places were grouped into Middle and High mix SES (top >= 25; middle >= 25; bottom <= 25) or Low and Middle mix SES (top <= 25; middle >= 25; bottom >= 25).

A clear spatial distinction exists between predominantly higher SES neighbourhoods in northern Johannesburg (with exceptions on the suburban fringes) and predominantly lower SES neighbourhoods in southern Johannesburg (with the exception of a cluster of neighbourhoods south of Rosettenville which are higher SES). This distinct separation of neighbourhoods echoes the observation by Crankshaw (2008: 1701) that "all the neighbourhoods with more than two thirds of the population being middle class are in the northern suburbs, none are in the South". Suburbs between the N1 and M1 highways (which also contain the most expensive properties in the city) are predominantly high, middle to high or mixed SES, with an increase in high SES suburbs north of Sandton in 2011. Suburbs with mixed SES around Sandton and Midrand could be attributed to two possible characteristics. First, there may be quite different occupation ranks within one household resulting from gender, age and other stratifications in the labour market. Second, it could reflect the development of relatively affordable cluster housing that has made these areas accessible to residents employed in a greater mix of occupations. Low and polarised SES suburbs around Sandton in 2001 are likely associated with the overrepresentation of top and bottom occupations discussed alongside Fig. 5.3, above, and largely disappears by 2011. The lower SES of Alexandra, directly east of high SES areas around Sandton, is a striking feature of Johannesburg's geography.

The development of large luxury gated estates, private commercial investment and cluster housing around Midrand has also shifted neighbourhoods from mixed SES to high SES. Meanwhile, some public housing projects have also made a measurable difference to socio-economic desegregation. The area labelled Cosmo City was low to middle SES and low SES in 2001. With the construction of a major state-led housing project there from 2004, the occupation mix had elevated to middle SES by 2011. Moreover, the category middle SES contains a mix of top, middle and bottom occupations and this suggests that Cosmo City has achieved its goal of creating a more mixed-income urban environment than had been achieved in previous public housing projects. Figure 5.4 also indicates that the Johannesburg CBD has an increasingly middle SES. In the south of Johannesburg, the classification of suburbs in townships are a testament to the socio-economic mix of these residential spaces. Soweto is almost entirely characterised by middle SES, a change that is partly due to the removal and formalisation of informal settlements in the township (Huchzermeyer et al. 2014).

5.4.4 Location of Top Socio-economic Status Groups in 2001 and 2011

In 2001 and 2011, the top 20% of managers and professionals lived in 2% of sub-places in Johannesburg (Fig. 5.5). The location of the quintile 1 sub-places has not changed substantially but remains mostly located north and west of Sandton. No more than two of these sub-places were located south of the Johannesburg CBD in either 2001 or 2011. It is important to bear in mind that the quintile 1 sub-places have relatively low population densities and vary in geographic size, especially in comparison to dense sub-places in townships such as Soweto and Diepsloot. Quintile 1 suburbs were established throughout the twentieth century with freestanding houses on large plots. From the 1990s, many of these neighbourhoods were retrofitted with access control gates and new suburban developments were built with fences and gates from the outset while also attracting substantial private commercial and retail investment (Fig. 5.1). In this representation of the concentration of top occupations, it is again evident that the proportion of top occupations increased in sub-places close to the northern edge of Johannesburg (e.g. around Midrand). There has also been a slight increase in the proportion of top occupations in parts of Soweto and in Cosmo City.

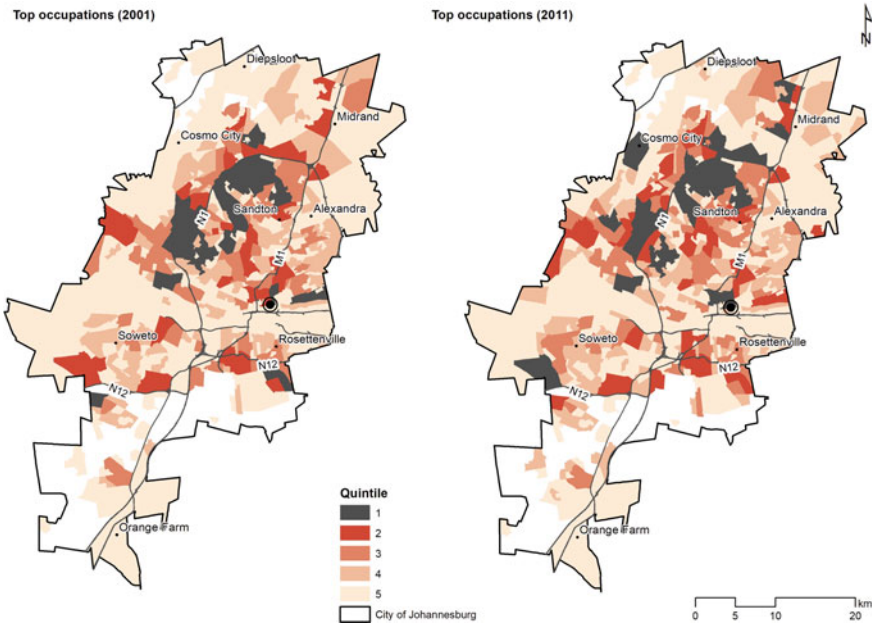

Fig. 5.5 The concentration of the top socio-economic group in Johannesburg, 2001–2011. *Data sources* Quantec (2014, 2016)

5.5 Conclusion

Segregation by race was apartheid's defining ambition, and one that was actively pursued until the political transition of the early 1990s. In attempting to stratify society and space racially, the programmes of white minority governments also influenced socio-economic stratification. They produced settlements with cheaper property for the black working class and more expensive suburbs for the white working class, middle class and elites. Since the end of apartheid, income inequality amongst black people has grown dramatically. Given the strong purchasing power of some black, Indian and coloured people, suburbs once set aside for white people are now racially diverse.

Yet the calculations presented in this chapter show the way in which different occupations continue to be segregated. The transition from a Fordist secondary economy to a post-Fordist service economy has served some better than others (Beall et al. 2002; Crankshaw 2008) and unemployment also remains high. Managerial jobs have been particularly robust, consolidating and expanding the position of those at the high-earning end of the income spectrum. Machine operators have diminished, while in their place low paid unskilled, industrial and retail sector categories have grown. The effect of this employment profile is that the Gini coefficient in Johannesburg remains amongst the highest in the world. Thus, the repeal of racial restrictions has no bearing

on the inability of the low-earning black majority to afford housing in more expensive suburbs once reserved for white occupation. The dissimilarity index between top and bottom occupation groups decreased slightly between the 2001 and 2011 censuses but increased between other occupation groups. The concentrations of top and bottom occupations illustrate the polarised structure of Johannesburg described by Crankshaw (2008) as being divided into northern suburbs (mostly middle class) and the southern suburbs or townships (mostly working class).

Residential development and job markets have both reproduced the spatial nature of socio-economic inequality and facilitated key changes. Although state-provided housing might have acted somewhat independently of the market to break up these patterns, it has largely failed to do so. Essentially, long-term and deeply entrenched inequalities have not changed substantially notwithstanding the scrapping of apartheid segregation. The 2016 Johannesburg Spatial Development Framework recognises these enduring patterns of socio-economic segregation and the city has subsequently proposed more proactive responses to the situation, including densification along transit corridors and inclusionary housing. Our analysis does suggest that state housing developments such as Cosmo City has enabled a greater mix of occupations than what was previously possible. Whether these proactive measures can offset market-led production of residential space is an important issue for the coming decades.

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Part III
Asia

Chapter 6
Dual Land Regime, Income Inequalities and Multifaceted Socio-Economic and Spatial Segregation in Hong Kong

Mee Kam Ng, Yuk Tai Lau, Huiwei Chen, and Sylvia He

Abstract Hong Kong has a dual land regime in the urban and rural territories. The urban areas on both sides of Victoria Harbour (8.8% of land, excluding Country Parks on Hong Kong Island) and new towns (about 15.3% of land) house over 90% of the city's population (about 7.5 million) with an extremely high population density of about 26,000 per km^2. After deducting Country Parks and Special Areas (about 40% of land), the rest of the rural New Territories (traditional settlements leased by the British Government in 1898 for 99 years) constitutes about 35% of land, but houses 5.5% of all residents with a substantially lower population density of about 1,000 per km^2. China's Open Door Policy since 1978 has led to economic restructuring in Hong Kong, changing its occupational structure, intensifying income inequality, and leading to socio-economic and spatial segregation. Whilst the affluent classes continue to concentrate in traditionally central locations in urban areas, or in luxurious residential enclaves in rural New Territories, the less well-off tend to be marginalised and live in remote new towns or rural New Territories. The latter is also a result of a skewed power relationship between the government and the property sector in directing spatial development that breeds a hegemonic (dis)course and regime of urban-biased and property-dominant development, sustaining the government's coffer through a high land price policy.

Keywords Dual land regime · Income inequalities · Multifaceted socio-economic segregation · Spatial segregation · Hong kong

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6.1 Introduction

This chapter illustrates and explains the situation and the underlying causes of socio-economic and spatial segregation in Hong Kong, beginning with a brief introduction of the city's dual land regime, housing structure and welfare system. It then highlights the relationship between welfare provision, economic restructuring and income polarisation since the 1980s when Hong Kong metamorphosed from a manufacturing city to a global financial centre due to China's Open Door Policy. Based on the spatial patterns of residential segregation of different socio-economic classes, we conclude that in addition to income polarisation and ever-rising house prices, the urban-biased and property-dominant mode of (re)development has led to socio-economic and spatial segregation in Hong Kong. Also, this situation is expected to perpetuate in the foreseeable future if the dual land regime is not changed.

6.2 Context

6.2.1 Dual Land Regime

Hong Kong was a British colony from 1842 to 1997. The city was handed over to Chinese rule as a Special Administrative Region in July 1997. Currently, about 7.5 million inhabitants dwell within an area of 1,106 km^2 (CSD 2019) (Fig. 6.1). After

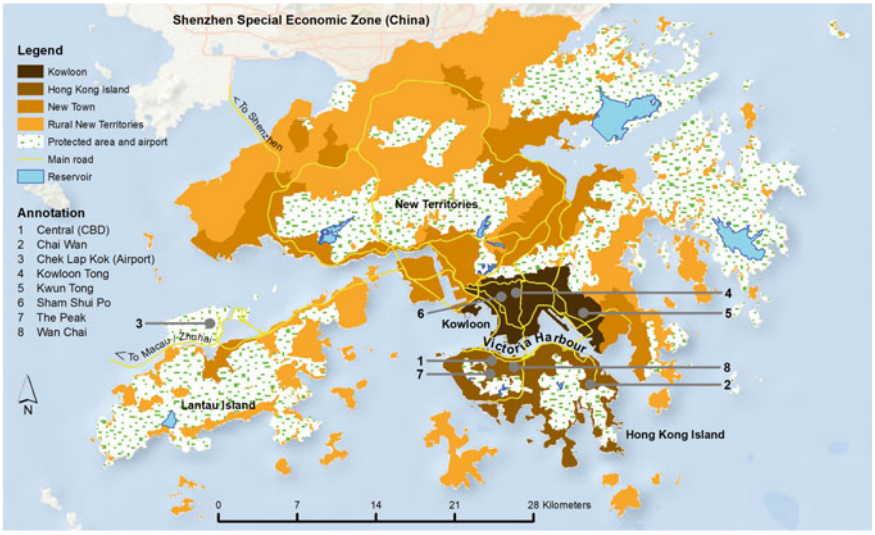

Fig. 6.1 The map of Hong Kong, with locations of place names mentioned in this chapter planning data reproduced with permission of the director of planning. © Hong Kong

excluding Country Parks and Special Areas (as 'Protected areas' that occupy 443 km^2 or 40% of Hong Kong's total land area) within which urban development is strictly prohibited, the actual territorial population density is about 11,000 per km^2.

However, there is a dual land regime in Hong Kong as reflected in different population densities between the urbanised areas (Hong Kong Island, Kowloon and new towns, that is, about 24.1% of land area) with an average population density of about 26,000 per km^2, and the rural New Territories (with village-type settlements, brownfield sites, agricultural land and green belts, etc.) occupying 35% of the land with a population density of about 1,000 per km^2. Such a striking difference in population density has to do with the city's colonial history. Colonial Hong Kong started with the ceded territories of Hong Kong Island and Kowloon Peninsula in the mid-nineteenth century, forming the existing densely populated urban areas. Unlike Hong Kong Island and Kowloon Peninsula, the New Territories where the existence of indigenous villagers predated the colonists, were only leased to Britain in 1898 for 99 years.

Urban development activities in the New Territories were minimal before the urban riots in 1966 and 1967. After the riots, in order to pacify the restless population, the colonial government started to build public housing through developing new towns in the 1970s (Glaser et al. 1991). Developed from market towns or along the coast by land reclamation, the nine new towns now form pockets of densely populated urbanised zones in the New Territories. The vast 'rural' area in the rest (about 35%) of the New Territories accommodate only around 5.5% or 412,500 of Hong Kong's 7.5 million population (CSD 2017a). Contrary to the urban areas and new towns, urban planning was not extended to the rural New Territories until 1991, seven years after a court case that allowed farmland to be converted into storage sites (Lai and Ho 2002). Consequently, massive brownfield sites with a diversity of land uses emerged, including most notably open storage. They serve the opening and rapid industrialising economy across the border in mainland China (Chau and Lai 2004).

To accommodate population growth and economic development, the Hong Kong government has relied on massive land reclamation within and beyond Victoria Harbour and incessant redevelopment of old and low-rise tenement buildings to make way for high-rise residential apartments (Ng 1998; Adams and Hastings 2001). This urban-biased (re)development strategy has boosted land values and the emergence of gated private housing estates (Wong et al. 2011) that are unaffordable for most Hong Kong residents. As house prices in Hong Kong rank the top among other world cities (Gurran and Bramley 2017), many less well-off residents have to rely on public housing (mostly located in Kowloon and new towns) or move to smaller dwellings or remote locations.

6.2.2 *Housing System*

Public housing accommodates a significant proportion of households in Hong Kong (Fig. 6.2) (Forrest and Yip 2014; Valença 2015). The proportion of households living in public housing (i.e. public rental housing units and subsidised sale flats in Fig. 6.2) only declined slightly from 46.2% in 2001 to 45.7% in 2016 (CSD 2012 and 2017a). Yet, the focus of public housing provision has shifted from rental housing to assisted home ownership. Since its inception in the 1950s, public rental housing can be regarded as a major welfare provision (Ronald and Doling 2010), contributing much to poverty alleviation (Guo et al. 2018). Currently, about 30% of households in Hong Kong live in public rental housing units (CSD 2017a). Another pillar of Hong Kong's public housing system is the Home Ownership Scheme (HOS; corresponding to 'subsidised sale flats' in Fig. 6.2), established in the late 1970s to assist low- and middle-income households to achieve home ownership (Lee et al. 2014). In 2016, about 15% of households in Hong Kong lived in HOS dwellings (CSD 2017a). Public housing is thus crucial for satisfying the housing needs of the middle and lower classes in Hong Kong (Lau and Murie 2017).

The percentage of households living in owner-occupied units decreased slightly from 2001 to 2016 (CSD 2002 and 2017a), implying more households have entered the private rental market. In 2016, about 450,000 households (about 1.3 million people) rented private dwellings (CSD 2018a), of which about 92,000 households

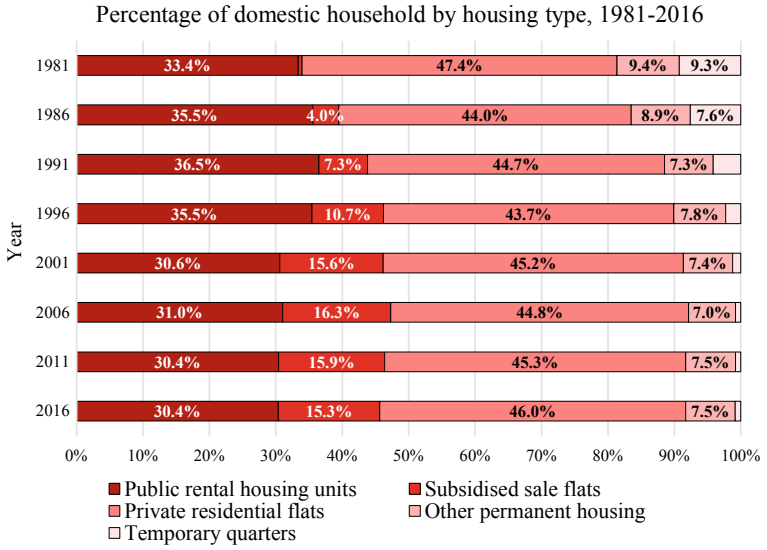

Fig. 6.2 The evolution of housing structure in Hong Kong, 1981–2016 (Reproduced from CSD 1993, 2007, 2012, 2017a)

(around 210,000 people) lived in subdivided units (CSD 2018b). Given population growth due to immigration from China, stagnant income levels and skyrocketing house prices, the population living in subdivided units with harsh conditions is expected to increase. Meanwhile, the city's house price to income ratio of 20.9 is one of the highest in the developed world (compared with Singapore: 4.6; New York City: 5.5 and Greater London: 8.3) (Bertaud 2018; Ng 2018). As house prices keep increasing, property ownership leads to a widening wealth gap in Hong Kong. For the indigenous population in rural New Territories, the colonial government introduced the 'Small House Policy' in 1972 to satisfy their housing needs in the course of new town development. Under this policy, adult male indigenous inhabitants are entitled with rights to build a village house of 700 ft^2 (approx. 65 m^2) up to three stories in approved villages in the New Territories (Hayes 2007).

6.2.3 Welfare System and Inequality

Despite the extensive provision of public housing, Hong Kong has never been a welfare state. The government spending in Hong Kong has been capped to around 18% of GDP, much lower than in the USA (37.8%), Britain (41.6%) or Japan (38.7%) (Miller et al. 2019). Education is the largest component of recurrent government expenditure, amounting to about 17.3% of total government spending in the 2016/17 fiscal year (HKSAR Government 2017a). In September 2009, the 9-year free education system was extended to 12 years, allowing school-age children to receive, respectively, 6 years of free primary and secondary education (HKSAR Government 2008). In addition, subsidised tertiary education is provided by eight universities financed by public funds (HKSAR Government 2018b). Health care also constitutes 17% of the government's total spending. The public sector provides around 74% of inpatient and specialist medical services expenditure. In late 2016, there were around 28,000 beds in all public hospitals and institutions under the management of the statutory Hospital Authority (HKSAR Government 2017a). The bed-population ratio in public hospitals is about 3.8 per 1,000, which is comparable to the aggregate ratio of public and private hospital beds in Britain (2.8 in 2013), USA (2.9 in 2012), Japan (13.3 in 2013) and Singapore (3.2 in 2014) (HKSAR Government 2016).

As of 2019, Hong Kong has no public pension system. Retirement security provision has been delegated to the private sector via the Mandatory Provident Fund (MPF) scheme, in operation since 2000. The MPF scheme requires the working population and employers to contribute an aggregate sum of 10% of individuals' total monthly salary to pension schemes offered by the private sector (Sawada 2004; Lee et al. 2014). Since the MPF contributions are tied to salaries, the non-working population is not covered by the MPF scheme. Nevertheless, several cash transfer policies from the public sector exist in the city.

An important cash transfer is the Comprehensive Social Security Assistance (CSSA), which is means-tested for the economically vulnerable to support their basic needs (SWD 2018a). Between 2001 and 2016, more than half of all CSSA

recipients were elderly people. There are also two cash benefits for the elderly: Old Age Allowance (OAA) and Old Age Living Allowance (OALA). The former is a non-means-tested allowance given to the elderly aged 70 or above (Lee et al. 2014). The latter, introduced in 2013, is means-tested for poor elderly people aged 65 or above with monthly income and assets lower than a defined level (SWD 2018b).

Cash transfers and subsidies are also available in transport. To facilitate community participation and social inclusion of the elderly and the disabled population, a scheme was launched in June 2012 to cover major transport modes, and the beneficiaries only need to spend HK$2.0 (US$0.25) for each trip whilst the fare differentials are subsidised by the government (TD 2018). In January 2019, the government introduced the Public Transport Fare Subsidy Scheme. If the monthly transport-related expenditures of commuters exceed HK$400 (US$51.3), the exceeded expenses are entitled to a cash rebate equivalent to 25% of travelling expenditure with a monthly maximum of HK$300 (US$38.5). This scheme aims particularly at lessening the transport burden of long-haul commuters in new towns and rural New Territories (HKSAR Government 2018a).

The Gini Index offers a clear indication of income inequality in Hong Kong. Notwithstanding the enhancement of welfare provision over recent decades, the index soared from 0.451 in 1981, surpassed the 0.5 mark in 1996 and then gradually climbed to 0.539 in 2016 (HKSAR Government 2017b), the largest inequality among all developed economies (Central Intelligence Agency 2019). Such upward trend suggests that occupational polarisation due to economic restructuring has brought about income polarisation in Hong Kong.

6.3 Census Data and Spatial Units

In this chapter, data obtained from the 2001 and 2011 Population Census and the 2016 By-census are used for the segregation analysis. Each dataset consists of data with nine occupational groups, categorised according to the International Standard Classification of Occupation (ISCO) published by International Labour Organisation (ILO). The ISCO-08 version is applied in the 2011 Census and the 2016 By-census, whilst ISCO-88 is applied in the 2001 Census (CSD 2017b). The nine occupational groups are further classified into three large socio-economic status (SES) groups based on their income:

Top SES (income) group (TOP)

- Managers and Administrators (MAN)
- Professionals (PRO)

Middle SES (income) group (MID)

- Associate Professionals (APR)
- Clerical Support Workers (CLE)
- Craft and Related Workers (CRA)

Bottom SES (income) group (BOT)

- Service and Sales Workers (SER)
- Plant and Machine Operators (MAC)
- Elementary Occupations (ELE)
- Skilled Agricultural and Fishery Workers; and Occupations not Classifiable (data are combined with 'Elementary Occupations' in the analysis).

In 2016, the average gross median monthly income of the top SES group was HK$39,500 (US$5,064), whilst the corresponding figures of the middle SES group and the bottom SES group were HK$16,750 (US$2,147) and HK$10,750 (US$1,378), respectively, compared with the city's overall median of HK$15,000 (US$1,923) (CSD 2017b). The spatial (or neighbourhood) unit used for the analyses is Large Street Block Group (LSBG). LSBG is the smallest spatial unit that contains sufficient relevant census data available for public access, and each LSBG consists of a street block cluster. In all three snapshot years, the average area and population of urban LSBGs were 0.18km^2 and 2,162, whereas rural LSBGs were 2.2km^2 and 934, respectively.

6.4 Spatial Patterns of Occupational and Income Disparities

6.4.1 Changing Occupational Structure and Growing Income Disparity

Hong Kong's economy has undergone tertiarisation since the 1980s after the implementation of the Open Door Policy in mainland China. The enlargement of the tertiary sector took place in tandem with the shrinkage of the secondary sector. By the early 2000s, the tertiary sector had become the mainstay of Hong Kong's economy. From 2001 to 2016, the proportion of the working population (excluding foreign domestic helpers) classified as managers and administrators as well as professionals (i.e. high paid tertiary workers) grew from 17.3 to 18.8%, whilst the corresponding figure of services and sales workers as well as elementary occupations (i.e. low-income tertiary workers) rose from 30.9 to 32.5% (Fig. 6.3). Between 2001 and 2016, the average gross median monthly income of high paid tertiary workers increased by 41.1% from US$3,590 to US$5,064, outstripping significantly that of low-income tertiary workers with the corresponding growth (i.e. 31.9%) from US$924 to US$1,218. Although the implementation of Statutory Minimum Wage since 2011 has probably led to the income increases of the latter occupational groups (CSD 2007 and 2017a), the figures still show widening income disparities between the high-income and low-income tertiary workers over time.

Whilst 98% of business units in Hong Kong are Small and Medium Enterprises (SMEs), they provide only 45% of employment (LegCo 2018). The profitability

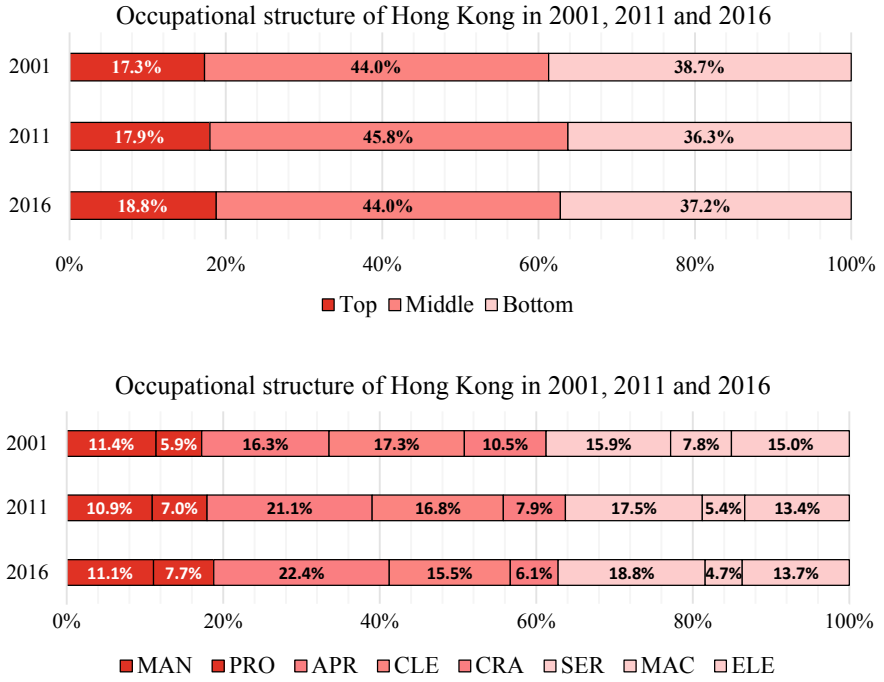

Fig. 6.3 Occupational structure of Hong Kong, 2001–2016 (Reproduced from the datasets of 2001 and 2011 Population Census and 2016 By-census, CSD) *Please refer to Sect. 6.3 for the abbreviations of occupational groups

gap between SMEs and non-SMEs, as shown by the difference in profit ratios, had widened from 2.7 in 2011 to 6.7 in 2016 (LegCo 2018). This may also reflect the widening income gap between SME and non-SME employees. Occupational and income disparities have worsened the issue of housing affordability in Hong Kong, whilst the urban-biased and property-dominant (re)development strategy has led to escalating house prices. Since 2000, property prices and rental values have been tripled and doubled, respectively (see Fig. 6.4). This has led to increasing levels of spatial segregation, which can be illustrated by two quantitative approaches: Index of Dissimilarity (IoD) measuring the evenness of distribution of various occupational groups, and Location Quotient (LQ) serving to investigate the patterns of spatial concentration of selected occupational groups.

6.4.2 Socio-Economic Segregation

Tables 6.1 and 6.2 display the IoD between various occupational groups in specified years. Generally, socio-economic segregation increased in Hong Kong between 2001

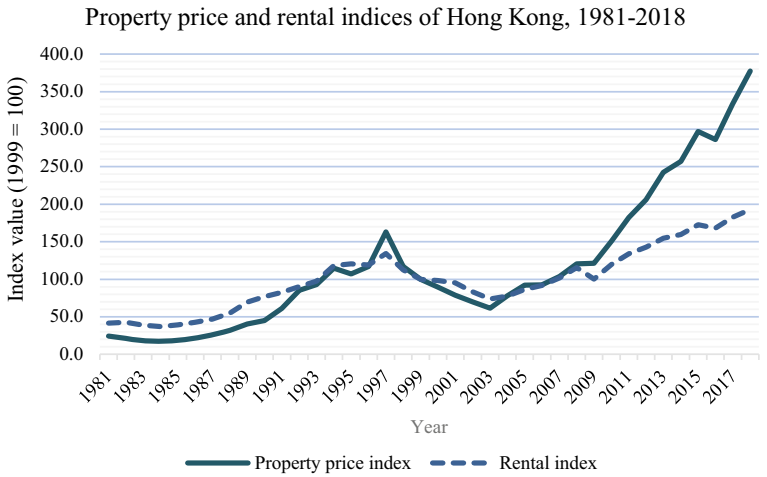

Fig. 6.4 Property price and rental indices of Hong Kong, 1981–2018 (Reproduced from Rating and Valuation Department 2019a, b.

Table 6.1 Index of Dissimilarity (multiplied by 100) between the occupational groups in Hong Kong in 2001, 2011 and 2016

2001	MAN	PRO	APR	CLE	CRA	SER	MAC	ELE
MAN		20	32	48	61	56	61	65
PRO	19		27	43	57	51	57	62
APR	32	26		23	39	33	39	45
CLE	45	41	20		23	19	23	29
CRA	60	55	36	21		17	19	19
SER	52	48	29	17	17		21	20
MAC	60	56	37	22	14	20		22
ELE	62	57	41	26	16	19	19	

2011	MAN	PRO	APR	CLE	CRA	SER	MAC	ELE
MAN								
PRO	17							
APR	27	23						
CLE	39	35	18					
CRA	56	54	37	26				
SER	49	46	30	20	17			
MAC	55	53	36	25	20	21		
ELE	59	56	41	29	17	18	21	

2016	MAN	PRO	APR	CLE	CRA	SER	MAC	ELE
MAN								
PRO								
APR								
CLE								
CRA								
SER								
MAC								
ELE								

Table 6.2 Index of Dissimilarity (multiplied by 100) between the Top, Middle and Bottom groups in Hong Kong in 2001, 2011 and 2016

	2001	2011	2016
TOP–MID	40	38	31
TOP–BOT	55	57	50
MID–BOT	20	24	24

and 2011, but then slightly decreased until 2016. The economy was very bad in the first decade of the millennium due to economic depression induced by the Asian financial crisis in 1997 and epidemic outbreak such as bird's flu and SARS in the early 2000s, triggering the acceleration of 'neoliberal' policies. When the economy gradually improved, the government implemented more social policies and hence segregation was slightly attenuated. Nevertheless, the figures between top and bottom SES groups in all three years stand much higher from the rest. This numerical pattern

reveals apparent segregation between top and bottom SES working population as well as the persistence of self-segregation of the top SES workforce.

6.4.3 Residential Locations of Top and Bottom SES Workforce

Figure 6.5 shows the distribution of neighbourhoods with top SES working population in 2001 and 2016. In this figure, all neighbourhoods are categorised into five quintiles (Q1–Q5), each of which accommodates about 20% of Hong Kong's top SES working population. Seemingly, quite a number of neighbourhoods with large top SES working populations (Q1–Q3) were initially concentrated in the formally ceded territories of Hong Kong Island and Kowloon. As time passed, more neighbourhoods in new towns had a large top SES working population. This may contribute to a slim drop in the extent of segregation. Owing to the compact urban environment of Hong Kong, neighbourhoods with the largest top SES working population (categorised as Q1) are usually located in high-density residential areas, some of which are coastal areas with beautiful sea views or recently redeveloped districts. Additionally, these neighbourhoods often consist of middle-class private housing estates and gated residential areas with detached houses. It should, however, be noted that traditionally wealthy residential areas such as southern Hong Kong Island and Kowloon Tong are not featured in the maps because these districts are of much lower density and hence they accommodate a smaller number of top SES workers.

There is a huge wealth gap even within the top SES working population, and the prohibitively high house prices in wealthy residential areas in Hong Kong mean that these areas are only accessible to a very small percentage of the top SES group. The rest of the top SES workforce thus mostly live in more densely populated middle-class residential areas in which Q1 neighbourhoods are located.

The LQ analysis offers us another perspective to examine residential locations of various SES groups. An LQ value greater and smaller than 1.0 indicates a higher and lower share of an occupational group within a neighbourhood than the city's overall share, respectively, whilst a value of 1.0 implies an equal share of an occupational group compared to the city as a whole. Figures 6.6 and 6.7 depict the spatial distribution of residence of top SES and bottom SES working population, respectively. According to Fig. 6.6, the residential distribution of top SES working population in 2001 is clustered around The Peak, southern coast of Hong Kong Island and Kowloon Tong. These are areas where luxurious residences and detached houses dominate. Meanwhile, fewer neighbourhoods in the New Territories had their LQ exceeding 1.0. The distribution of the top group became more even in 2016 as some neighbourhoods in the New Territories experienced LQ increases due to large-scale low-density gated residential developments, whilst the LQ decreased in conventional wealthy residential areas as a result of the reduction of top SES workers who might move to the newly completed gated communities in the New Territories. Whilst still

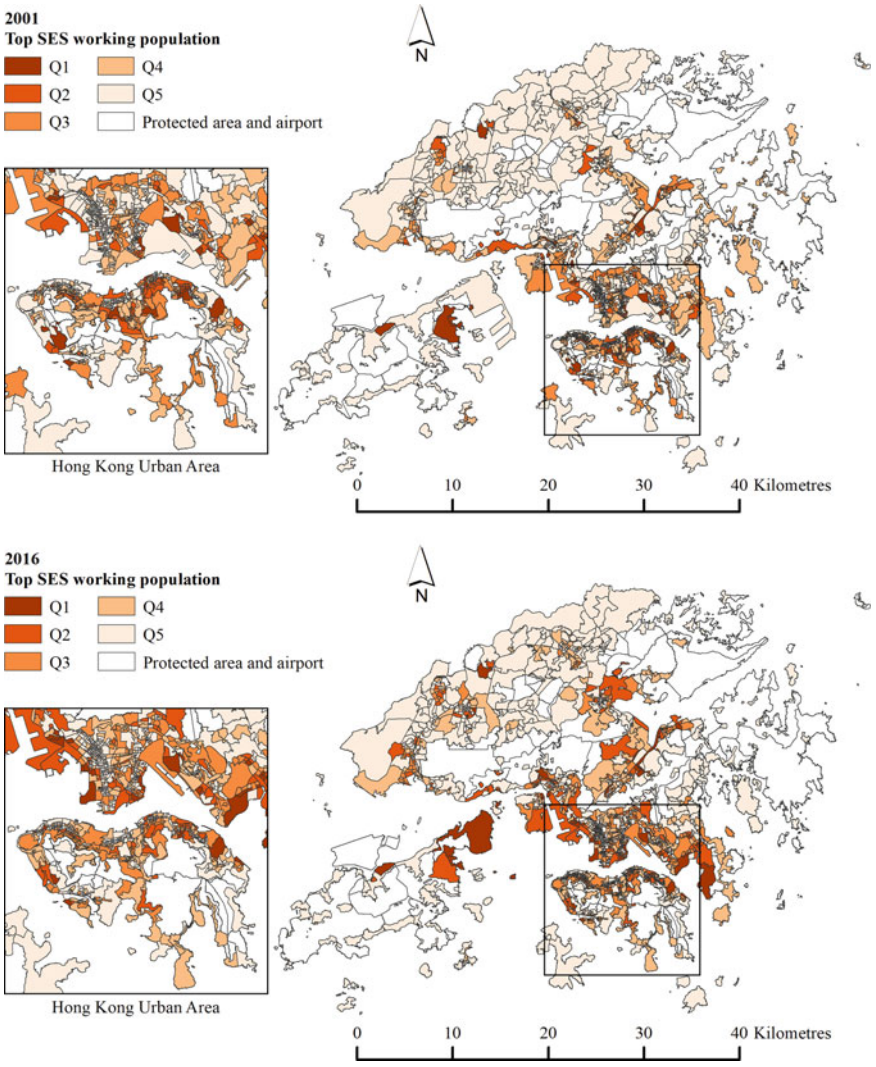

Fig. 6.5 Spatial distribution of residential location of top SES group in Hong Kong, in 2001 and 2016. Planning data reproduced with permission of the director of planning. © Hong Kong

evident, self-segregation of top SES working population has become less pronounced in the study period as the decrease in top SES workers in conventional wealthy areas was largely replaced by middle SES workers after 2011. This might be a result of the retirement of the top SES workers with off-springs still in their middle career.

The residential distribution of bottom SES workers (Fig. 6.7) was comparatively even throughout the study period. However, some spatial clusters were still visible in urban areas where public housing and old tenement buildings dominated such as

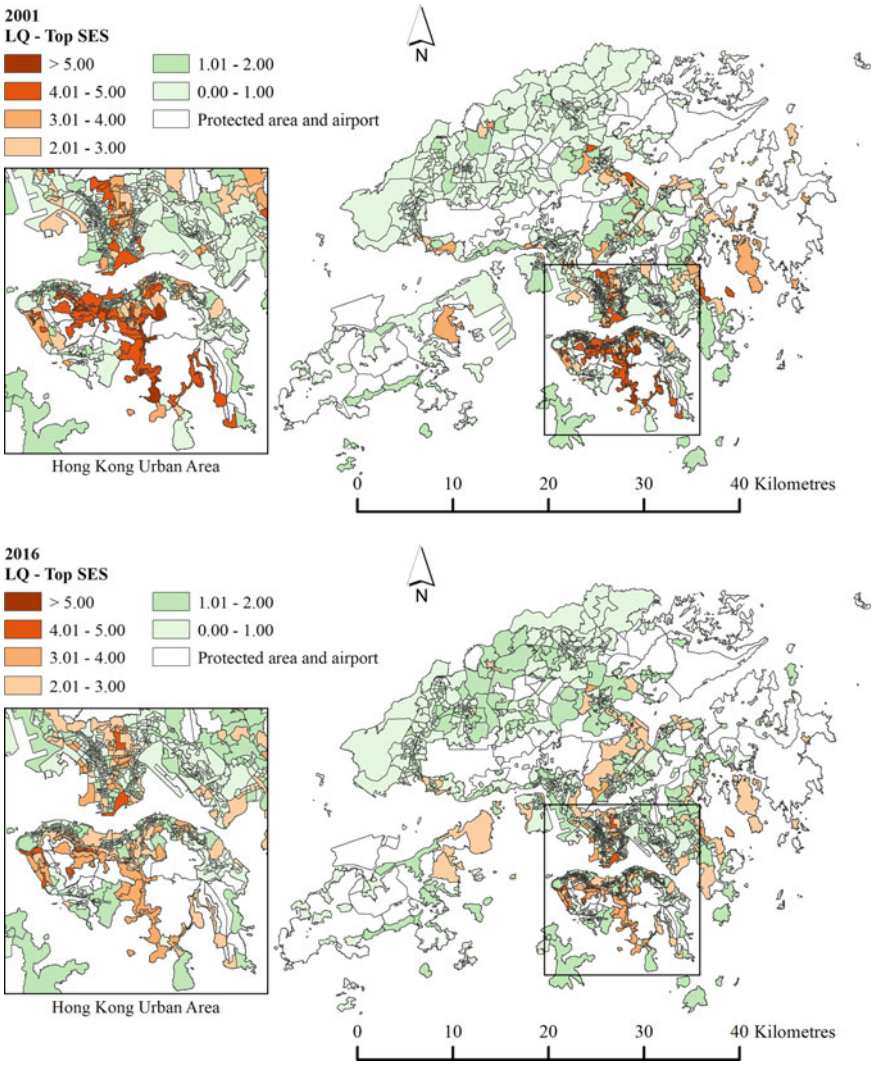

Fig. 6.6 LQ map of top SES group in Hong Kong, in 2001 and 2016. Planning data reproduced with permission of the director of planning. © Hong Kong

Chai Wan on Hong Kong Island, Sham Shui Po and Kwun Tong in Kowloon as well as new towns farther away from urban areas. Notwithstanding the existence of the above clusters, the spatial concentration of bottom SES group was less marked than that of top SES group.

Additionally, some neighbourhoods in urban areas had significant LQ fluctuations in top and bottom SES working population. For example, some neighbourhoods in Wan Chai, a rapidly gentrifying inner-city area, experienced marked LQ increases in

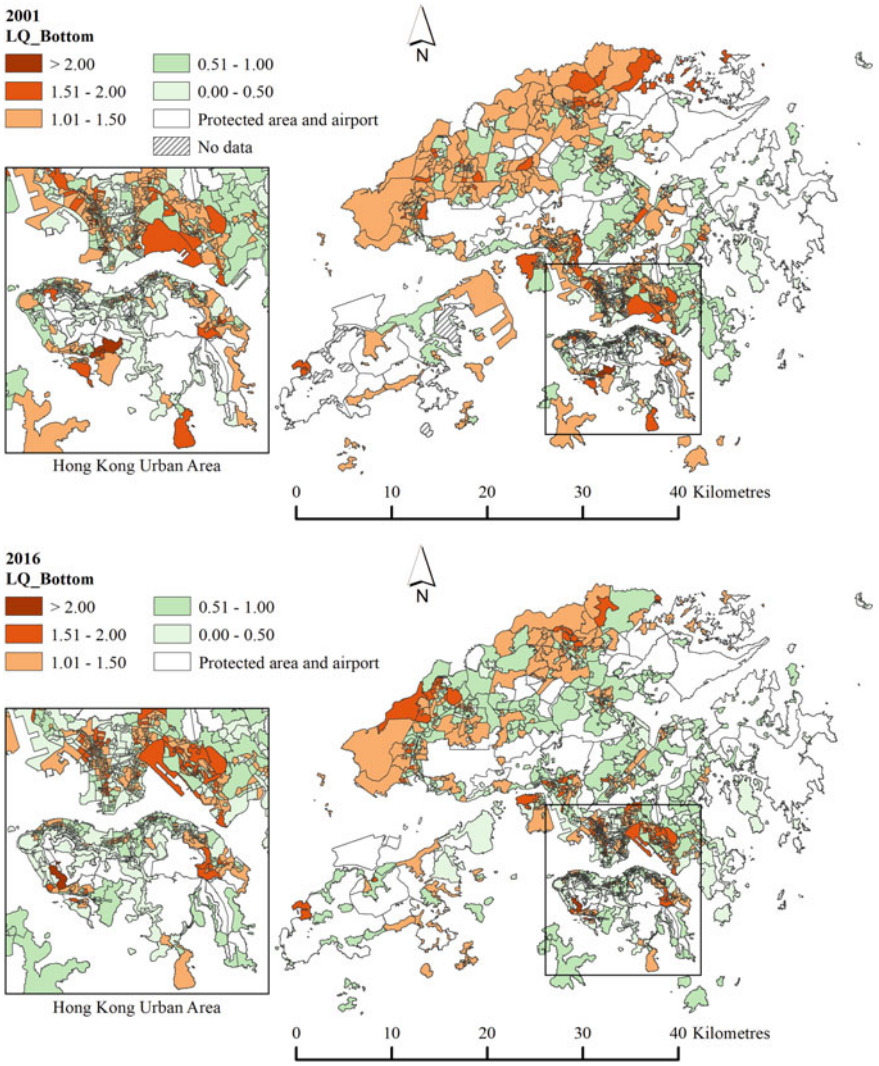

Fig. 6.7 LQ map of bottom SES group in Hong Kong, in 2001 and 2016. Planning data reproduced with permission of the director of planning. © Hong Kong

top SES working population due to the completion of urban redevelopment projects. Meanwhile, neighbourhoods affected by urban renewal projects in Kwun Tong, an industrial and working-class residential area in east Kowloon transforming into a new commercial district, experienced a relatively significant LQ decrease in bottom SES working population.

6.4.4 Socio-Economic Composition of Neighbourhoods

To further examine the pattern of residential segregation, all neighbourhoods are categorised in accordance with their respective proportions of working population from different SES groups. As shown in Fig. 6.8, the majority of neighbourhoods

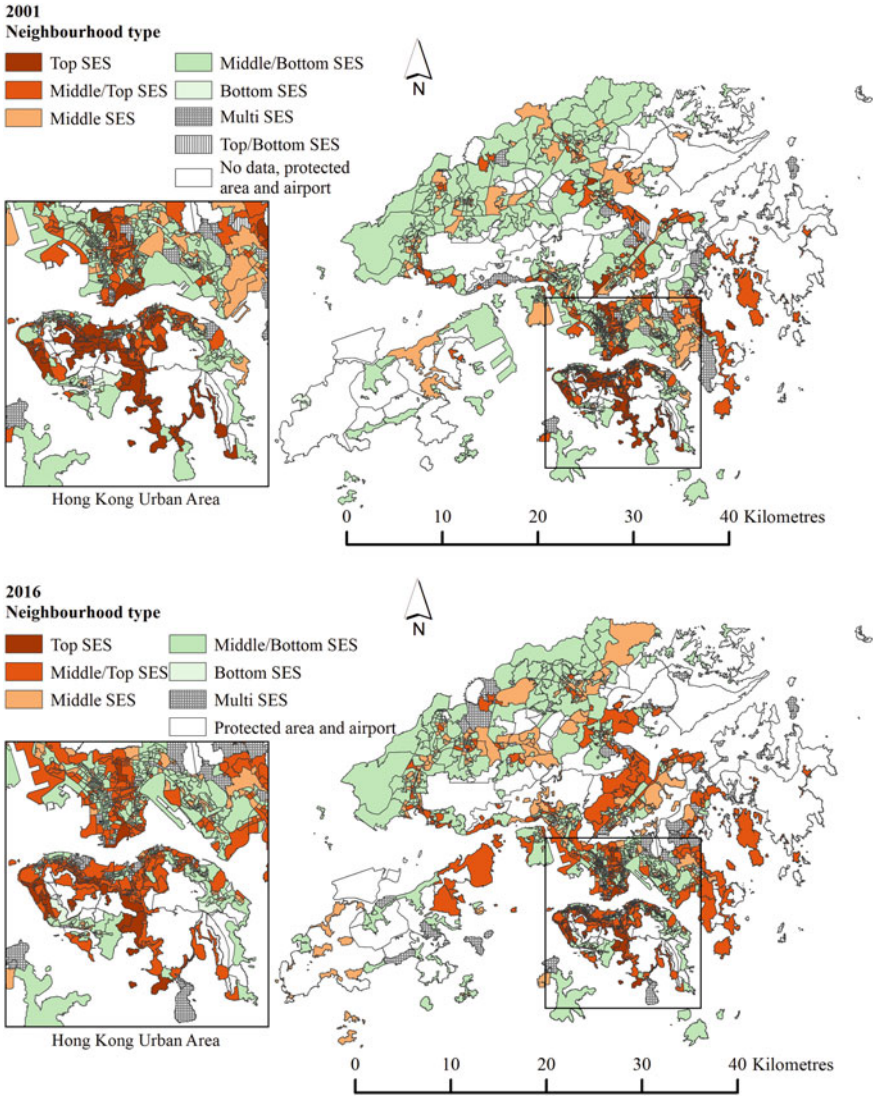

Fig. 6.8 Spatial distribution of neighbourhoods classified by SES in Hong Kong, in 2001 and 2016 (Reproduced from the classification provided by Marcińczak et al. 2015. Planning data reproduced with permission of the director of planning. © Hong Kong)

in Hong Kong can be categorised as mixed (Middle/Top or Middle/Bottom) SES neighbourhoods during the study period, meaning that most neighbourhoods are socio-economically heterogeneous. This situation is probably due to a compact and dense urban living environment where populations with diverse SES have to be accommodated within small areas. Yet, the distribution of 'Middle/Top SES' and 'Middle/Bottom SES' neighbourhoods is rather distinctive, echoing the distribution of the top and bottom SES workforce.

In urban areas, 'Middle/Top SES' neighbourhoods can be found in middle-class and wealthy residential areas, such as the northern coast of Hong Kong Island and coastal areas of Kowloon Peninsula (where gated private high-rise residential towers were built), as well as central Kowloon, a low-density residential area. On the other hand, 'Middle/Bottom SES' neighbourhoods are located in inner cities and public housing areas such as Chai Wan on Hong Kong Island as well as Sham Shui Po and Kwun Tong in Kowloon, all of which had low LQs of the top SES working population. The neighbourhood classification reveals clear socio-economic and spatial segregation in the urban areas of Hong Kong.

Meanwhile, a minority of neighbourhoods labelled as 'Middle SES' and 'Multi-SES' neighbourhoods were evenly distributed throughout the urban areas and new towns without apparent spatial clustering. In new towns, the widespread presence of 'Middle/Bottom SES' neighbourhoods is probably associated with the prevalence of public housing, often considered as neighbourhoods for low-income households. There is sporadic existence of 'Middle/Top SES' neighbourhoods amidst primarily 'Middle/Bottom SES' ones. Hence, new towns in Hong Kong could be regarded as residential areas mainly for the middle and bottom SES population.

Notwithstanding the prevalence of mixed SES neighbourhoods, spatial clustering of top SES neighbourhoods within luxurious residential areas in urban areas (e.g. The Peak and southern Hong Kong Island) was clearly observable. However, some of these neighbourhoods were no longer dominated by top SES population and became 'Middle/Top SES' neighbourhoods by the end of the study period. This was probably due to the departure of top SES population to gentrified urban areas or newly built gated communities in the New Territories, whilst the population there was replaced by middle SES population. Self-segregation of the top SES workforce takes place not only in urban, but also in rural areas. In Fig. 6.8, 'Middle/Top SES' neighbourhoods are confined within gated low-density residential areas with detached houses. In the meantime, rural New Territories house the majority of agricultural workers, who are classified as part of the bottom SES group. Together with other bottom SES workers, they spread evenly in various typical rural settlements, thus giving rise to an extensive 'Middle/Bottom SES' residential area throughout rural New Territories, particularly in northwest and northeast New Territories adjacent to the Hong Kong-Shenzhen border.

6.5 Underlying Causes for Socio-Spatial Segregation

Socio-spatial segregation in Hong Kong has been attributed to income polarisation due to economic restructuring together with rising house prices since the 1980s. After the implementation of China's Open Door Policy in the late 1970s, economic restructuring in Hong Kong transformed the city into a financial and service hub and China's strategic gateway to the global economy. As a consequence, the occupational structure of Hong Kong changed, with a shrinking manufacturing sector and an expanding tertiary sector (see Sect. 4.1). The tertiary sector is subdivided into high-income tertiary sector workers (e.g. managers and administrators, professionals) and low-income tertiary sector workers (e.g. services and sales workers, elementary occupations). Although Hong Kong had experienced rapid and continuous economic growth until the Asian financial crisis in late 1997 (the year Hong Kong returned to Chinese rule), most economic benefits were skewed towards the high-income tertiary sector including the financial and professional sectors. Therefore, top SES workers who were engaged in related occupations experienced rapid income increases. On the contrary, bottom SES workers, many of whom were originally employed in the manufacturing sector that moved out of Hong Kong to mainland China since the early 1980s, had to enter the low pay tertiary sector, sharing little, if any, benefit from economic growth.

Concurrently, soaring house prices over recent decades have made home ownership a very remote dream for those in the bottom SES workforce (see Fig. 6.4). Even though bottom SES workers have experienced income increases, these were severely outpaced by a massive rise of property and rental values. Therefore, bottom SES workers mostly could not afford to buy private units and have to either apply for public rental housing or rent low-cost private units including subdivided flats. These types of dwellings are mostly located in new towns and in inner-city areas such as Sham Shui Po, with relatively high proportions of the impoverished bottom SES working population (see Fig. 6.7). Given the relatively large population size, segregation of the bottom SES workforce was less pronounced than the self-segregation of the top SES workforce over the study period.

Secondly, the urban-biased and property-dominant mode of (re)development led by the government and property developers have sustained or even intensified socio-spatial segregation in Hong Kong. For many decades, the Hong Kong government has relied on massive reclamation projects to create new land along coastal areas to accommodate urban growth and new town development, whilst the vast rural land resources in the heart of the New Territories have been largely left untouched. Urban development has thus long been confined to urban areas and new towns. The Hong Kong government, as the city's dominant landowner under the leasehold land tenure system, has relied on high land prices and related income as major sources (at least 20%) of revenue (Wong 2015). As a thriving property sector is indispensable to sustain high land prices, an 'alliance' between the government and big property development tycoons is perceived to have developed in the course of urban development. To maximise profit from developing valuable land plots, the

planning and building mechanisms have allowed property developers to build high-rise residential blocks, especially in coastal areas with great sea views that often give rise to 'wall-like buildings', 'overshadowing' old urban areas (Ng et al. 2011; Ng 2014; Wong et al. 2011). The exorbitant prices for these housing units mean that only the top SES workforce can afford to live there. Hence, coastal areas in both urban areas and new towns have become primarily top SES neighbourhoods (see Figs. 6.5 and 6.6).

Redevelopment is an alternative means of recycling scarce land resources in urban Hong Kong. Usually, redevelopment projects are carried out by public–private partnership between property developers and the Urban Renewal Authority, a statutory body responsible for facilitating urban redevelopment (Ng 2002; Ye et al. 2015). Therefore, redevelopment projects in the city are directed towards the maximisation of exchange value (Tang 2017) and often result in gentrification of neighbourhoods. As residents affected by redevelopment often cannot afford soaring house prices within their original communities of residence, they are often displaced to other areas with lower rents such as other inner-city areas, new towns (Ye et al. 2015) or even the rural New Territories. Meanwhile, the regenerated built environment in redeveloped areas can only be afforded by the top SES population. As a result, socio-economic segregation in urban Hong Kong is also characterised by the infilling of the top SES population into gentrified inner cities and the exodus of the bottom SES population to other inner cities and remote areas. This process is expected to accentuate in years to come.

Interestingly, it seems that colonial legacies continue to influence the current socio-spatial distribution of Hong Kong's population. In urban areas, the designation of The Peak on Hong Kong Island as a European-exclusive residential zone in the first half of the twentieth century (Lai and Yu 2001) and the establishment of a low-density Garden City in Kowloon Tong before World War II had attracted the elite and affluent population for residence (Forrest et al. 2004; Lo 2005). These residential areas are still mainly for the top SES population today. In the massive territory of the rural New Territories where the colonial government had avoided major investments, except for coastal areas reclaimed for new development, most neighbourhoods are classified as 'Middle/Bottom SES' neighbourhoods.

6.6 Conclusion

The legacies of Hong Kong's colonial urban development history can still be seen in the new millennium. Dictated by historical events, a dual land regime can be seen in Hong Kong: dense urban development had once been concentrated on Hong Kong Island and Kowloon until the development of new towns in the 1970s; the implementation of a 'Small House Policy' since 1972, and the designation of conservation areas, green belts and Sites of Special Scientific Interest in rural New Territories, have led to low population density. Such spatial patterns of urban development and population distribution have sustained a property-dominant mode of urban-biased

development, a cornerstone of the government's high land price policy to sustain its coffer.

Meanwhile, the restructuring (or tertiarisation) of Hong Kong's economy as a result of the Open Door Policy in China since the 1980s has led to occupational and income polarisation among the city's working population. As depicted by the rising trend of the Gini Index, the income gap widened constantly despite the improvements in welfare provision over recent decades. The widening income gap coupled with the astronomical rise of housing costs also intensified residential segregation in the city, especially in urban areas and new towns.

As indicated in Tables 6.1, 6.2 and Fig. 6.8, self-segregation of the top SES working population is arguably one of the key features of socio-spatial segregation in Hong Kong as the IoD levels between top and bottom SES occupational groups mostly stood at 0.5 or above throughout the study period. Spatial clustering of top SES neighbourhoods is clearly identifiable. In the meantime, the IoD levels between middle and bottom SES groups as well as between top and middle SES groups generally stayed at 0.4 or below, showing no apparent residential segregation between these occupational groups.

Contrary to other major cities where segregation is characterised by monotonous neighbourhoods with a dominant SES and/or racial group, segregation in Hong Kong, due to its dual land regime, is marked by the clustering of two types of socio-economically mixed neighbourhoods: 'Middle/Top SES' neighbourhoods in high- and middle-class residential areas and 'Middle/Bottom SES' neighbourhoods where old tenement buildings and public housing dominate. This is especially obvious towards the end of the study period. Such a dichotomy of socio-economically heterogeneous neighbourhoods, a consequence of a compact urban environment in the city's dual urban–rural land and density regimes, demonstrates Hong Kong's distinctive feature of residential and socio-economic spatial segregation.

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Chapter 7
Income Inequality and Socioeconomic Segregation in Jakarta

Deden Rukmana and Dinar Ramadhani

Abstract Socioeconomic segregation has become a common phenomenon, both in the Global North and Global South, and highly relates to income inequality. The merging of these two notions affects the geography of residential areas which are based on the socio-occupational composition. This chapter focuses on the Jakarta Metropolitan Area (JMA). Not only is Jakarta the largest metropolitan area in Southeast Asia, it is also one of the most dynamic. Batavia, the colonial capital of the former Dutch East Indies in the first half of the twentieth century, was a small urban area of approximately 150,000 residents. In the second half of the century, Batavia became Jakarta, a megacity of 31 million people and the capital of independent Indonesia was beset with most of the same urban problems experienced in twenty-first-century Southeast Asia, including poverty, income inequality, and socioeconomic segregation. This study aims to identify the correlation among income inequality, socioeconomic segregation, and other institutional and contextual factors which caused residential segregation in JMA. The analysis consists of two stages. First, we examine income inequality measured by the Gini Index as well as the occupational structure based on the International Standard Classification of Occupations (ISCO). Second, we investigate residential segregation by using the Dissimilarity Index as a result of socioeconomic intermixing in residential areas. The data in this study comes from multiple sources including Indonesia's Central Bureau of Statistics, Indonesia's National Socio-economic Survey (Susenas), Indonesia's Economic Census, Jakarta's Regional Bureau of Statistics, and policies related to the housing system and investment in the JMA. This study also produces maps of socioeconomic segregation patterns from several sources including Jakarta's Geospatial Information Centre, Jakarta's Spatial Plan Information System, and the Indonesian Poverty Map by the SMERU Research Institute.

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Keywords Income inequality · Residential segregation · Rapid urbanization · Jakarta

7.1 Introduction

Socioeconomic segregation has become a common phenomenon, both in the Global North and the Global South, and is strongly related to income inequality. The residential geography of income inequality represents where different income groups live, but also affects an individual's spatial opportunity structures. This study will focus on residential segregation in the metropolitan region of Jakarta. Not only is Jakarta the largest metropolitan area in Southeast Asia, it is also one of the most dynamic. Batavia, which used to be the colonial capital of the Dutch East Indies in the first half of the twentieth century was a small urban area of approximately 150,000 residents. In the second half of the twentieth century, Batavia became Jakarta, a megacity of 31 million people and the capital of independent Indonesia was beset with most of the same urban problems experienced in twenty-first-century Southeast Asia.

The modern city of Jakarta was envisioned by President Soekarno in the early 1960s. He used the 1962 Asian Games to modernize Jakarta by building the national monument of Monas, government and parliament buildings, shopping plazas, the national stadium, and hotels. The New Order regime continued such development while Indonesia enjoyed steady economic growth during the 1980s and 1990s. The boom of the property sector through foreign and domestic investments transformed Jakarta as it gained the status as a global city. Jakarta has been the powerhouse of Indonesia's economy since the colonial era due to its high concentration of skilled labor and entrepreneurs and Jakarta's dominance in the financial and business sector (Firman 2008; Salim and Kombaitan 2009). Jakarta is also the most attractive area for domestic and foreign investment in Indonesia. Jakarta's contribution to Indonesia's GDP increased from 14.9% in 2000 to 16.7% in 2010 and 17.5% in 2016.

Despite robust development and economic growth, Jakarta remains a place of poverty. The contrast between rich and poor is highly pronounced in many parts of the city (Prasetyanti 2015; Salim et al. 2019). Many modern towers in Jakarta are surrounded by kampungs, which are unplanned, incrementally developed areas with small plots of land and low-quality building structures and materials and are often associated with slums (Winarso 2010). Most of the inhabitants of kampungs are low-income residents.

This chapter explores income inequality and residential segregation between socioeconomic groups in Jakarta, and the institutional and contextual factors that cause residential segregation in the metropolitan region of Jakarta. The analysis consists of two stages. First, we examine income inequality measured by the Gini Index as well as the occupational structure based on the International Standard Classification of Occupations (ISCO). Second, we investigate residential segregation by using the Location Quotients (LQs) and the Dissimilarity Index as a result of socioeconomic intermixing in residential areas.

This chapter uses data from multiple sources including Indonesia's Central Bureau of Statistics, the National Socio-Economic Survey (Susenas), the National Labor Force Survey (Sakernas), and the Jakarta's Regional Bureau of Statistics, as well as policies related to the housing system and investment in the metropolitan region of Jakarta. The study will also create maps representing socioeconomic segregation patterns and the data will be obtained from several sources including Jakarta's Geospatial Information Centre, Jakarta's Spatial Plan Information System, and the Indonesian Poverty Map by the SMERU Research Institute.

7.2 Jakarta: The Core, Inner Peripheries and Outer Peripheries

Jakarta is the capital of Indonesia and the largest city in Southeast Asia. The core of the metropolitan region of Jakarta is called *Daerah Khusus Ibukota (DKI)* or the Special Capital Region of Jakarta. DKI Jakarta has provincial government level status and covers a total area of 664 square kilometers. DKI Jakarta consists of five municipalities (West Jakarta City, East Jakarta City, Central Jakarta City, North Jakarta City, and South Jakarta City) and 42 districts (*kecamatan*). The metropolitan region of Jakarta is popularly known as *Jabodetabek,* taken from the initial letters of the administrative units of Jakarta, Bogor, Depok, Tangerang, and Bekasi. *Jabodetabek* consists of the core, inner peripheries, and outer peripheries. The inner peripheries of the metropolitan region of Jakarta include four municipalities (City of Tangerang, City of South Tangerang, City of Depok, City of Bekasi), whereas the outer peripheries of *Jabodetabek* include the City of Bogor, Tangerang Regency, and Bekasi Regency. The peripheries of *Jabodetabek* are within the jurisdiction of two provinces. The City of Bogor, City of Depok, City of Bekasi, and Bekasi Regency are within the jurisdiction of West Java Province, whereas Tangerang City, City of South Tangerang, and Tangerang Regency are within the jurisdiction of Banten Province as shown in Fig. 7.1. The metropolitan region of Jakarta covers a total area of 6,392 square kilometers. The four municipalities within the inner peripheries of *Jabodetabek* are founded in the 1990s and 2000s. Tangerang City, City of Bekasi, City of Depok, and City of South Tangerang were founded in 1993, 1996, 1999, and 2008, respectively. Depok City seceded from Bogor Regency and Bekasi City was part of Bekasi Regency. Meanwhile, Tangerang City and City of South Tangerang seceded from Tangerang Regency.

The population of Jakarta was about 115,000 in 1900, and increased to 544,823 in 1940. After Independence, Jakarta's population increased by nearly three times to 1.43 million in 1950. It increased to 2.91 million in 1960 and 4.47 million in 1970. Table 7.1 shows the population of the metropolitan region of Jakarta including Jakarta, the inner and outer peripheries of Jakarta, from 1990 to 2010 and 2015. All data come from the population censuses, except the population data of 2015 from the intercensal survey of Indonesia (SUPAS). The population of the metropolitan

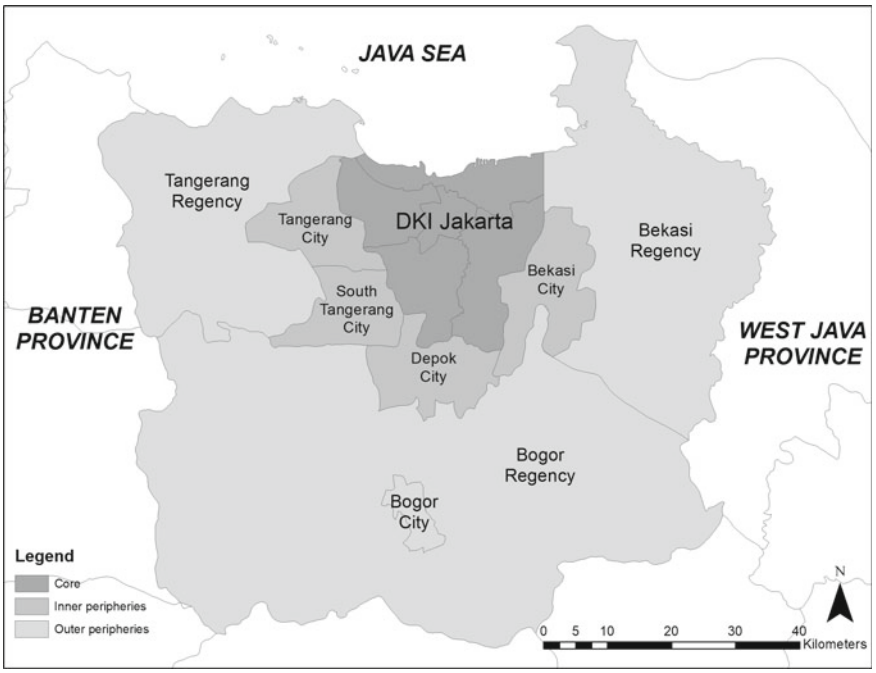

Fig. 7.1 Map of the metropolitan region of Jakarta

region of Jakarta increased from 17.14 million in 1990, to 20.63 million in 2000, to 28.01 million in 2010, and to 31.62 million in 2015. In 2015, the metropolitan region of Jakarta accounted for 12.39% of Indonesia's total population, while this population resides in less than 0.3% of Indonesia's total land area. The proportions of *Jabodetabek's* population to the total Indonesia's population have steadily increased from 9.6% in 1990, to 10.0% in 2000, and to 11.8% in 2010.

This chapter focuses on the core and the inner peripheries of the metropolitan region of Jakarta or *Jabodetabek* including all five municipalities within DKI Jakarta and Tangerang City, South Tangerang City, Depok City, and Bekasi City as the study area. The selection of the core and the inner peripheries of *Jabodetabek* refers to the functional urban areas (FUAs) as defined by the OECD. As shown in Fig. 7.1, Tangerang City, South Tangerang City, Depok City, and Bekasi City are neighboring areas of DKI Jakarta to the West, South, and East, respectively. The population density of these municipalities in 2015 is 11,531 inhabitants per square kilometers. The population density of each municipality in the inner peripheries of *Jabodetabek* is presented in Table 7.1.

The chapter uses a report published in 2014 by the Central Board of Statistics "Statistik Komuter *Jabodetabek*" (The Statistics of Commuters in *Jabodetabek*) to identify the proportion of employed residents of the peripheries of the metropolitan region of Jakarta who work in the urban core or DKI Jakarta. According to this report

Table 7.1 Population and population density of the metropolitan region of Jakarta in 1990–2015

Area	Number of population (in millions)				Area (in sq. km)	Population density in 2015 (per sq. km)
	1990	2000	2010	2015		
Core	8.26	8.39	9.60	10.17	664	15,316
DKI Jakarta	8.26	8.39	9.60	10.17	664	15,316
Inner peripheries	n.a	4.93	7.22	8.36	725	11,531
City of Tangerang	n.a	1.33	1.80	2.04	164	12,439
City of South Tangerang	n.a	0.80	1.29	1.53	151	10,132
City of Depok	n.a	1.14	1.75	2.09	200	10,450
City of Bekasi	n.a	1.66	2.38	2.7	210	12,857
Outer peripheries	8.88	7.31	11.20	13.09	5003	2,616
City of Bogor	0.27	0.75	0.95	1.04	109	9,541
Tangerang Regency	2.77	2.02	2.84	3.36	960	3,500
Bekasi Regency	2.10	1.62	2.63	3.23	1,270	2,543
Bogor Regency	3.74	2.92	4.78	5.46	2,664	2,049
Jabodetabek	17.14	20.63	28.02	31.62	6,392	4,946

Sources Rukmana et al. (2018), Central Board of Statistics (2015)

(Central Board of Statistics 2014), less than 15% of residents living in municipalities within the outer peripheries of *Jabodetabek,* actually work in DKI Jakarta. The City of Bogor, Tangerang Regency, Bekasi Regency, and Bogor Regency have 3.2%, 1.7%, 4.2%, and 2.8% of their residents, respectively, who commute and work in DKI Jakarta.

Meanwhile, three municipalities within inner peripheries of the metropolitan region of Jakarta, including Depok City, South Tangerang City, and Bekasi City, have at least 15% of their residents who commute and work in DKI Jakarta. Depok City, South Tangerang City, and Bekasi City have 15.7%, 15.3%, and 15.5% of their residents, respectively, working in the core of *Jabodetabek*. Tangerang City is the only municipality within the inner peripheries of *Jabodetabek* has less than 15% of the residents working in DKI Jakarta (10.7%). However, Tangerang City is still included in the study area of this chapter because of its high population density (12,439 inhabitants per km^2), and its close proximity to the core of *Jabodetabek.*

7.3 Rapid Urbanization and Income Inequality

Jakarta experienced rapid urbanization in the 1980s and 1990s. The population of the core area of *Jabodetabek* or DKI Jakarta increased from 6.50 million in 1980 to 8.26 million in 1990. The population of the peripheries of *Jabodetabek* increased from 5.41 million to 8.88 million in the same period (Rukmana et al. 2018). In the 1990s, Jakarta sustained the rapid growth of population, but the growth occurred mostly in the peripheries. The core area of *Jabodetabek* experienced a slow growth of population of 0.15% per year, but the peripheries of *Jabodetabek* experienced a very high growth of population of 3.78% per year. In addition to a high population growth and rural-to-urban migration, this rapid suburbanization was a result of Indonesia's steady economic growth and Indonesia's growing linkages to the world economy (Herlambang et al. 2019; Indraprahasta and Derudder 2019; Leaf 1994; Winarso et al. 2015). In the early 1980s, agricultural areas and forests in the outskirts of Jakarta were transformed into large-scale subdivisions and new towns (Silver 2008). Jakarta's suburbanization followed the development of a network of freeways from Jakarta to the peripheries including the Jagorawi toll road, the Jakarta-Merak toll road, and the Jakarta-Cikampek toll road (Henderson and Kuncoro 1996).

The urban development in the peripheries of *Jabodetabek* is a planned or regulated process (Leaf 1994). It contrasts the unregulated urban growth in the Jakarta's kampungs. Suburban development in Jakarta is made up of large-scale housing projects and new town developments by private developers. These housing projects and new towns are sold to mostly middle and upper-income residents (Firman 2004; Leaf 1994). Some of the new towns have excellent infrastructure and facilities, including shopping malls, hospitals, and golf courses. Many middle and upper-income residents moved from the core of the urban region to new towns in the peripheries. The poor and lower middle-income residents of the metropolitan region of Jakarta still live in unplanned and unregulated settlements of kampungs located in both the core area and in the peripheries. Most residents in kampungs own their housing units, built with low-quality building materials on small plots of land. Most of the dwellings are constructed gradually by the residents from permanent and non-permanent materials, depending largely on what the residents can afford (Tunas and Peresthu 2010). Many poor kampung residents in the metropolitan region of Jakarta are marginalized urban residents who illegally construct their dwellings on state land such as riverbanks, disposal sites, and railway tracks, or on private unoccupied land (Rukmana 2018; Winayanti and Lang 2004).

Jakarta is a city of dualistic contrasts (Leaf 1994). The new suburban settlements or the 'modern' city are associated with wealth, formality, and globalized standards of urban development. Meanwhile, the kampung city is associated with poverty, informality, and traditional standards of living. The existence of new suburban communities and kampungs in Jakarta reflects the socioeconomic dualism which pervades Indonesia's urban society (Leaf 1994; Winarso 2010). The dualism of Jakarta's society also reflects the widening socioeconomic disparities and residential segregation based on income level and lifestyle. Firman (2004) argues that the

suburban development of Jakarta creates enclave settlements which segregate middle and upper-income residents from low-income residents.

The 1992 Housing and Settlement Law introduced a 1:3:6 provision that requires developers to build three middle-income and six low-income units for every high-income housing unit. This socially integrated housing policy had two main objectives including producing more affordable houses and encouraging more socially integrated housing development through mixed-income residential areas (Mungkasa 2013; Silver 2008; Yuniati 2013). In most large-scale housing projects in the metropolitan region of Jakarta, the developers negotiated the housing compositions with local governments and even replaced low-cost housing units with public facilities and infrastructure development (Tunas and Darmoyono 2014). The developers circumvented the 1:3:6 regulation by building the required low-income housing elsewhere, or not at all (Herlambang et al. 2019).

Suburban development in the region of Jakarta was disrupted by the economic crisis which hit many Asian countries in 1997. This crisis resulted in a rapid decrease in domestic and foreign investment in Jakarta. The annual economic growth in Jakarta fell to minus 7% (Firman 1999). More than 450 developers who built new towns and large-scale housing projects in the metropolitan region of Jakarta went out of business. The property industry consolidated through mergers (Herlambang et al. 2019). By 2002, about two-fifths of the property projects in the metropolitan region of Jakarta suddenly came to a stop (Firman 2004; Indraprahasta and Derudder 2019).

From the late 1960s to the mid-1990s, Indonesia's income per capita increased by 5% per year and the overall Gini coefficient was about 0.33. Indonesia's Gini coefficient is lower than those of the Philippines and Thailand (0.45) and Malaysia (0.50) (Timmer 2007). The Asian economic crisis caused a sharp reduction in Indonesia's GDP of over 13% and poverty rates doubled in 1998 (Skoufias and Suryahadi 2000). The Asian economic crisis also sharply reduced inequality in Indonesia, particularly in the metropolitan region of Jakarta.

Indonesia's economy recovered from the Asian economic crisis as early as 2005 (Herlambang et al. 2019). The rate of Indonesia's economic growth was 5.7% per year between 2004 and 2008 (Rukmana et al. 2018), and the influx of foreign direct investment increased again in the metropolitan region of Jakarta (Indraprahasta and Derudder 2019). The recovery of Indonesia's economic growth resulted in the construction of high-rise luxury apartments (Rukmana et al. 2018) in many districts of the core of the metropolitan region of Jakarta such as Nerina Tower in Cempaka Putih District, Paradise Mansion Apartment in Kalideres District, and Elpis Residence in Sawah Besar District (Colliers International 2017). Many investors of these apartments came from China, Singapore, Japan (Colliers International 2018).

Income inequality measures at the neighborhood level, such as sub-districts (*kelurahan*), with a population of approximately 20,000 people are not available in Indonesia (Roitman and Recio 2019). Unlike most census data sets in countries in the Global North, Indonesia's censuses do not provide information on household income. This chapter uses the Gini Index of household expenditure as a proxy measure of income inequality. The Gini Index of household expenditure in Indonesia was calculated and published by the SMERU Research Institute. The data source for the Gini

Index is the National Socioeconomic Survey (Susenas) and Indonesia's Economic Census.

The Gini Index of household expenditure in Indonesia by districts is available for 2010 and 2015. The average population of each district is about 100,000. The SMERU Research Institute published the Gini Index in both years and made them available on their website. The SMERU Research Institute stated in 2019 that the Gini Index was developed from a series of variables from individual, household, and sub-district levels, and that the standard error of the 2010 Gini Index derived from the National Socioeconomic Survey (Susenas) of 2010 is large. This chapter uses only the 2015 Gini Index due to the large standard error of the 2010 Gini Index. We retrieved all Gini Indices for all 85 districts of the study area from the SMERU Research Institute website. The 85 districts of the study area include 42 districts in DKI Jakarta, 13 districts in Tangerang City, 7 districts in South Tangerang City, 11 districts in Depok City, and 12 districts Bekasi City.

The 2015 Gini Index in the study area ranges from 0.25 in Bantargebang District of Bekasi City to 0.40 in Kelapa Gading District of DKI Jakarta's North Jakarta City. The 2015 Gini Index average in the area study is 0.31. This Gini Index is slightly lower than Indonesia's Gini Index (0.40) in the same year. The Gini Index of four municipalities in the inner peripheries of the metropolitan region of Jakarta including Depok City (0.30), South Tangerang City (0.31), Tangerang City (0.31), and Bekasi City (0.30) are slightly lower than those of the municipalities in DKI Jakarta (0.33) (Fig. 7.2).

The distribution of the 2015 Gini Index in the study area is presented in Fig. 7.3**.** Five districts in the study area with the highest Gini Index are located in Central Jakarta City (Cempaka Putih and Menteng Districts), North Jakarta City (Kelapa Gading District), East Jakarta City (Duren Sawit District), and South Jakarta City (Kebayoran Baru District). A high Gini Index indicates high levels of economic inequality in those districts. In districts with high-economic inequality, many luxury apartment buildings, shopping malls, and offices are surrounded by kampungs (Budi 2013; Simatupang et al. 2015; Yunianto 2014). Districts with high-economic inequality also have gated communities which represent socioeconomic enclaves for the rich (Hun 2002). People who can afford to live in gated communities in Jakarta do so because of security reasons (Leisch 2002). In the inner peripheries of the metropolitan region of Jakarta, there are a number of districts with a moderate-to-high level of income inequality. This income inequality increased in those districts because of the existence of gated communities including in South Tangerang City (Leisch 2002; Winarso et al. 2015; Yandri 2015), Tangerang City (Leisch 2002; Surya Wardhani 2016), and Bekasi City (Diningrat 2015).

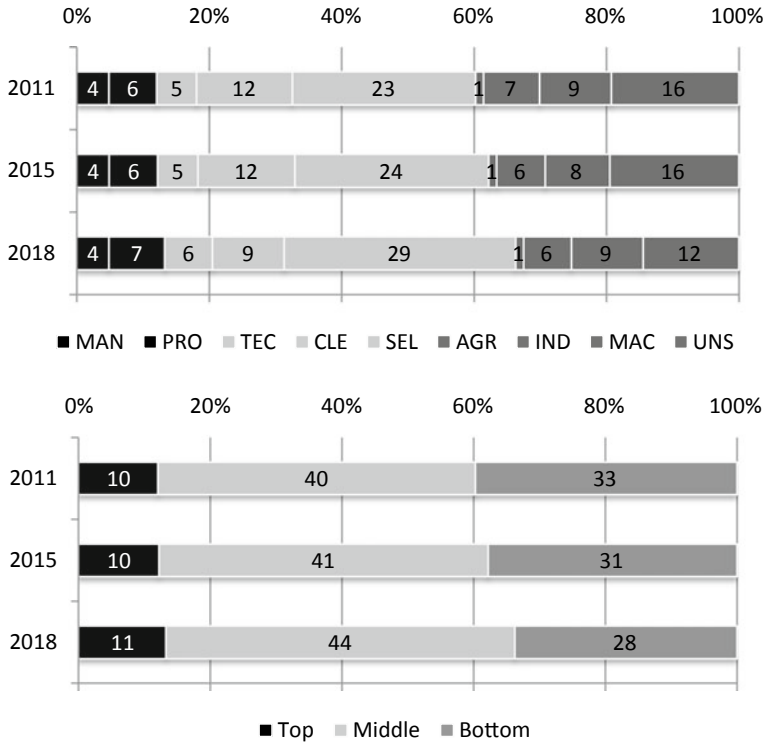

Fig. 7.2 Distribution of occupational groups and change over time in the metropolitan region of Jakarta

7.4 Changes in Occupational Structures

The economy of the metropolitan region of Jakarta is composed of very diverse activities and related occupations. This section discusses changes in the occupation structures in the metropolitan region of Jakarta. We use data from the annual National Labor Force Survey (Sakernas) in three years (2011, 2015, and 2018). We use this data to analyze the patterns of socioeconomic segregation over time. The classifications of the economically active population by occupation in the Sakernas are in line with those of the International Standard Classification on Occupations (ISCO). The breakdown of occupational structures of the ISCO also relates to earlier studies on socioeconomic segregation (Marcińczak et al. 2015; Musterd et al. 2017).

The occupation classifications of the Sakernas has nine ISCO categories including managers (MAN), professional (PRO), technicians (TEC), clerks (CLE), sellers (SEL), agriculture workers (ARG), industrial workers (IND), machine operators (MAC), and unskilled workers (UNS). The nine categories were grouped into three broader occupational groups. The managers and professionals fall into the top occupational group (TOG). The technicians, clerks, and sellers are categorized in the

middle occupational group (MOG), while agricultural workers, industrial workers, machine operators, and unskilled workers form the bottom occupational group (BOG).

Figure 7.2 shows the distribution of occupational groups in 2011, 2015, and 2018 in the metropolitan region of Jakarta. It is clear that the population in Jakarta Metropolitan Area (JMA) is dominated by the MOG, and the percentage of this middle group has grown between 2011 and 2018. Sellers are the largest occupational group, followed by unskilled workers, clerks, machine operators, industrial workers, professionals, technicians, manager, and agricultural workers. The small number of agricultural workers in the Jakarta region is due to the urban character of the region, and the disappearance of farmland and rice fields in the JMA. The largest occupational category in the BOG consists of unskilled workers. As can be seen in Fig. 7.2, both the TOG and MOG have been increasing from 2011 to 2018. In the meantime, the BOG have been decreasing during the same time period. The percentage of the TOG is far below the BOG and MOG. The number of workers in the TOG, with high-quality human resources, is still low for a growing megacity like the JMA. The size of this top group has hardly increased between 2011 and 2018.

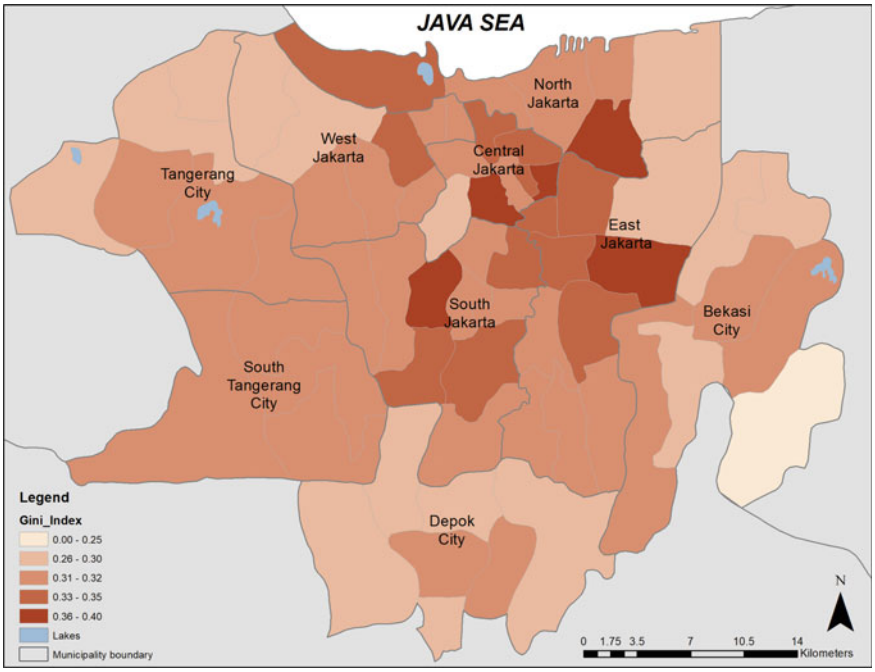

Fig. 7.3 The 2015 Gini index in the metropolitan region of Jakarta

7.5 Levels of Residential Segregation Between Socioeconomic Groups

The Dissimilarity Index (DI) in Table 7.2 shows the level of segregation between the different occupational categories. This chapter uses data on the occupation structure from the annual National Labor Force Survey (Sakernas) to calculate dissimilarity index in the metropolitan region of Jakarta. Indonesia's censuses or household surveys do not provide socioeconomic information of households at the neighborhood level. Data on the occupation structure derived from the annual National Labor Force Survey (Sakernas) can only be used at the level of municipalities or higher. We have a total of nine municipalities including five municipalities within DKI Jakarta (West Jakarta City, East Jakarta City, Central Jakarta City, North Jakarta City, and South Jakarta City) and four municipalities in the inner peripheries of the metropolitan region of Jakarta (City of Tangerang, City of South Tangerang, City of Depok, City of Bekasi). The population size of these municipalities in 2015 ranges from 0.91 million in Central Jakarta City to 2.84 million in East Jakarta City. The Sakernas has very limited samples at the district or sub-district levels; therefore, we cannot use a smaller geographic unit for calculating a dissimilarity index.

In Table 7.2, the DI in 2011 is shown below the diagonal gray cells, while the DI in 2018 is shown above the diagonal gray cells. The most prominent DI in 2011 is segregation between agricultural workers and all other categories in the TOG and MOG. But it has to be noted that the group of agricultural workers is very small. The lowest DI is denoted by technicians and professionals (6.3), followed by unskilled workers and clerks (9.7). In 2018, the highest DI is found for sellers and agricultural workers (33.9), and the lowest DI for clerks and other categories with values below 11, except that of the agricultural workers (33.9). The lowest DI in 2018 is found for technicians and professionals (5.6).

Table 7.2 Indices of dissimilarity (multiplied by 100) in 2011 and 2018 in the metropolitan region of Jakarta

Jakarta												
	MAN	PRO	TEC	CLE	SEL	AGR	IND	MAC	UNS	**TOP**	**MID**	**BOT**
MAN		11	11	6	8	32	13	10	7			
PRO	11		6	10	14	29	15	13	14			
TEC	12	6		10	15	32	15	13	15			
CLE	18	11	11		7	31	9	9	7			
SEL	24	20	16	10		34	12	13	6			
AGR	47	44	46	45	41		24	29	32			
IND	24	21	25	19	18	29		10	12			
MAC	15	14	17	17	21	38	12		13			
UNS	16	12	14	10	12	38	12	12				
TOP											**8**	**9**
MID										**15**		**6**
BOT										**13**	**9**	

For the broader occupational group, it can be seen that the DIs for all combinations of groups are decreasing. It means that the spatial enclaves of these socio-occupational groups are getting smaller. In other words, the segregation level among occupational groups is decreasing and the municipalities in Jakarta are more mixed in 2018 than in 2011. It is especially apparent in the spatial proximity between the kampongs and neighboring luxury apartment buildings in the inner city, such as in Mega Kuningan (Budi 2013), Menteng, and Rasuna (Simatupang et al. 2015), and Kemayoran (Yunianto 2014).

The biggest decline is related to the DI between the TOG and MOG category, which halves from 15 in 2011 to 7.7 in 2018. It is then followed by the 3.9 points decrease of the TOP and BOG from 13 in 2011 to 9.1 in 2018. The smallest reduction is found for the DI of the MOG and the BOG category from 8.6 in 2011 to 5.9 in 2018. It can also be seen that the order of the highest to smallest DI is shifting. The order in 2011 is TOG-MOG (15), TOG-BOG (13), and MOG-BOG (8.6), while the order in 2018 is TOG-BOG (9.1), TOG-MOG (7.7), and MOG-BOG (5.9). From the order of the DI, it can be concluded that TOG is still the most segregated group when compared with the others, though the gap is getting smaller.

7.6 Geography of Residential Segregation Between Socioeconomic Groups

This section analyzes the geography of residential segregation between the top and the bottom socioeconomic groups. We use location quotient maps for the top and bottom occupation groups at the level of municipalities as a proxy measure of changes in residential segregation between socioeconomic groups. Location quotients of the occupational structure by municipalities in the study area were calculated from the 2011 and 2018 Sakernas surveys. The location quotients of the TOG in 2011 range from 0.58 in North Jakarta City to 1.72 in Central Jakarta City. Central Jakarta City remained as the municipality with the highest location quotient (1.45) and East Jakarta City became the municipality with the lowest location quotient (0.88) in 2018. The location quotients for the BOG in 2011 ranged from 0.72 (East Jakarta City) to 1.42 (Tangerang City). In 2018, East Jakarta City remained as the municipality with the lowest location quotient (0.71) and Central Jakarta City was the municipality with the highest location quotient for the BOG (1.75).

Figure 7.4 shows the location quotient maps for the top and bottom occupational groups in 2011 and 2018. These maps cannot show changes in residential segregation, but they do give an indication of changes in the geographical concentrations of the top and bottom occupational groups at the municipal level. The TOG remains highly concentrated in Central Jakarta City and South Tangerang City. Some luxury apartments such as Keraton and Le Parc in Central Jakarta City reached to US$10,700 and US$5,350 per m^2, respectively (Alexander 2019). This price is far higher than the rest of the city. In contrast, the lowest land price in the inner city of Jakarta

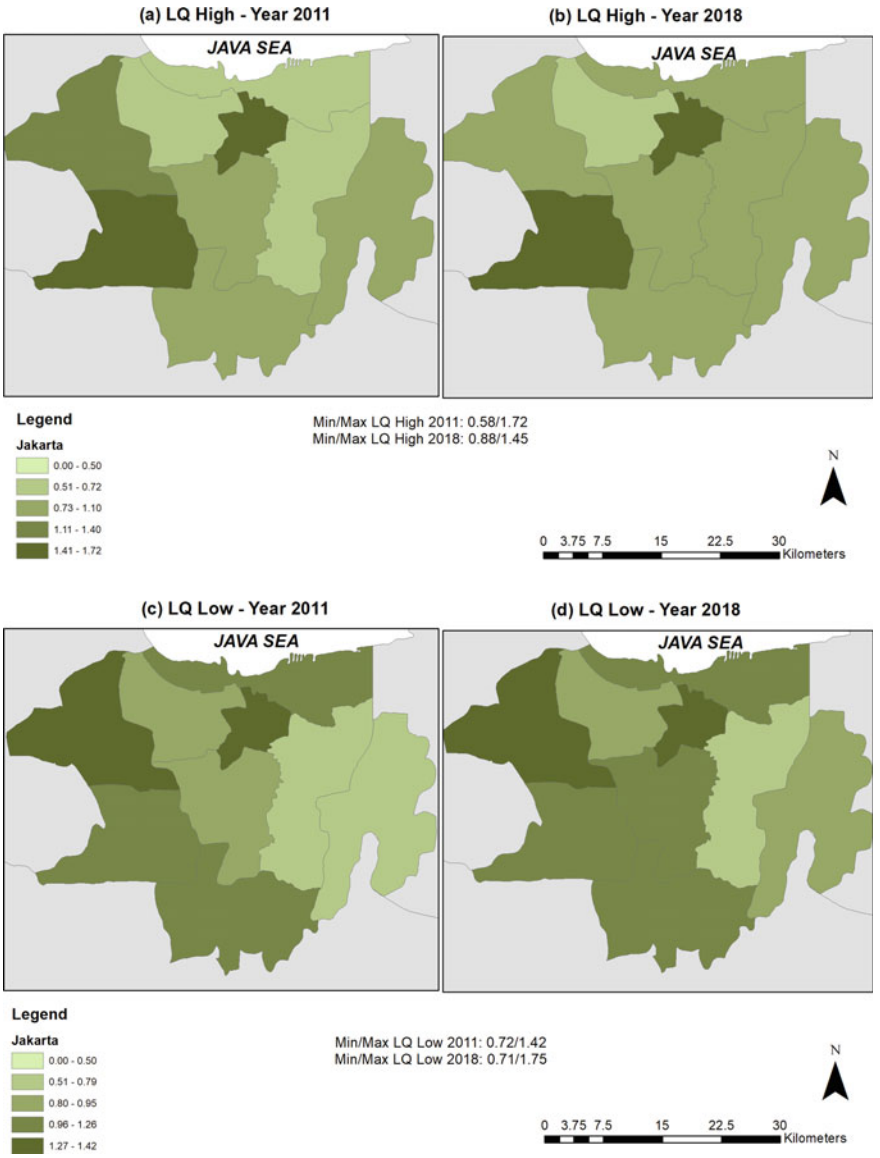

Fig. 7.4 Location quotients for the top and bottom occupational groups in the metropolitan region of Jakarta

can be found at Kamal Muara, North Jakarta, which is worth merely US$34 per m^2 (Elmanisa et al. 2016). Meanwhile, South Tangerang City has a couple of large luxury residential areas including Bintaro Jaya and BSD City.

Central Jakarta City became a concentration area for both the TOG and BOG. According to an interview with staff from the Housing Department of Jakarta Province, such a concentration is the result of the fact that luxury houses and apartments are increasingly found in Central Jakarta City. It is also the location of many shopping malls, the central business district, government buildings, embassies, and official government houses which makes the land and housing prices expensive. The high concentration of the TOG in South Tangerang City is caused by the development of a new central business district, and middle-upper class housing, especially in Bumi Serpong Damai (BSD). In addition, both Central Jakarta City and South Tangerang City have good accessibility and are connected with highways and train routes.

In reference to Fig. 7.4a, b, many households of the top occupational group moved from Tangerang City to the core of the metropolitan region of Jakarta. It relates to the fact that a large industrial area is located in Tangerang. The laborers which fall into the BOG mostly reside in Tangerang. Meanwhile, the BOG remains highly concentrated in Central Jakarta City and Tangerang City. Behind the high-rise buildings in Central Jakarta City, there can be found many informal housing areas in the form of urban kampongs. Based on an interview with a staff member from the Housing Department of Jakarta Province, urban kampongs in Jakarta are the residential locations for the BOG or informal sector workers such as street vendors, cleaning workers, and security guards.

The changes of location quotients indicate that four municipalities have an increased concentration of the TOG in 2018 including West Jakarta City, East Jakarta City, North Jakarta City, and Depok City. It is marked by several concentrations of luxury apartments found in those municipalities, such as Veranda Residence, Wang Residence, St Moritz (West Jakarta City), The H Residence, Patria Park (East Jakarta City), Regatta London Tower, The Summit, Sherwood Residence (North Jakarta City), De Vonte Apartments, Grand Depok City, Permata Green Sentosa, and Victoria Hills Residence (Depok City).

In the meantime, three municipalities experienced an increased concentration of the BOG in 2018 including Central Jakarta City, South Jakarta City, and Bekasi City. Tangerang City is the only municipality in the study area experiencing a decreased concentration of both top and bottom occupational groups from 2011 to 2018. A further analysis shows that Tangerang City has an increased concentration of the middle occupational group during the same period.

7.7 Conclusion

This chapter describes changes in inequality and socioeconomic segregation in the core and the inner peripheries of the Jakarta metropolitan region. Under the transformative government of Indonesia, Jakarta has experienced various kinds of development, the most important of which is openness to private and foreign investment. The suburban area of Jakarta has grown rapidly and transformed rural areas and agricultural land into a vast area of housing which were targeted mostly to the middle-upper class community. This has led to rather homogenous socioeconomic areas in the outskirts of the metropolitan area. As the result, the Gini Indices in the inner periphery of Jakarta are lower than those in the municipalities of DKI Jakarta. It means that the household expenditure inequality in the inner periphery is narrower than that in the municipalities of DKI Jakarta. The high Gini Indices in the municipalities of DKI Jakarta are caused by the existence of urban kampongs among the high-rise building with luxury apartments, offices, and shopping center. Meanwhile, segregation in the periphery of Jakarta occurred because of gated communities developed by the private sector.

In 2030, vertical housing for the low, middle, and upper class will dominate the city. A lecturer from the University of Tarumanegara, Suryono Herlambang, argued that the existence of vertical housing will worsen residential segregation (Mariani 2019). Vertical residential buildings tend to be more socioeconomically segregated. The luxury apartments and penthouse for the upper class are built separately from low-cost apartments for the middle-low class will (Mariani 2019). This chapter used data by municipalities for calculating the segregation indices. If data would have been available at a smaller geographical unit, the levels of residential segregation would be possibly higher.

The occupational profile breakdown shows that the Jakarta Metropolitan Area residents are dominated by the MOG, and then followed by the BOG and TOG. The largest groups are the sellers (MOG) and unskilled workers (BOG), and the size of the TOG group is relatively small. As the LQ maps showed, it is obvious that the high proportion of LOG occupied more municipalities than the TOG. However, housing provision by the private sector does not meet the demand for the middle- and low-class population of society who reside outside gated communities and create segregated residential areas.

The socioeconomic segregation in JMA is fostered by the government's policy on land use. The privatization of land in the core and the inner peripheries of Jakarta by private developers affected the housing market and the affordability of the community. Addressing segregation in this context should not only rely on controlling the housing market, but also on developing community capacity and creating more employment opportunities in JMA.

In August 2019, Indonesia's President Joko Widodo announced Indonesia's capital relocation plan. The government of Indonesia selected two regencies (North Penajam Paser and Kutai Kartanegara) in East Kalimantan as the new site for Indonesia's capital. The governmental function and buildings will be moved to the

new site and will be ready for occupation in 2024. However, Jakarta will remain the country's economic hub. It means that the housing market in Jakarta will remain tense. Furthermore, the 2030 Jakarta Spatial Plan also mentions the phrase 'estate management' which means land management in Jakarta will be bestowed to private developers. The relocation of Indonesia's capital out of Jakarta will not ease the myriad of problems Jakarta will face, especially as it is projected that 1.5 million people will migrate from Jakarta (Walton 2019). Jakarta's problems will remain in place unless serious attention is paid to them including socioeconomic segregation and income inequality.

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Chapter 8
Socio-spatial Segregation and Exclusion in Mumbai

Abdul Shaban and Zinat Aboli

Abstract Indian society is characterised by significant horizontal (religious, regional, linguistic) and vertical (income, occupation, caste) divisions. These socio-economic fragmentations significantly shape the production of space in cities. In fact, all major cities in the country are pervaded by socio-spatial divides, which often become sources of conflict, violence, exclusion and, also, solidarity. Mumbai is the industrial, commercial and financial capital of the country. Bollywood has, over the years, helped in carving out a distinct (pan) Indian identity for itself and the city, both within and outside India, and is a major rallying and unifying aspect for India. Among all its glitter, the city is also infamous for its underworld (originating from its excluded and marginalised neighbourhoods), slums and poor residential areas. The city is pervaded by socio-spatial fragmentation and is a divided city. This chapter shows that the highest level of segregation in Mumbai is based on religion (Muslims and Non-Muslims), followed by class, caste and tribe.

Keywords Socio-spatial segregation · Real estate prices · Slums · Communal violence · Marginalisation

8.1 Introduction

India is socio-culturally a very diverse country. Historically, it has been home to all the major races, castes, languages and religions. Hundreds of minor groups have also existed side by side. Indian civilisation has evolved through the processes of immigration, assimilation and adaptation. Although large-scale inter-group wars and

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violence have been absent in Indian history, as experienced by European civilisation, the processes of devalourisation, de-assimilation, discrimination and peaceful hostility against marginalised and minorities have existed in one form or another.

About 80% of the Indian population follows Hinduism. Caste, especially in Hinduism, has been one of the major defining social features, based on the conception of purity and pollution, endogamy and commensality. Hindus are divided into four *varnas*[1] (major caste groups) where the lowest caste group is *Shudra*s (the untouchables), now termed as Scheduled Castes[2] (SCs). The *Shudras,* historically, have faced socio-spatial exclusion. Another defining feature of Indian society is the division based on tribes. Tribal groups in India belong to different ethnic groups and are often treated as outcaste population. Although the Government of India has made several provisions and anti-discrimination laws, socio-spatial exclusion, discrimination and segregation continue to be practised both in urban and rural areas. These socio-spatial practices largely shape the morphologies of Indian villages and cities.

The early twentieth century saw the emergence of religion-based politics in India. Hinduism became a major rallying point for certain political parties [Jana Sangh, now Bhartiya Janata Party (BJP) and cultural groups like Rashtriya Swayamsevak Sangh (RSS)]. Muslims, as a religious minority group, have been under constant threat from hostility, violence and discrimination by right-wing Hindus. Thousands of lives from both communities have been lost in these hostilities. The open and tacit discrimination against Muslims in the housing market, jobs and education have also existed since then. Succumbing to the Hindu right-wing groups, the State has not been able to bring any separate provisions to deal with the violence and discrimination against Muslims [as has been done in the case of SC and Scheduled Tribes (STs)[3]]. As a result, today, a very polarised communal (religious) concentration exists in Indian cities.

These socially discriminatory practices have also shaped the morphology and distribution of populations in Indian cities. All the major cities in the country, including Mumbai, are pervaded by socio-spatial divides, which in turn become sources of conflict, violence, exclusion and, also, of solidarity. Mumbai is the industrial, commercial and financial capital of the country. Among all its glitter, the city is also infamous for its underworld (originating from its excluded and marginalised social groups and neighbourhoods), slums and poor residential areas. The city is pervaded by socio-spatial fragmentation and the divides run deep along religious, class and caste lines. We do not have city-level data for income inequalities, but the World Bank (2020) estimates show that income inequalities at the country level in

[1]There are four *varnas* among Hindus, namely *Brahmins* (priestly castes), *Kshatriyas* (warrior castes), *Vaishyas* (cultivators and merchant castes) the *Shudras* (the lowest castes in the hierarchy, the untouchables).

[2]Scheduled Caste is an officially designated group of historically disadvantaged people in India. The British in India created a list of castes belonging to *Shudra* group which was adopted in 1935 under the Government of India Act (see Dushkin 1967: 626).

[3]Scheduled Tribes are the tribal groups of India scheduled under the Government of India Constitutional Order of 1950 or the Act as amended thereafter (Government of India 1950).

India measured through the Gini index have risen from 32.1 in 1982, to 34.4 in 2004 and 35.7 in 2011.

The present paper attempts to examine exclusionary development and socio-spatial divides in Mumbai on class (population with formal housing versus those living in informal neighbourhoods, called slums), religion (between Non-Muslims and Muslims), castes (non-SCs and SCs) and tribes (non-STs and STs) bases. The paper is divided into six sections. Section 8.2 outlines the data and methods used to examine the socio-spatial segregations. Section 8.3 deals with real estate prices and slums in Mumbai. Section 8.4 examines the religious conflicts and segregation of Muslims in the city. Section 8.5 discusses the spatial concentrations and exclusions of SCs and STs. The last section concludes the paper.

8.2 Data and Methods

Mumbai city (Greater Mumbai) has seen a steady increase in population over the years. The population of the city has risen from 0.9 million in 1901 to 12.4 million in 2011. The population density of the city is currently about 28,472 persons/sq. km. This population growth has been fuelled by migration from different states of the country including from within Maharashtra state (in which Mumbai is located). The city is home to all major religious communities in the world. Muslims constituted 20.7% of the total population of Mumbai city in 2011 and formed the largest religious minority group (Census of India 2011). The share of Hindus in the same year was 66%. Other religious groups like Buddhists (4.9%), Jains (4.1%), Christians (3.3%), and Sikhs (0.5%) individually constituted less than 5% each of the total population of the city.

For this study, data has been collected from various sources to examine place-based segregation and interaction between dominant and marginalised ethnic groups in Mumbai city. The decennial population census of India is a major source for data on religion, caste and tribes. It provides data at ward and sub-ward (section) levels for SC and ST populations for cities. There are 88 sections in Mumbai and they have an average population of around 141,000. Data on the religious groups are available only at city and district levels, which are meso units. Therefore, an attempt was made to find out the data from alternative sources. The Election Commission of India provides the eligible voter's name. An attempt was made to sort the names of Muslims from the voter lists of 2018 [(as has been done by Susewind (2017) for 11 cities of India)]. The adults over 18 years old are registered in these voter lists. The distinctly 'Muslim sounding' names were sorted out from the lists. However, there remains a possibility of errors of 5–10% due to non-recognisable names and non-registration of Muslims in voter lists (see Shariff and Shaifullah 2018 on Muslim missing voters). There are in total 36 assembly constituencies in Mumbai and Mumbai Suburban districts. Together these districts are known as Greater Mumbai or Mumbai City (see Fig. 8.1). The data was compiled for 7289 polling booths (with an average number of voters about 930, and a population of about 1250, respectively, per booth)

Fig. 8.1 Assembly Constituencies in Mumbai and General Geographical Context, 2018. (*Source* Authors). *Note* The base map used from Esri's ArcGIS online, while the Assembly Constituencies are drawn by the authors

under 27 assembly constituencies. Data for 9 constituencies could not be gathered, namely Borivali, Dahisar, Magathane, Kandivali, Charkop, Mankhurd Shivaji Nagar, Anushakti Nagar, Vandre West and Wadala. The total registered voters in these constituencies (leaving out nine constituencies) were 5,503,051 and the total number of Muslim voters were 1,271,655, that is 23.1%. As per the Census of India (2011), Muslims comprised about 21% of the total population of Mumbai City.

Index of Dissimilarity (D), Entropy Index (h) and Interaction or Exposure Index (B) have been computed to examine the spatial segregation and interaction of the

above-mentioned ethnic groups. For discussion on *D, h* and *B* indices, see also Chap. 1 of this book.

The data for slums by census tracts or sections are available only for the year 2001. The 2011 Census provides data for slum population only at the city level. Therefore, only the 2001 Census data, for its 88 sections are used for understanding the distribution and concentration of slum populations in the city. The data on real estate (residential/flat) prices are taken from supplements published by the popular broadsheet daily, *The Times of India* and adjusted to property tax wards.

8.3 Real Estate and Increase of Slums in the City

Residentially, Mumbai is a divided city. On the one hand, there are upper and middle-class high rises and colonies, on the other, there are vast areas of slums inhabited by lower and underclasses. The high rises and middle- and upper class colonies are also interspersed by slums. It is a city where thousands also live on the pavement in rudimentary structures, which may have not be classified as slums by the Census of India.[4] In fact, an increasing population, a lack of land supply, and lackadaisical government policy response have created considerable housing and shelter issues in the city. The prices of the houses in the city have grown enormously over the years and have gone beyond the reach of the lower class population. The ratio between the index number of the income of factory workers (this index is used for the working class related inflation and as most of the population in the city are workers, it is the most appropriate index) in Maharashtra and the price of residential flats in Mumbai provides further insight into this issue (Table 8.1). The ratio has considerably risen over the years. Notwithstanding the rise in income of factory workers, the comparatively higher rise in real estate prices have dashed the hopes of lower classes to own a house. Between 2003 and 2012, the price of real estate in the city increased by 3.5 times relative to the wages of the factory workers. Only in the Eastern Suburb of the city, the increase in real estate prices was slightly lower, while the highest increase was in Mumbai District. During 2003–2012, the average flat prices in Mumbai District [from INR 6,872 (US $147.5) to INR 36,056 (US $773.7)], and Western Suburb [from INR 3,726 (US $80.0) to INR 18,211 (US $390.8)] have risen more than five

[4]Census of India (2011: 4) defines a slum as residential areas where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilation, light or sanitation facilities or any combination of these factors which are detrimental to the safety and health. Three types of slums have been identified for the purpose of Census. There are: (i) notified slums (All notified areas in a town or city notified as 'slum' by State, UT Administration or Local Government under any Act including a 'Slum Act'), (ii) recognised slums (All areas recognised as 'Slum' by State, UT Administration or Local Government, Housing and Slum Boards, which may have not been formally notified as slum under any act) and (iii) identified slums (A compact area of at least 300 population or about 60–70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities).

Table 8.1 Comparison of wages of factory workers and prices of flats in Mumbai

Wages/Prices/Index		2003	2012
Average annual wages of factory workers*	Per annum (Indian Rupees, Rs. or INR)	71,778	103,000
	Index no. of wages	100	143.5
Average price of flats in Greater Mumbai (INR)#	Per sqft (INR)	3725	18,632
	Index number	100	500.2
Average price of flats in Mumbai District (INR) #	Per sqft (INR)	6872	36,056
	Index number	100	524.7
Average price of flats in Western Suburb (INR) #	Per sqft (INR)	3726	18,211
	Index number	100	488.8
Average price of flats in Eastern Suburb (INR) #	Per sqft (INR)	2269	10,736
	Index number	100	473.2
Flat price index–wage index ratio (2003 and 2010)	Greater Mumbai	–	3.5
	Mumbai District	–	3.7
	Western Suburb	–	3.4
	Eastern Suburb	–	3.3

Source *Government of Maharashtra 2005, 2012. # *Times of India* (2003, 2012)

times, while the same has been comparatively lower in the Eastern Suburb [from INR 2,269 (US $48.7) to INR 10,736(US $230.4)] of the city. While for the city as a whole, the average flat prices rose from INR 3,725 (US $79.9) in 2003 to INR 18,623 (US $399.8) in 2012 (*Times of India* 2003, 2012). Mumbai District and Western Suburbs house a majority of the upper and middle classes of the city, while the Eastern Suburb traditionally has housed lower class workers. However, of late, the class character of the Eastern Suburb has also changed drastically and a number of upper and middle-class colonies have emerged. This change started since the liberalisation of the economy in 1991, which allowed more inflow of capital in the built environment of the city. Since then, a relatively higher growth rate of the economy had led to the rise of per capita income and hence rise of the demand for better housing. Further, the development of road infrastructure like Vashi–Mankhurd bridge, Eastern Freeway, Chembur–Wadala sky-bus, etc., added to this process of gentrification.

Figure 8.2 shows that the growth rate in real estate prices in the city has been significantly higher in almost all the property tax wards. The prices between 1993 and 2012 have increased by more than 12% per annum and this increase has been as high as 28.6% in some wards. In some areas of South Mumbai (in Mumbai district) and Bandra, also known as Vandre (in Western Suburb), the residential flat prices were as high as 71,000 per sq. ft. in 2012.

Overall, the above discussion shows that the workers' wages are not keeping pace with the rise in real estate prices. A large proportion of the population of the city, specifically slum dwellers and those working at the lower spectrum of the informal

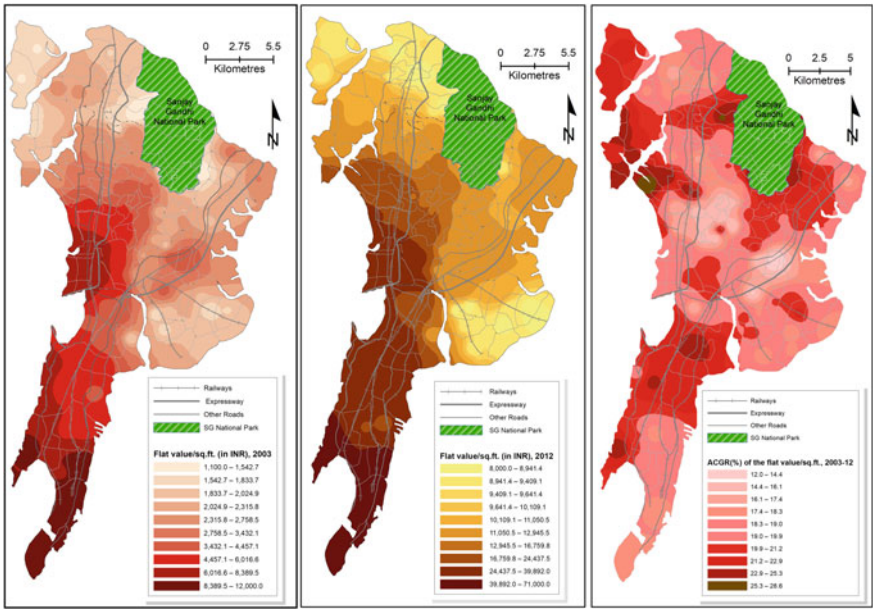

Fig. 8.2 The growth of prices of residential flats by property tax ward, 2003 and 2012. *Note* INR = Indian Rupees; ACGR = Annual compound growth rate (%); The data related to residential/flat prices available from *The Times of India* have been adjusted to property tax wards. *Source* Based on data from *The Times of India* (2003, 2012)

sector, cannot afford housing in Mumbai. For slum dwellers, average family earnings remain at only Rs 5,000 per month (at 2007–2008 prices) and many of them somehow subsist on this (Jain and Shaban 2009; Sujata and Shaban 2008; Sharma et al. 2008; Shaban 2010). This forces them to squat on public land and trade their goods through hawking and vending. Given this situation, the housing market in Mumbai, in fact, denies any access to formal housing to a large majority of its citizens (Sharma 2007: 291).

The rise of real estate prices in Mumbai has, among others, been determined by its large population living in small houses or in slums. With liberalisation and the opening of the service sector (especially the Financial and Information Technology sectors), there has been a significant increase in the share of middle-class citizens who desire better housing. The share of the middle class in urban areas in India has risen from 54.7 to 72.4% during 1999–2000 to 2011–2012 (Krishnan and Hatekar 2017). The limited land supply in the island city (Greater Mumbai) and lack of effective integration with its periphery has added to the significant rise of real-estate prices in the city (Migozzi et al. 2018).

The archaic Rent Control Act 1974 (amended several times) has also resulted in rapid obsolescence of buildings in Mumbai city. Most of the buildings constructed in the 1940s and 1950s require repair and maintenance (Shaban 2010). It is estimated that there are about 16,502 buildings in the city built before 1940 (Janwalkar 2006)

which are in a dilapidated condition; some of them have collapsed in recent years, killing several. A judgment passed by the Supreme Court on September 4, 2008, has paved the way for the redevelopment of these buildings by providing an extra Floor Space Index (FSI)[5] to the builders. They now can profitably build the structures and make a 225 sq. ft. flat available to every resident family of the buildings, free of cost (Mahapatra 2008). The decision by the court ushers hopes for the redevelopment of dilapidated buildings in south and central Mumbai (in Mumbai District).

The government's inadequate response and skewed policies are responsible for the housing crisis in the city. Mumbai was expecting a massive respite from congestion due to the availability of about one-third of some 600 acres of land from 60 textile mills for open space. Mumbai has an open space ratio of about only 0.03 acres per 1000 persons. Recommended open space at the international level is often 4 acres per 1000 persons. The availability of mill land was expected to somewhat correct this. However, much of the land went to builders and only 133 acres have been provided for open spaces and public housing (Katakam 2006).

The controversy over the sale of mill land dates back to 1991 when the government, in response to appease mill owners, introduced Sect. 58 in the DCR. Better known as the 'one-third formula', DCR 58 allowed mill owners to divide the area into three parts. They could then sell one-third, give the second part to Greater Mumbai Municipal Corporation to create open spaces and the other third to the Maharashtra Housing and Area Development Authority to provide affordable housing to the families of mill workers who lost their livelihoods with the closure of the mills. In 2001, however, the state government used a loophole in the Maharashtra Regional and Town Planning Act, 1966, and amended DCR 58–DCR 53 (I), according to which the only land that is vacant—that is, with no built-up structure—shall be divided under the one-third formula. Thus, the mill owners managed to keep the bulk of the land and the area to be given to the municipal corporation and to the workers was substantially reduced (Katakam 2005, 2006).

The political bargaining and competition within the city have assured some housing schemes for the poor in an otherwise neoliberal regime. In the 1990s, popular city leader Bal Thackeray initiated the Slum Rehabilitation Scheme (SRA). SRA attempted to provide houses for slum dwellers through cross-subsidy. The transfer of development rights was granted to the builders who came forward to develop slums and provide flats of 225 sq. ft., free of cost to the dwellers. The scheme has been hugely successful as poorer sections of the population have been able to acquire constructed homes free of cost in place of their hutments. This has also resulted in the decline of the slum population, as is evident from the data of the 2001 and 2011 Indian censuses, mentioned below.

In sum, the lack of adequate provisions for affordable formal housing has created a huge number of slums in Mumbai. High real estate prices, government apathy and lower wages have undermined the city's development. This has resulted in amassing of the lower class population in slums. In fact, in 2001 and 2011, 54.0% and 41.1%,

[5]Floor Space Index (FSI) is the ratio of built or constructed area and actual land area. For instance, if a land is 100 sq. ft. and construction on the same land is of 300 sq. ft. area, FSI is 3.

respectively, of Mumbai's population was living in slums (Census of India 2014a, b). In 2011, 15.85% of Mumbai district (489,068 of total population of 3,085,411) and 49.38% in Mumbai suburban district (4,620,654 of total population of 9,356,962) lived in slums (Census of India 2014a, b). One of the reasons for this has been the success of the SRA. However, many claim that the Census of India undercounts the slum population and does not reflect the actual situation in the city. Going by this claim, the proportion of population living in slums in Mumbai is estimated to be about 60% of the total population (Shaban 2008).

The lack of development of social and physical infrastructure, poverty, large size families and a dense population do increase the probability of social deviance. It is found that slum areas of the city are also prone to a higher crime rate (Shaban 2010). A large family with limited resources often results in family disruption and decreasing formal and informal social controls. Communities with a higher level of social disruption tend to be characterised by a lower rate of participation in voluntary organisations and local efforts, which have an important role to play in controlling crime. Overcrowding in houses means that personal matters are difficult to keep private in domestic life (Shaban 2010).

The slum population is not evenly distributed in the city. The highest concentration of the slum population is found in the Eastern Suburb, which is the least developed part of the city (Shaban 2010). As shown in Fig. 8.3, Mankhurd, Trombay, Govandi, Deonar, Vikhroli, Bhandup, Bazar Church-Hall and Chembur, have a large share of their total population living in slums.

The computed Dissimilarity Index (D) between non-slum and slum population for the year 2001 in Mumbai city is 0.460, which shows high levels of spatial segregation between non-slum and slum population (Table 8.2) (Jahn et al 1947). Further, the computed value of Interaction or Isolation Index (B) for slum and non-slum populations for the year 2001 is 0.321, showing that the probability of a slum dweller interacting with a non-slum dweller is about 32.1%.

8.4 Inter-religious Conflicts and the Segregation of Muslims

Hindu–Muslim rivalry in India arose during the colonial period in the latter half of the nineteenth century. It gave rise to religious nationalism and an ethno-nationalist philosophy, which resulted in the division of India in 1947 into India and Pakistan. After independence, the Hindu right-wing with their political formations have attempted to communalise Indian democracy. This has resulted in the marginalisation of Muslims. As Sen (2013) writes "India's Muslims are … victims of untold indignities in a country still fighting the ghosts of a blood-soaked partition in 1947 that turned vast swathes of it into Muslim-majority Pakistan. The baggage of history and the cynical calculus of caste, class, community and religion still dictate the fate of most things in India: from who wins elections and wields power to who has a better chance of getting jobs, healthcare or justice" (p. 127). The religious politics of the

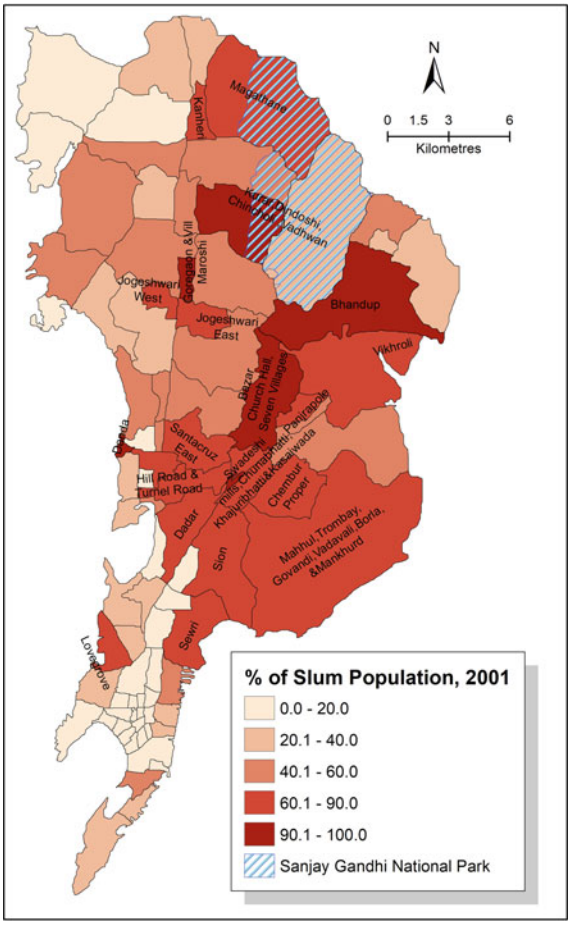

Fig. 8.3 Distribution of slum population in Mumbai by sections, 2001. [*Source* Based on data from Census of India (2001)]

Hindu right-wing has resulted in religious violence (communal riots), discrimination against and the stigmatisation of Muslims. This has further led to the geographic concentration of Muslims in urban centres, both as a result of discrimination (in the housing market) and violence. The Sachar Committee Report (2006) contends that "fearing for their security, Muslims are increasingly resorting to living in ghettos across the country" (p. 14). Other studies have also pointed out the spatial and social segregation of Muslims in urban centres is mainly because of state's apathy and negligence towards Muslims, recurrence of communal violence and perception of security concerns by Muslims themselves (Gayer and Jaffrelot 2012; Thorat et al. 2015; Shaban and Khan 2013). Contractor (2012), in her study on Shivaji Nagar in Mumbai, argues that ghettoisation increases with new communal riots.

As mentioned above, the cityscape of Mumbai is fractured on class, caste and religion. In terms of religion, the city is largely polarised in Hindu and Muslim areas. The Muslim concentrated areas have been shaped and reinforced by frequent

Table 8.2 The dissimilarity, entropy and interaction indices

Indices	Groups	1991	2001	2011	2018
Dissimilarity index (*D*)	Non-SC/SC populations	0.241	0.242	0.231	–
	Non-ST/ST populations	0.291	0.253	0.191	–
	Non-slum/Slum populations	–	0.460		–
	Non-Muslims/Muslims populations	–	–	–	0.609
Entropy (*h*) index	Non-SC & Non-ST/SC/ST populations	0.271	0.220	0.270	–
Interaction or exposure Index (*B*)	Non-SC/SC populations	0.913	0.932	0.914	–
	Non-ST/ST populations	0.974	0.986	0.986	–
	Non-slum/Slum populations	–	0.321	–	–
	Muslims/Non-Muslims populations	–	–	–	0.486

Source Computed using data from Census of India (1991, 2001, 2011) and Government of Maharashtra (2018)

communal riots and discriminations against Muslims in the formal and informal housing markets. Dongri, Pydhonie, Nagpada, Byculla, Mazgaon, Mahim in Mumbai city district, Bharat Nagar, Millat Nagar, Behrampada and Jogeshwari in Western Suburb, and Kurla, Sonapur–Bhandup, Govandi, Cheeta Camp and Kidwai Nagar (Wadala East) in Eastern Suburb are examples of areas where there is a high concentration of Muslim populations. Between 1927 and 2008, a total of 84 Hindu–Muslim riots have been recorded in the city. In these riots, about 1870 persons have been killed, 8463 injured and millions of rupees in property has been destroyed. The incidence of riots between the two religious communities was very high prior to Independence. The decade of the 1950s was a relatively peaceful period. But the city again experienced a higher incidence of riots during 1970–75, 1984–87, 1991–93 (see Wilkinson 2005; Punwani 2018; Shaban 2008; 2016; 2018).

The computed values of Dissimilarity Index (*D*) of 0.61 for the year 2018 show that spatial segregation among Muslims and non-Muslims is very high in the city (Table 8.2). This indicates that 61% of the Muslim population need to move to other polling booths in order to create a uniform distribution of Muslim and Non-Muslim populations in all the polling booths of the city. Further, the interaction index (*B*) computed for non-Muslims and Muslims is 0.486, showing that the probability of a non-Muslim interacting with a Muslim is about 48.6%. This shows higher segregations, as Muslims will meet more Muslims rather than non-Muslims.

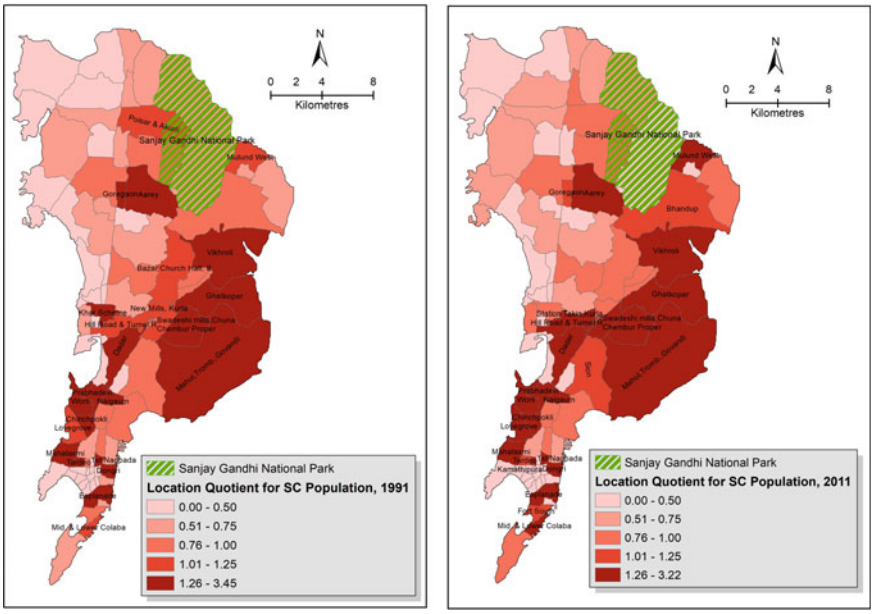

Fig. 8.4 Location quotient for Scheduled Castes (SC) population in Mumbai, 1991 and 2011. [*Source* Based on data from the Census of India (1991, 2011)]

8.5 Segregation of Scheduled Castes and Scheduled Tribes

Mumbai is also polarised on caste and tribe lines, though relatively less in degree, as compared to religion. The SC population though clustered, is relatively more spread out or ubiquitous in the city than Muslim populations (Shaban 2012). The areas inhabited by the SCs often act as a buffer between the areas dominated by Muslims and higher caste Hindus. In other words, the SC population often acts as a shock absorber between higher caste Hindus and Muslims. The major area of concentration of SCs is in the Eastern Suburb, where their share in the total population ranges from 5 to 15%. The location quotient for SCs in most of the sections of the Eastern Suburbs are higher than 1 in both the years 1991 and 2011, showing that these sections have higher share of SC population than the share of SC population at the city level (Fig. 8.4). Besides the Eastern Suburbs, the major areas of concentration of SCs are Dharavi, Agripada–Byculla and Mulund. In central Mumbai, SCs are generally concentrated in 33 labour[6] camps and Bombay Development Directorate (BDD) chawls (a cluster and basic housing scheme with community toilet, water supply and little open spaces by the Municipal Corporation of Mumbai for textile workers started in the mid-twentieth century). The concentration of the SCs has

[6]Labour camps were built by the Government of Maharashtra in the first half of the twentieth century to tackle housing for migrant workers from the interiors of Maharashtra who were employed in textile mills in the city and/or railways. They still mainly house the poorer section of the society or SCs.

increased in the Eastern Suburb, between 1991 and 2001, because of the growth of slums (see the location quotient distribution in Fig. 8.4).

Given the legal provisions and affirmative actions deployed by the State, the open discrimination against SCs and STs is becoming rare. However, the social divides resulting in spatial segregation does show up in residential differentiations. SCs mainly worked in textile mills in central Mumbai, while STs are relatively more concentrated in the northern part of the city. A comparison between the location quotient of 1991 and 2011 reveals that the relative share of ST population has declined in the southern part of the city and increased in the northern part. This is mainly because of exclusionary urban development in the southern and central parts of the city. However, the northern part of the city, i.e. the area around Sanjay Gandhi National Park and mangrove forests around the coast provide them with a livelihood (like fishing) and also offer them opportunities to build their rudimentary houses on relatively cheaper and development-free lands. This explains the location quotients for ST population being higher in the northern part of the city (Fig. 8.5).

Our computation shows that the Dissimilarity (*D*) Index for SCs with respect to non-SC population in the city has largely been stable between 1991 and 2011 (Table 8.2) but substantially lower than Muslim–Non-Muslim Dissimilarity Index value. The index shows that about 24% of the SC population need to move in order to achieve a uniform distribution of population by caste (SC and non-SC) in the city. The *D* values for SCs are lower compared to *D* for the religions. The reasons are (i)

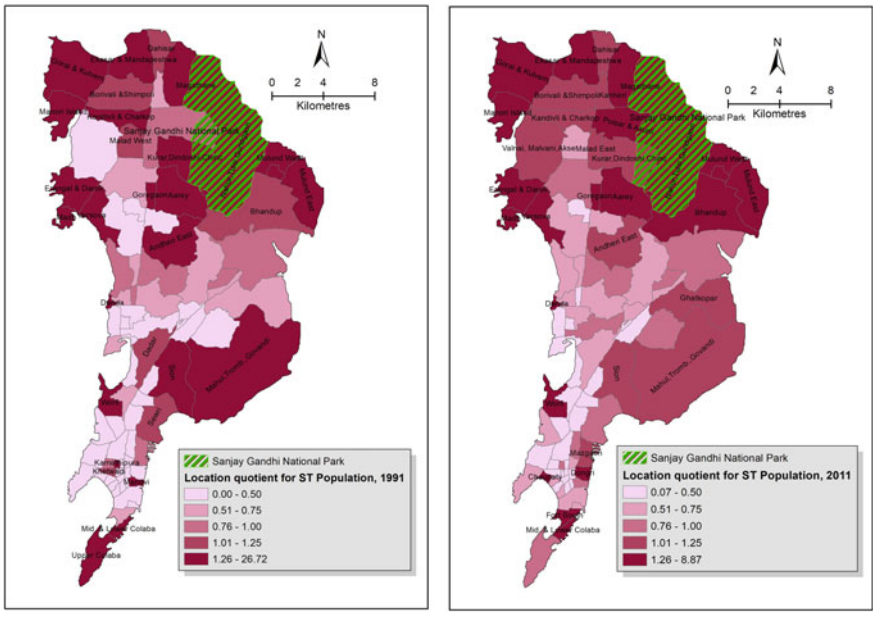

Fig. 8.5 Location quotient for Scheduled Tribes (ST) population in Mumbai, 1991, 2011. [*Source* Based on data from the Census of India (1991, 2011)]

religion-based discriminations are stronger in the city, (ii) as opposed to Muslims who can be easily recognised by their Arabic, Turkish or other Central Asian origin names and surnames, and also by his/her religious practices, one cannot easily find out a person's caste and tribe by name, and, therefore, it is easier for lower castes and tribal groups to find houses in other Hindu areas and mix with other Hindu castes, (iii) caste- and tribe-based discrimination is punishable through a special Government of India Act, called 'The Scheduled Castes and The Scheduled Tribes (Prevention of Atrocities) Act, 1989' (Government of India 1989) and there are no such special provisions and rules against discriminations based on religion. In fact, the *D* for STs has declined over the years, which indicates that a relatively uniform distribution of SCs is emerging in the city. The interaction or exposure (*B*) index for both the SCs and STs have been significantly higher in comparison to Muslims. During the period between 1991 and 2011, it has ranged between 0.913 and 0.932 for SCs and 0.974 and 0.986 for the STs. The index shows that SCs and STs have a significantly higher probability of interaction with other groups (non-SCs and non-STs, respectively) than Muslims. Thus, the study shows that the major social and spatial segregation in the city exist on the basis of religion (Muslims and non-Muslims) rather than caste and tribes, though they do have their own residential segregations.

As *h*-index is based on the summation of individual geographic unit score; the higher the individual units or section's score, the greater the diversity in the section. Therefore, we have mapped the scores of individual geographic units. On average, the *h*-index for SCs and STs are higher in the Eastern Suburb and northern part of the city than those in the Western Suburb and Mumbai district (Fig. 8.6). This shows that ethnically the Eastern Suburb and northern part of Mumbai are more diverse than western and southern parts of the city. Given the economically marginalised nature of SC and ST communities, cheaper real estate and large-scale slums (informal settlements) allow them to inhabit in large numbers Eastern Suburb and northern part of the city, and this creates greater diversity in these parts of the city. Figure 8.4 shows that the concentration of SCs has significantly increased between 1991 and 2001 in Chuna Bhatti, Ghatkopar and Vikhroli.

8.6 Conclusions

Mumbai, the commercial and financial capital of India, is also a divided city. The divide runs deep along religious, class and caste lines. The housing market of the city and government apathy to inclusive development has led to the emergence of a large number of informal settlements or slums, where millions of people are forced to survive in substandard living environments without adequate social and physical infrastructure (such as better transport facilities, educational institutions, health care, access to water supply, sanitation, etc.). The fast-rising real estate prices and relatively lower increase in wages make it impossible for millions of people in the city to have any formal housing.

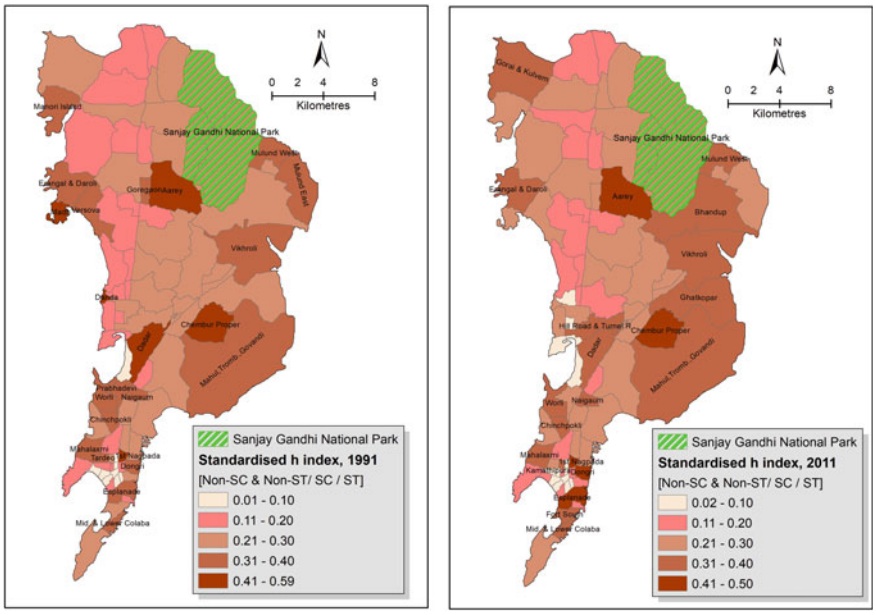

Fig. 8.6 Entropy index (h) for the Non-SC & Non-ST, SC and ST population groups in Mumbai, 1991, 2011. [*Source* Computed using data from Census of India (1991, 2011)]

In their study, Gupta et al (2009) find that a disproportionately large share of historically disadvantaged caste groups live in slums. Mehta (1969) in a longitudinal study also shows the highest segregation of lower caste groups and the persistence of the same phenomenon in Pune city. In a recent study on spatial segregation, based on data from the Census of India, 2011, focusing on seven major cities (Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai) of India, Vithayathil and Singh (2012) show that the degree of residential segregation by caste (combined SC and ST)—is highest in Kolkata (D index = 0.364) followed by Hyderabad (0.325) and in Mumbai (0.222). It is argued that a lower segregation index for Mumbai for lower castes (SC and ST combined), in comparison to other major cities, is mainly due to the dispersal of SCs and STs in central and South Mumbai.

Mumbai is also extremely divided on a religious basis. In a large part of the city, Muslim and non-Muslim areas are highly segregated. In fact, the segregation index, on the basis of religion (Muslim and non-Muslim), is found to be higher than the slum and non-slum divide. Even the slums are divided on the basis of religion. The Hindu–Muslim divide that emerged during the early twentieth century has been a bane for the city. The recurring communal riots have taken thousands of lives and destroyed properties worth millions of rupees. The fear of riots and violence has kept Muslim populations concentrated in a few pockets of the city, and these pockets are transforming into underclass ghettos. The communal production of spaces not only

manifest various forms of injustices but actually produces and reproduces them, and thereby maintains established social relations based on domination and oppression.

To bridge these social and spatial divides, the city needs new emancipatory politics. The emancipation from suppression, domination, repression and exclusion. This emancipatory approach should be able to free and liberate those trapped and incarcerated in space, chained to a place or disabled by socially produced spaces. This politics needs to end the social devalourisation of communities and avert social exclusion and spatial segregation.

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Chapter 9
Social Polarization and Socioeconomic Segregation in Shanghai, China: Evidence from 2000 and 2010 Censuses

Zhuolin Pan, Ye Liu, Yang Xiao, and Zhigang Li

Abstract China's rapid economic growth since the early 1980s has been accompanied by a substantial increase in economic inequality. Economic restructuring, rural–urban migration, globalization and marketization have jointly led to a transformation of the socio-spatial structure of large Chinese cities. Although a handful of studies have examined the level and pattern of socioeconomic segregation in a particular Chinese city using neighbourhood-level census data from the year 2000, little research has been done to investigate in-depth changes in the level and pattern of segregation using more up to date and more geographically detailed data. This chapter aims to examine the levels, patterns and drivers of socioeconomic segregation in Shanghai, China, using neighbourhood-level and subdistrict-level data from the 2000 and 2010 decennial population census. This chapter uses the dissimilarity index to measure the overall level of socioeconomic segregation by occupation and household registration (hukou) status. Based on a location quotient and neighbourhood composition, it also illustrates the change in the spatial pattern of segregation. The chapter ends with a discussion on the possible drivers of segregation and policy suggestions to combat segregation in large Chinese cities.

Keywords Socioeconomic segregation · Occupation · Hukou status · Shanghai · China

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9.1 Introduction

Over the past four decades, rapid economic growth has been interwoven with internal and international migration during a process of globalization, which has led to an unprecedented socioeconomic transition around the world (Marcińczak 2012). Rapid growth in the economy is inevitably accompanied by a substantial increase in socioeconomic inequality (Marcińczak et al. 2015), and China is no exception. According to the National Bureau of Statistics of China, the Gini Index of the country increased from 0.317 in 1978 to 0.465 in 2016, which indicates a widening income gap. In the largest Chinese cities, such as Beijing, Shanghai and Guangzhou, rising income inequality has resulted in socioeconomic segregation. Evidence from the 2000 and 2010 censuses showed that many large cities in China have experienced a rise in residential segregation by class, household registration (hukou) status and housing tenure (Li and Wu 2006, 2008; Chen and Li 2014). The increase in residential segregation has resulted in a number of detrimental consequences, such as the reproduction of marginality, the prolonged and rising rate of unemployment in deteriorated towns, the widening of social inequality and the weakening of social solidarity (Wilson 1987; Bolt et al. 2010). Understanding the pattern and drivers of residential segregation in large cities in China will help policymakers to achieve the goal of building an inclusive and harmonious society.

A growing body of literature has explored patterns of residential segregation in large Chinese cities since the beginning of the reforms in 1978. Earlier studies have focused mainly on the delineation of socio-spatial differentiation in Chinese cities (Gu and Kesteloot 1997). More recently, growing attention has been paid to the drivers and mechanism of residential segregation (Gu et al. 2006; Li and Wu 2006). Nevertheless, most earlier studies on residential segregation were based on the fourth and fifth waves of the national population census carried out in the years 1990 and 2000, respectively (Gu and Kesteloot 1997; Feng and Zhou 2003). Recently, a few studies have examined the residential segregation of a particular city, such as Shanghai and Nanjing, using data from the sixth round of population census conducted in 2010 (Wu et al. 2014, 2018; Shen and Xiao 2020), but surprisingly, little attention has been paid to neighbourhood segregation with regard to hukou status, occupation and socioeconomic status (Liao and Wong 2015; Wu et al. 2018). Moreover, little research has been done to investigate the changes in the spatial pattern of residential segregation over time in globalized Chinese cities, and the process of urban socio-spatial reconfiguration remains under-researched.

This chapter aims to examine and compare the level and pattern of socioeconomic segregation between 2000 and 2010 by occupation and hukou status in Shanghai using neighbourhood-level and subdistrict-level data from the decennial population census. As a polarizing global city with a dramatically rising number of both super-rich and extremely disadvantaged and poor citizens, Shanghai provides an ideal laboratory to investigate the patterns, drivers and consequences of residential segregation against the backdrop of globalization and marketization in China.

9.2 Residential Segregation in Large Cities in China

Residential segregation has always existed in the history of urbanization (Nightngale 2012). In Europe and North America, racial segregation is regarded as the most persistent form of segregation, and a large number of empirical studies have been devoted to this form of segregation (Massey 1985; Wilson 1987). Although some globalizing Chinese cities attract a large number of international migrants, they account for only a very small proportion of the total population of these cities (for example, 0.71% of Shanghai's total population in 2000), exerting an insignificant effect on the spatial pattern of residential segregation. Socioeconomic status has become a major dimension of residential segregation in the new millennium in the transition from a planned economy to a market-oriented economy (Li and Wu 2008). Socioeconomic segregation was not severe in the period of the planned economy when the state exerted a monopoly over a wide range of resources, and state-owned work units played an important role in arranging resource allocation (Wu and Li 2005). The work unit determined workers' wage levels and the allocation of means of subsistence, such as housing and health care. Meanwhile, the hukou system imposed stringent constraints on internal migration and excluded outsiders from urban public services (Chan 2009). Chinese cities experienced a low degree of socioeconomic differentiation before the early 1980s as a result of the state-dominated housing system and the stringent hukou system.

The advent of the reform and the opening up has provided more freedom and incentives for the growth of the private sector and thereby generated a new-rich class, but the reform of the state-owned work units has also led to millions of workers being made redundant, and housing is now no longer allocated by work units (Wu 2004; Li and Wu 2008). Although the government still owns the land after the housing reform, real estate developers can obtain the land use right through the land conveyance system. Supported by bank loans, real estate developers have gradually become the principal participants in the housing development (Fu 2013). Housing reform has promoted the formation of housing marketization in China and increased levels of housing consumption. From 1984 to 2010, the rate of homeownership increased from 9.4 to 89.3% in China. However, the market mechanism has led to the rise of house prices in large cities, and housing has become a commodity which can be purchased on the market rather than a welfare benefit allocated by the state and work units (Wu and Li 2005; Logan et al. 2010). The market-oriented housing reform has aggravated the segregation among socioeconomic status groups, thus restructuring the socio-spatial structure of Chinese cities (Walder and He 2014; Song et al. 2017). In addition, internal migration has also contributed to the socio-spatial restructuring of urban China (Liao and Wong 2015). The loosening of the hukou system and the growth of low-end urban job opportunities have caused the influx of migrants into urban areas since the mid-1980s (Fan 2008). However, the long-established dual system between migrants and urban residents excludes migrants from the mainstream social welfare system (Chan and Zhang 1999; Chan and Buckingham 2008). Migrants suffer from only limited accessibility to the urban formal housing system, and they

are unlikely to be able to afford the soaring cost of housing in large Chinese cities (Huang and Jiang 2009; Logan et al. 2009). Therefore, they have no choice but to concentrate in particular urban areas and form migrant enclaves, such as *Little Hubei* in Guangzhou and *Zhejiangcun* in Beijing (Zhang 2001; Liu et al. 2015). In contrast, higher socioeconomic status groups prefer to live in gated communities with guaranteed safety and favourable amenities (Wu and Webber 2004). Thus, the rising housing stratification exacerbates the residential segregation in large cities in China.

Numerous studies on residential segregation have been conducted since the late 1980s, when socio-spatial differentiation began to emerge in urban China (Xu et al. 1989; Gu and Kesteloot 1997). The reform amplified some of the effects inherited from the pre-reform era and aggravated the residential segregation during the transitional period (Wu et al. 2010). Meanwhile, market forces became interwoven with state forces to generate multiple dimensions of segregation, including segregation by hukou status, education, housing tenure, working status and occupation (Wu and Li 2005; Li and Wu 2008). It can be expected that with increasing levels of marketization of housing, the widening of the income gap by occupation, the influx of migrants, and the level of socioeconomic segregation in Shanghai will increase (Shen and Xiao 2020).

9.3 Data and Methods

9.3.1 Data

In this chapter, we examine the level and the pattern of socioeconomic segregation at the neighbourhood (residential committee, *juwei*) level and the subdistrict (*jiedao*) level in Shanghai using data from the 2000 and 2010 decennial population censuses. The residential committee along with the village committee is the lowest level of administration unit in China with an average population of 3,000. The subdistrict is the second lowest level of administration unit in urban areas and is constituted by several residential committees. We are not able to examine socioeconomic segregation by occupation at the neighbourhood level in 2000 due to a lack of relevant data. The research area of the current study covers the entire administrative area of Shanghai, including 329 subdistricts and 6,256 residential committees for the 2000 census database, and 230 subdistricts and 5,432 residential committees for the 2010 census database. Please note that administration units' boundaries in Shanghai changed slightly over the decade.

Although income is not recorded in Chinese population censuses, it is highly related to occupation and hukou status, both of which are available in census data. Occupation has been largely affected by market factors following the economic reform and represents the best single-variable indicator of socioeconomic status. We divided occupations into three categories: the TOP group, the MIDDLE group and the

BOTTOM group. The TOP group consists of heads of government agencies (HEA), party agencies, enterprises, institutional organizations and professional personnel (PRO); the MIDDLE group consists of clerks and related personnel (CLE); and the BOTTOM group consists of employees in commerce and service sectors (COM), people operating manufacturing and transportation equipment and related personnel (MAN) and employees in the farming, forestry, animal husbandry and fishery sectors (FAR). In contrast, hukou status is affected by institutional factors and underlies a deep rural–urban chasm in China (Chan 2009). Rural hukou holders in cities normally have limited access to the public goods and services provided by the city government (Wu 2002). As for residential segregation by hukou, people living in Shanghai are divided into two groups: Shanghai hukou holders and migrants. In this chapter, the term 'migrants' refers to people who have lived in Shanghai for at least 6 months (whose place of usual residence is Shanghai) without Shanghai hukou (non-Shanghai hukou holders), and 'locals' refers to people who have lived in Shanghai for at least 6 months and who have Shanghai hukou.

During the period 2000–2010, the total population of Shanghai increased from 16.74 million to 23.02 million. The influx of migrants from other parts of China contributed to the growth of the population of Shanghai. Migrants accounted for 23% of the total population in 2000, and the proportion increased to 39% in 2010. Regarding occupational groups, the proportion of the TOP group and MIDDLE group increased slightly, while the proportion of the BOTTOM group dropped from 72 to 66% over the decade (Fig. 9.1). With the improvement in educational attainment or technical ability of migrants, the proportion of the TOP group has increased along with the influx of migrants since 2000. As shown in Fig. 9.2, the central area and

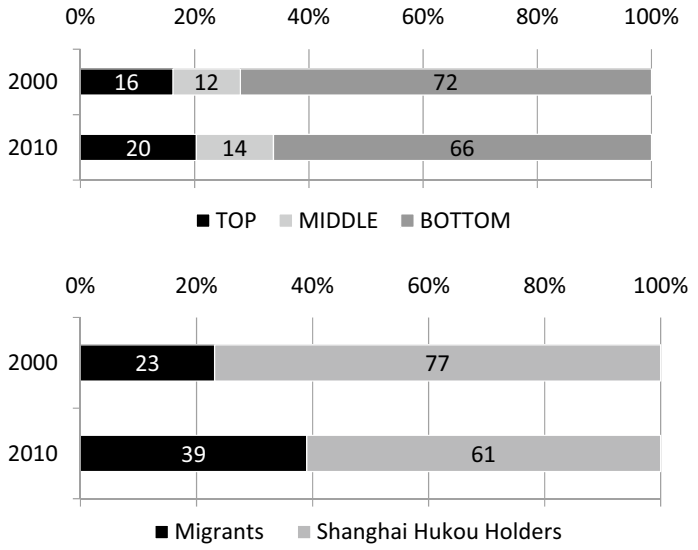

Fig. 9.1 Distribution of occupational groups and hukou status in 2000 and 2010

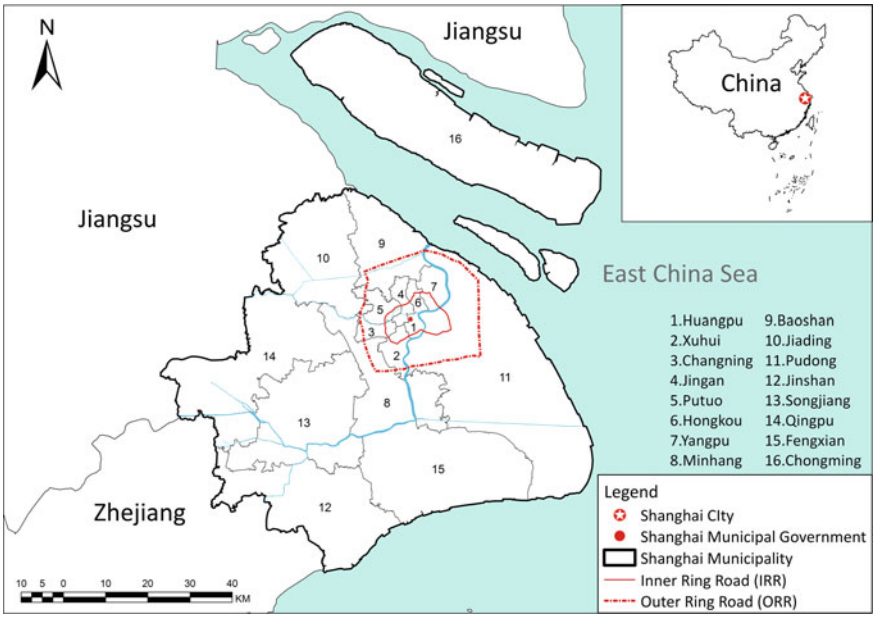

Fig. 9.2 Geography of Shanghai

the suburban area are demarcated by the Outer Ring Road (hereafter ORR), and the west bank of the Huangpu River (*Puxi*) inside the Inner Ring Road (hereafter IRR) is the old town of Shanghai, where the Shanghai municipal government and traditional cultural, residential and commercial centres are located. The east bank of the Huangpu River (*Pudong*) inside the IRR is the financial centre of Shanghai, and it accommodates many advanced producer service firms and the headquarters of multinational and national corporations. Pudong has experienced radical changes in its economic and demographic landscapes and built environment over the past three decades. Besides, as the northernmost district of Shanghai, Chongming is proceeding with its development in the ecological environment and industry in recent years, and a large proportion of the territories are still undeveloped or under protection.

9.3.2 Methods

We examined residential segregation in Shanghai using several methods. In the first stage, we used the traditional index of dissimilarity (DI) to assess the overall level of socioeconomic segregation in 2000 and 2010 for Shanghai. Indices of dissimilarity for occupational groups and hukou status were calculated at both the neighbourhood level and the subdistrict level. In the second stage, we adopted several approaches to depict the spatial pattern of socioeconomic segregation of Shanghai in 2000 and 2010

by occupational groups. First, we visualized the distribution of the location quotient (LQ) of the TOP group and BOTTOM group. Second, we applied the typology of units (subdistricts and neighbourhoods) for further analysis. Third, we inspected the location of the TOP group of Shanghai and revealed the changes in the social–spatial pattern over the period 2000–2010. In the third stage, we illustrated the spatial pattern of segregation by hukou status and then discussed its connection to segregation by occupation.

9.4 Results

9.4.1 Level of Segregation in Shanghai

Tables 9.1 and 9.2 report the results of DI by occupation. Regarding major occupational groups, there was a moderate level of segregation between the TOP and the BOTTOM group (0.32), and a moderate level of segregation between the MIDDLE and the BOTTOM group (0.35) at the subdistrict level in 2000. From 2000 to 2010, the level of segregation at the subdistrict level did not change dramatically, and there was only a moderate level of segregation between the TOP and the BOTTOM group (0.33) in 2010. Regarding sub-major occupational groups, DI for all pairs of occupational groups except DI for segregation between FAR and any other occupational group was below 0.5 at the subdistrict level, which indicated that FAR were segregated from any other occupational groups. Besides, Tables 9.1 and 9.2 suggest that the level of segregation at the neighbourhood level was higher than that at the

Table 9.1 Dissimilarity Indices (multiplied by 100) by occupation for Shanghai in 2000 and 2010 at subdistrict level (left) and in 2010 at neighbourhood level (right)

2000 subdistrict level	HEA	PRO	CLE	COM	MAN	FAR
HEA		22	27	27	48	75
PRO	25		14	20	46	75
CLE	31	11		14	41	72
COM	25	17	16		34	70
MAN	34	35	36	26		55
FAR	73	79	81	74	58	

2010 subdistrict level	HEA	PRO	CLE	COM	MAN	FAR
HEA						
PRO	33					
CLE	39	22				
COM	44	33	26			
MAN	62	60	52	41		
FAR	86	86	83	79	66	

Table 9.2 Dissimilarity Indices (multiplied by 100) between Top, Middle and Bottom groups for Shanghai in 2000 and 2010

	TOP - MID	TOP - BOT	MID - BOT
2000 subdistrict level	14	32	35
2010 subdistrict level	16	33	28
2010 neighbourhood level	24	47	38

subdistrict level in 2010. At the neighbourhood level, there was a higher level of segregation between the TOP and the BOTTOM group (0.47), and FAR as well as MAN were highly segregated with other occupational groups, especially HEA and PRO. In 2000 and 2010, FAR accounted for 11.3% and 6.3%, respectively, which led to a relatively higher level of segregation between FAR and other occupational groups.

Regarding hukou status, DI between migrants and Shanghai hukou holders increased over the period 2000–2010. The hukou-based segregation at the subdistrict level increased from 0.24 to 0.30. DI at the neighbourhood level also increased from 0.31 to 0.39. This indicates a moderate level of segregation by hukou status.

In summary, Shanghai is characterized by a moderate level of segregation by occupation and hukou status over the period 2000–2010, and the level of segregation between the TOP group and the BOTTOM group and that between migrants and local hukou holders increased over the same period. Moreover, the level of segregation by occupational groups exceeded the level of hukou-based segregation both at the subdistrict level and neighbourhood level in 2000 and 2010.

9.4.2 Spatial Pattern of Occupation-Based Segregation in Shanghai

The spatial distribution of the TOP group changed substantially from 2000 to 2010 (see Fig. 9.3). In 2000, people from the TOP group were mainly concentrated in the *Puxi* area and in areas between the Inner Ring Road (IRR) and the Outer Ring Road (ORR) in the southwest corner (where many research institutions, universities, government organizations and a sub-CBD were located). Outside the ORR, the suburban area had only a few sporadic subdistricts with a higher concentration of the TOP group. In 2010, the spatial distribution of the TOP group showed a characteristic of sprawling from the IRR to the ORR, and the old town of Shanghai (small area next to the west bank of the river) was largely occupied by the BOTTOM group. A significantly increased concentration of the TOP group was found in the *Pudong* area. Since the development of the *Pudong* area started in 1990, the area has gradually become the financial centre of China. Most of the residents from the TOP group concentrated here are from private sector organizations, such as transnational corporations. In 2010, the TOP group was more concentrated at the neighbourhood level than at the subdistrict level and was located mainly along with the IRR of Shanghai. Besides, a few sporadic neighbourhoods showed a higher level of concentration of the TOP group in the suburban area, in which some high-tech parks are located.

There is a stark contrast between the residential distribution of the BOTTOM group and that of the TOP group. In 2000, a higher level of concentration of the BOTTOM group was found in the *Pudong* area and the suburban area. Most of these areas were farmland or industrial parks. From 2000 to 2010, with the expansion of urban land, some of the farmland or industrial parks were expropriated by the

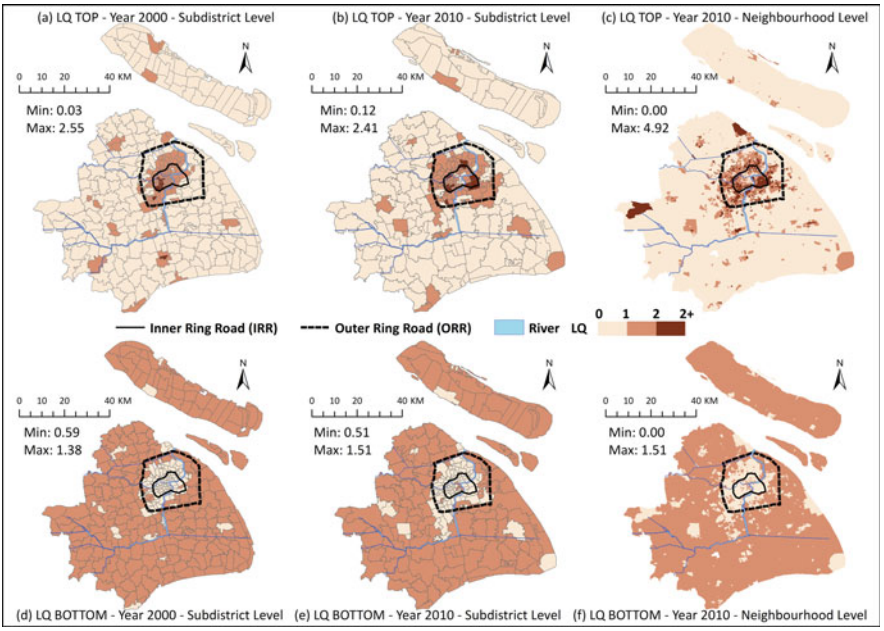

Fig. 9.3 Location quotient for the TOP and BOTTOM occupational groups in 2000 and 2010

government, such as the *Pudong* area. Some residents of the BOTTOM group were concentrated in the old town of Shanghai in 2010. However, although they have the most convenient location in Shanghai, they suffer from shabby and crowded residential conditions compared with other locations.

As we can see from Fig. 9.4, the geography of subdistricts' socioeconomic intermixing experienced dramatic changes from 2000 to 2010. In 2000, the low socioeconomic status subdistricts outnumbered the middle and high socioeconomic status subdistricts. Especially in the suburban area, nearly all subdistricts belonged to low socioeconomic status subdistricts. Inside the IRR, the old town of Shanghai was characterized by residents with middle socioeconomic status, while the west of the old town was characterized by residents with high or middle socioeconomic status. The *Pudong* area witnessed a growing number of mixed subdistricts where residents with high, middle and low socioeconomic status lived together. However, in 2010, although the low socioeconomic status subdistricts remained dominant across Shanghai, their share had decreased significantly, and the proportion of the middle to high socioeconomic status subdistricts had increased by 18% over the decade. These subdistricts were mostly distributed on both sides of the IRR, surrounding the old town of Shanghai. In 2010, the old town of Shanghai was characterized by residents with low or middle socioeconomic status. The outskirts of the central area were largely identified as mixed, middle to high and high socioeconomic status neighbourhoods, whereas in the suburban area, most of the neighbourhoods were identified as low socioeconomic status neighbourhoods. From 2000 to 2010, with

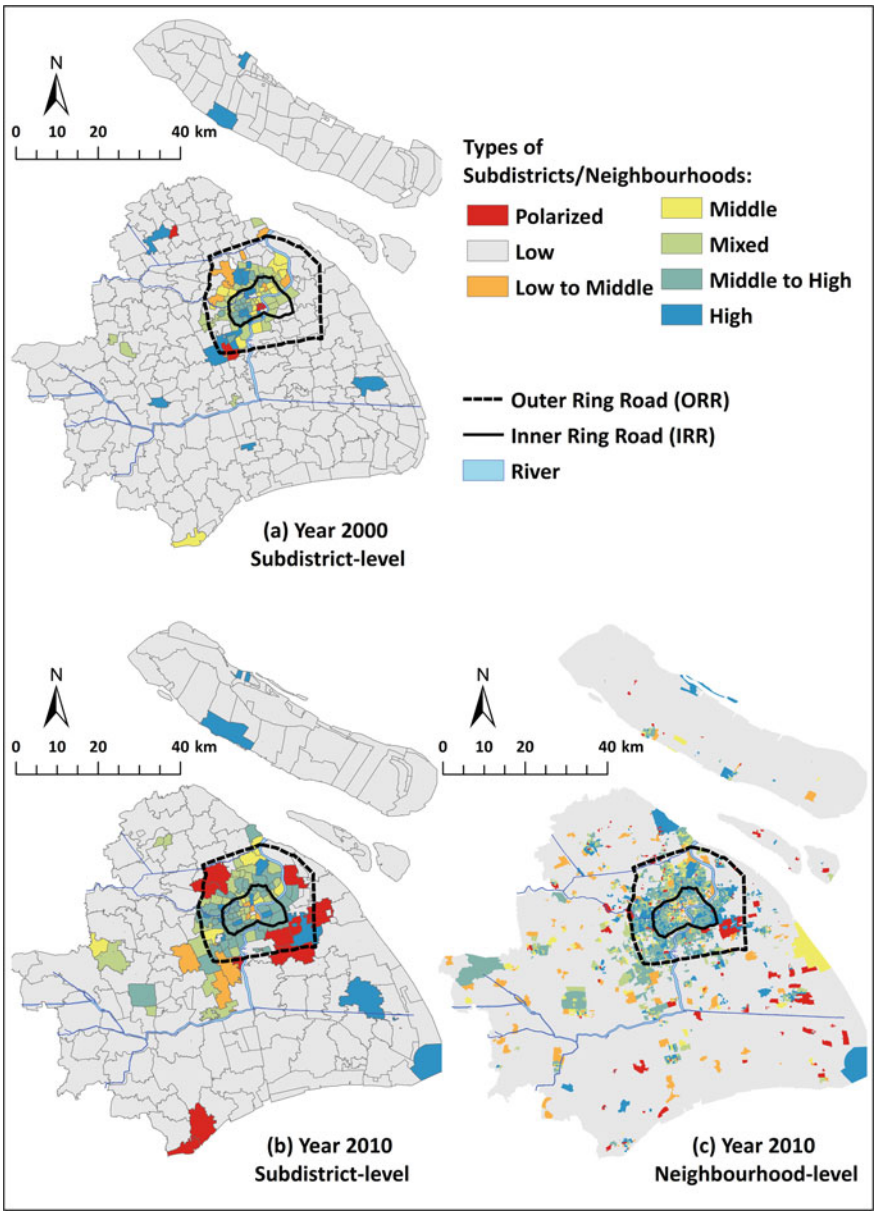

Fig. 9.4 Classification of subdistricts/neighbourhoods by socioeconomic composition in 2000 and 2010

the expansion of urban land and the improvement in the average socioeconomic status of the population in Shanghai, the districts with residents with high socioeconomic status sprawled from the west of the old town to other areas inside the ORR. The pattern at the neighbourhood level was much more fragmentized due to smaller scale geographic units. Neighbourhoods in the old town largely belonged to low, low to middle or middle socioeconomic status neighbourhoods, surrounded by middle to high and high socioeconomic status neighbourhoods.

Figure 9.5 depicts the residential landscape of the TOP group in Shanghai. In 2000, subdistricts of Q1 were mainly located in and dispersed across the central area and largely situated near the universities, government organizations and the sub-CBDs. In 2010, Q1 was situated mainly between the area of the ORR and the IRR, and especially concentrated in the *Pudong* area, which has become the financial centre of Shanghai, attracting an increasing number of experts from all over the world. Although the proportion of each type of subdistrict remained fairly stable over the period 2000–2010, the spatial distribution changed significantly.

9.4.3 Spatial Pattern of Hukou-Based Segregation in Shanghai

In 2000, most Shanghai hukou holders lived in the old town of Shanghai, and migrants were mainly concentrated along both sides of the ORR. In 2010, the location quotient of migrants was found at a low level inside the IRR. Migrants' agglomerations had been moved away from the IRR, and neighbourhoods on both sides of the IRR were mainly inhabited by local hukou holders in 2010 (Fig. 9.6).

Above all, it was found that segregation by occupation is interwoven with segregation by hukou status. Over the period 2000–2010, the spatial distribution of the BOTTOM group was similar to that of migrants, while the spatial distribution of the TOP group was contrary to that of migrants. This indicates that, in Shanghai, most migrants occupy the lowest position in the socioeconomic hierarchy. Shanghai local hukou is highly associated with higher socioeconomic status, while those without Shanghai hukou may suffer from lower socioeconomic status and so be segregated from residents with high socioeconomic status.

9.5 Drivers of Changing Patterns of Residential Segregation in Shanghai

Our findings reveal that the level of segregation by occupational groups has surpassed the level of hukou-based segregation, and occupation has become an increasingly significant factor in the reconstruction of the social space. In the post-reform era, educational attainment, occupation and income are interrelated and reinforce each

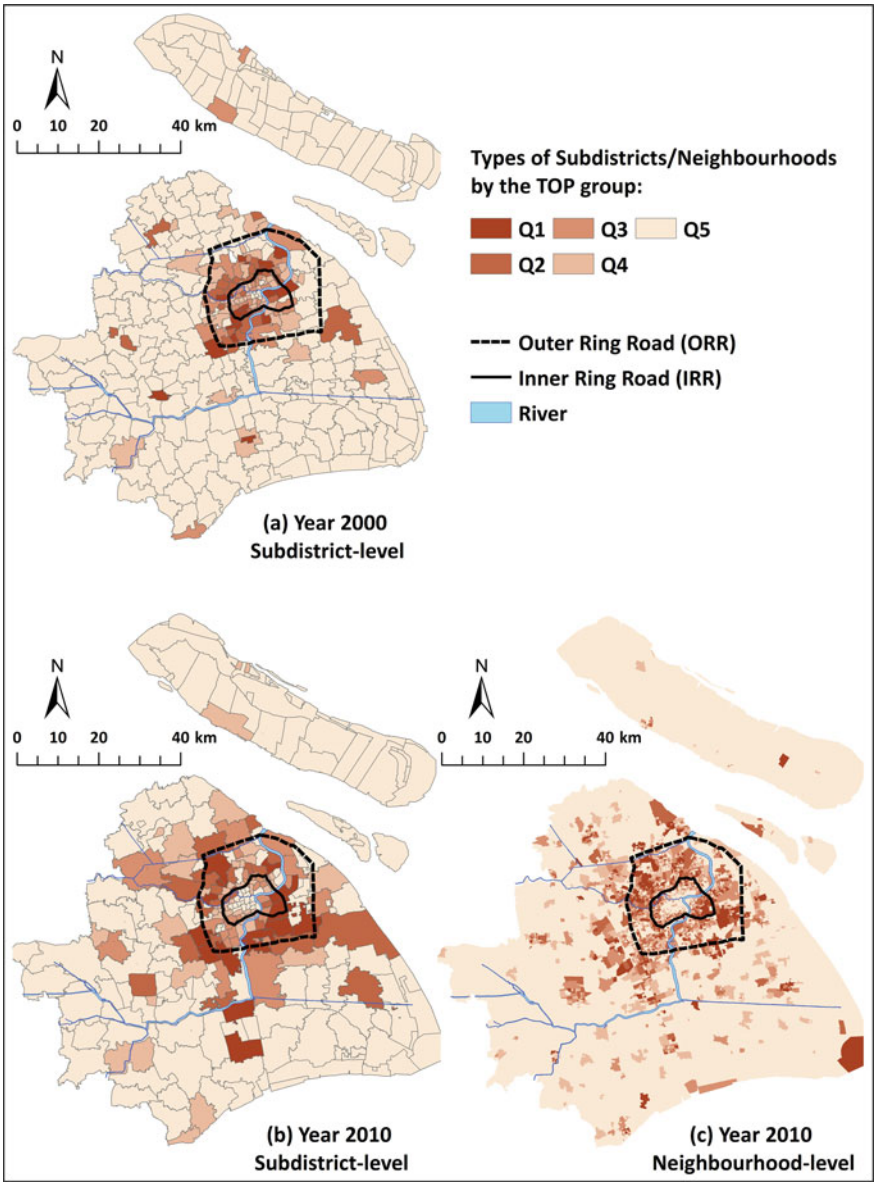

Fig. 9.5 Location of the TOP occupational group in 2000 and 2010

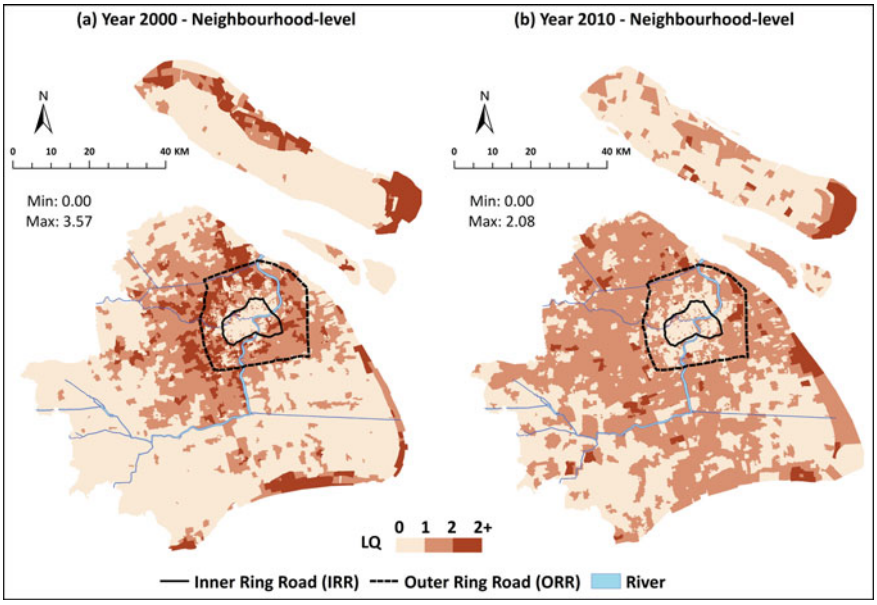

Fig. 9.6 Location quotient of migrants in 2000 and 2010

other. The rapid growth of the TOP group and the huge proportion of the BOTTOM group in the occupational hierarchy may exacerbate income inequality and socioeconomic segregation in Chinese rapidly globalizing cities. The proportion of the TOP group increased over the 2000–2010 decade, and the BOTTOM group still accounted for a large share of the population in 2010. Under the influence of globalization and marketization, housing accessibility is increasingly dependent on occupation and income (Bian and Liu 2005; Wu et al. 2018). As a result, the spatial process of socioeconomic polarization accelerates and results in residential segregation (Xiao et al. 2016). In the era of financialization of housing, the appreciation of housing values and the rapid increase of house prices have driven the process of socio-spatial differentiation, sorting people with different abilities to pay into different areas (Song et al. 2017; Shen and Xiao 2020). Under such circumstances, housing differentiation is supposed to be intensified, and market forces are assumed to play an increasingly dominant role in shaping the process of segregation of Shanghai over time.

Nevertheless, the institutional factors can never be ignored. In large Chinese cities, it is difficult for migrants without higher educational attainment to achieve upward social mobility (Wang and Fan 2012). The hukou system excludes migrants from a large variety of goods and services provided by local governments, thereby circumscribing unwanted migrants and maximizing government revenue (Zhang 2010; Chan 2012). In Shanghai, although migrants can apply for the urban hukou, they are obliged to meet several criteria, such as the possession of bachelor's degrees and regular residence in Shanghai or stable employment in formal enterprises. The qualified applicants will be ranked by the rating scheme and those applicants with a total

score higher than the qualification mark set by the Shanghai government can attain urban hukou. These criteria are intentionally skewed in favour of those with higher educational attainment or technical credentials (Zhang 2010; Zhang and Wang 2010). Even though the hukou system has been relaxed and migrants can attain urban hukou easily in small- and medium-sized cities, in large cities, hukou remains as an insurmountable barrier for most of the migrants to obtain public goods and services such as education and medical insurance, owing to the high threshold and limited quota of urban hukou attainment in large Chinese cities. Nevertheless, as the Lewis turning point is reached, surplus rural labour has been absorbed by the manufacturing sector and labour supply has become limited in urban China. The labour-intensive growth model in China has gradually lost its competitiveness (Cai 2010; Zhang et al. 2011). Therefore, the reform will be deepened, and an increasing number of migrants will be encouraged to integrate into urban China to spur economic growth. The market mechanism will play a significant role in mobility and resource allocation, and the level of hukou-based segregation will decrease at the expense of the increasing level of segregation by socioeconomic status.

Additionally, social factors play an important role in shaping the process of segregation in large Chinese cities. Chain migration is one of the most important forms of migration, and migrants tend to congregate in a particular location with the aid of kinship ties and native place ties (Liu et al. 2015). These social ties are vital for migrant communities to survive and thrive in large cities, as newly arrived migrants tend to seek jobs and accommodation with the aid of their family, relatives and fellow townsmen (*lao xiang*) (Liu et al. 2012; Huang et al. 2017). Besides, poor socioeconomic status and lower educational attainment reinforce the disadvantaged position of migrants in urban China, who suffer from persistent discrimination by the local residents (e.g. exclusion from community activities, difficulty in constructing a social network with local residents) (Chen and Wang 2015). As a result, migrants are isolated by the local residents, and they subsequently prefer to congregate in migrant enclaves for both instrumental and emotional support (Liu et al. 2012). Both the internal cement within each migrant group and the external discrimination against migrant groups contribute to the residential segregation between migrants and local hukou holders in Chinese cities.

Besides, the historical legacy of urban inequality laid a foundation for the structure of urban space (Wu and Li 2005; Li and Wu 2006). In the pre-reform era, rural labourers were forced to stay in rural areas, and urban residents who were affiliated with state-owned work units lived in city centres (Wu 2002; Chan 2009). The process of the marketization of housing affected the acquisition of housing property rights (Wu 2017). In the early period after the reform in 1988, as the sitting tenants of public housing in Shanghai, local hukou holders could afford housing and acquire property at highly subsidized prices (Logan et al. 2009). They benefitted from the housing reform and thus owned housing properties at the centre of Shanghai. The offspring of the beneficiaries of the housing reform inherited these properties, and some of them still lived in the centre of Shanghai. Thus, the housing reform and the commodification of housing have led to the problem of housing unaffordability and housing inequality, and therefore familial financial support and intergenerational transmission of housing

are increasingly important for young people to achieve homeownership (Cui et al. 2019). The drastic increase in house prices after the housing reform in Shanghai and the intergenerational transmission of housing reinforce the historical pattern of urban social space and aggravate the hukou-based segregation in Shanghai.

Moreover, urban planning by the local government also plays an active role in reshaping the socio-spatial configuration in Shanghai (Feng and Zhou 2003). The renewal projects in the rundown neighbourhoods have improved the living conditions and residential environment of the old town in Shanghai, attracting residents with a higher socioeconomic status and resulting in the gentrification of the city centre (He 2010). Besides, the development of the metro network and the construction of the new high-tech development zone have promoted the development of suburban areas and new towns. With the improvement of public transportation, residents who were employed in high-tech industries located in suburban areas tended to move to the periphery of the central area for a better job-housing balance and better living conditions (Liu and Hou 2014). Thus, Shanghai experienced the processes of gentrification and suburbanization (Yang 2005). Additionally, the construction of the metro network exerts a direct effect on house prices. Houses around the metro stations are more expensive than those away from metro stations, which are unaffordable for people from the BOTTOM group, aggravating segregation between the TOP and the BOTTOM groups. Through planning intervention, the Shanghai municipal government also contributed to the exacerbation of residential segregation.

Apart from the driving forces mentioned above, demographic factors, such as the family structure and household life cycle, play an important role in shaping the socio-spatial configuration in urban China (Feng and Zhou 2008). For example, the elderly may prefer inner-city areas with good access to public services, such as public-funded hospitals, over suburban areas, while families with children would rather live in gated communities in the periphery for more a spacious environment and better living conditions (Feng and Zhong 2018). The demographic processes result in socio-spatial differentiation in housing demands and thus shape the spatial pattern of residential segregation.

9.6 Conclusion and Discussion

China's economic reform has brought about a widening gap between the rich and the poor and thereby has led to a rise in socioeconomic segregation in large cities. This chapter provides an overview of the change in the level and spatial pattern of residential segregation in Shanghai over the period 2000–2010. Our findings reveal that socioeconomic status based on occupation has become a dominant axis of segregation in large Chinese cities, as the level of segregation by occupation has surpassed the level of hukou-based segregation. The evolving socioeconomic residential segregation patterns in Shanghai have emerged from the combination of market and institutional forces both of which favour higher socioeconomic groups over lower socioeconomic groups.

An increasing level of segregation in Shanghai is affected by various driving forces at the macro, meso and micro levels. Market factors (e.g. globalization and marketization), institutional factors (e.g. the hukou system), social factors (e.g. social bonds within migrant groups and discrimination from the mainstream society), the historical legacy of urban inequality, urban planning practices and demographic processes (e.g. family structure and household life cycle) have been interwoven to reshape the socio-spatial structure of Shanghai. The confluence of these forces has led to the change in the level and pattern of residential segregation. Inconsistent with findings from cities of transitional Central and Eastern European countries, where increasing economic inequality has promoted the formation of mixed neighbourhoods rather than segregated neighbourhoods (Marcińczak et al. 2015), our findings from Shanghai suggest that the widening of the income gap and the influx of internal migrants from elsewhere have led to an increasing level of socioeconomic segregation.

It would be difficult to reverse the trend of increased segregation in Chinese cities in the near future, as the market mechanism plays a dominant role in shaping the urban landscape (Xiao et al. 2016). However, it is advisable for Chinese policymakers to adopt the following measures to counter segregation. Most importantly, the government is advised to lower the threshold of attaining urban citizenship (urban hukou) and gradually remove institutional barriers against migrants. Current qualifications of urban hukou in large Chinese cities strongly favour those with higher educational attainment or desirable skills (Zhang 2010). In addition, strict rules and limited quotas exclude most of the migrants from urban hukou and the affiliated public goods and services such as pension and medical insurance. A comprehensive urban citizenship can improve migrants' integration and lower the level of residential segregation. Second, the government is advised to provide education and skill training for the low-end labourers and migrants since the accumulation of human capital is effective for migrants to integrate into the host society and achieve upward social mobility (Bian and Logan 1996).

Additionally, there is a need to provide more affordable housing in locations accessible to the disadvantaged. Recent years have witnessed large-scale redevelopment schemes carried out in many large cities. These redevelopment schemes are criticized because they fail to satisfy migrants' basic demand for accommodation and do not address the negative consequences of poverty concentration (Wu et al. 2012). Besides, policymakers are advised to promote the development of mixed communities by providing public rental housing[1] in middle-class neighbourhoods or providing a rental allowance to avoid an excessive concentration of the vulnerable. Moreover, the disadvantaged are forced to congregate in enclaves with poor living environments. Providing open green spaces and improving the traffic conditions can increase the value of these areas and therefore attract residents with a higher socioeconomic status. Last but not least, the pursuit of land revenue by the local government

[1]Public rental housing is a government sponsored economic assistance aimed towards alleviating housing expenses for low-income families or individuals, retired elderly, disabled or migrants with stable employment in urban areas. The public rental housing is owned by the local government, and the rental price is slightly lower than the market rental price.

has led to a rapid increase in the price of housing and increased resident segregation in urban China. Therefore, the local government should implement stiffer regulations on real estate investment. By implementing these strategies, governments can prevent the marginalization of the disadvantaged and ease the level of segregation in Chinese large cities.

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Chapter 10
Increasing Inequality and the Changing Spatial Distribution of Income in Tel-Aviv

Tal Modai-Snir

Abstract Despite its egalitarian past, in recent decades Israel followed the footsteps of the United States in terms of growing inequality levels and reduced welfare arrangements. It is assumed, therefore, to have followed similar trends of increasing residential segregation between income groups. This study focuses on the metropolitan area of Tel-Aviv, Israel's financial and cultural centre and examines the change in the spatial distribution of income groups between the years 1995–2008. It identifies trends in segregation between top and bottom income earners, as well as those between other income groups, given corresponding trends in income inequality. In addition, it examines spatial patterns of affluence and poverty concentration and assesses the influence of concentrated disadvantage among specific income and religious groups on overall segregation trends.

Keywords Spatial inequality · Income segregation · Tel-aviv · Inequality trends

10.1 Introduction

The level of residential segregation by income (income segregation from hereafter) is affected by the level of income inequality. This association has been investigated in several studies during the past decade (Watson 2009; Reardon and Bischoff 2011; Tammaru et al. 2015, 2019; Quillian and Lagrange 2016), and there is growing insight about several aspects of this relationship. First, it is understood that different characteristics of the income distribution affect the segregation of different income strata. Second, it is known that the residential distribution of income groups can follow diverse spatial patterns. Finally, it is acknowledged that given income disparities among ethnic or social sub-groups, increasing inequality affects the segregation between such groups.

This chapter focuses on the metropolitan area of Tel-Aviv, Israel's financial and cultural centre. It examines the change in income segregation between the years 1995

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and 2008. Those were the years when population censuses were conducted, but also a period in which inequality substantially increased. The study follows segregation trends of various income-group combinations, relating them to trends in inequality at different parts of the income distribution. A popular belief in Israel attributes a large extent of inequality to the effect of two extremely disadvantaged groups in society, Arabs and ultra-orthodox Jews. This study, therefore, also examines the effects of those groups on total income segregation in the metropolitan area.

The objective of this chapter is to explore patterns of change in the spatial distribution of income classes in the Tel-Aviv metropolitan area. The chapter will address several questions that arise given the background of Israel's inequality trends, its unique socio-demographic context and the patterns of urban development in the Tel-Aviv MA: *How did the segregation of different income classes evolve and how did segregation patterns correspond to inequality trends? Did the increasing relative disadvantage of Arabs and ultra-orthodox Jews play a role in increasing income segregation? How are the different income classes spatially distributed? Is this distribution indicative of spatial patterns of poverty/affluence concentration?*

10.2 Increasing Income Inequality in Israel and Socio-spatial Implications

Israel was born as a socialist state in 1948 and through its first decades was characterized by a progressive welfare policy. The days of socialism came to an end within three decades. A political upheaval in 1977 marked a shift to a neo-liberal regime, when the labour party, which led all governments until then, handed over the reins to a right-wing coalition. This political shift is believed to have transformed Israeli society. Another event, however, has also been considered a turning point in Israel's economy. A dramatic stabilization programme, which was conceived in 1985 following a severe economic crisis, reflected a final transition from socialism to capitalism.

Following these developments, and as part of Israel's integration in the global economy, income inequality levels have increased substantially since the 1980s. The Gini coefficient for disposable incomes[1] increased from 0.33 in 1985 to 0.38 in 2010. Inequality in market incomes also increased substantially due to structural processes in the labour market, with Gini coefficients mounting from a low of 0.47 in 1985 to a high 0.51 in 2005. The significant reductions in direct taxes and transfers resulted in increased participation in the labour market and decreased unemployment, which led to a substantial decrease in inequality, based on market incomes, from 2005 onwards. Inequality in disposable incomes, however, remained very high given the reduced transfers (Cornfeld and Danieli 2015), and as of 2015, Israel stands out together with the US as the most unequal among developed countries (OECD 2015).

[1] OECD data, extracted from OECD.Stat.

Israel also stood out (as of 2005) as having extreme upper and lower tail inequality (Ben-David and Bleikh 2013). Trends in wage decile ratios over the past decades indicate substantial increases in upper tail inequality (P90/P50) and decreases in lower tail inequality (P50/P10) during about a decade since the mid 1990s, which offset increases in that inequality during the previous decade (Cornfeld and Danieli 2015). The concentration of income among the top decile and top percentile is less extreme in Israel than in several OECD countries (Ben-David and Bleich 2013, as of 2005).

Increasing residential segregation appears from increasing income disparities among classes that affect the differential spending on housing. The increase in inequality levels involves diverse changes in the distribution of income and correspondingly, there may be diverse patterns of change in income segregation. Under conditions of increasing inequality, income disparities between the top and bottom classes inevitably increase and so does the segregation of top and bottom income groups. A study of income inequality and segregation among 13 European cities revealed that, in all of them, segregation between top and bottom classes increased with the increase in income inequality (Marcińczak et al. 2015). Increasing inequality may also manifest in changing disparities within different parts of the distribution which can affect income segregation, respectively. Lesser disparities in the lower part of the distribution and greater disparities in the upper part of the distribution are associated with greater segregation of affluence which is a most common aspect of segregation in contemporary cities of the developed world (Reardon and Bischoff 2011; Marcińczak et al. 2015; Quillian and Lagrange 2016).

The degree to which the income differential is translated into increasing residential segregation depends, to a great extent, on housing policies. The decline of the Israeli welfare state manifested also in the evolution of housing policies. During the first decades after Israel's establishment, housing policies were directed to achieve collective goals such as immigrant absorption and population dispersal in the country's periphery (Carmon 2001). The public housing sector peaked at a share of around 23% by the end of the 1950s, a share that remained stable for another decade (Werczberger and Reshef 1993). In contrast with many countries where the privatization of public housing reflected a reversal of housing policies, in Israel privatization was an ongoing policy long before the political shift, reflecting a preferential status of homeownership (Werczberger and Reshef 1993; Werczberger 1995). Privatization through the sale of public housing units to occupying renters intensified over the years and by 2015, the public housing sector constituted only 3% of the housing stock in Israel (Hananel et al. 2018). Despite the important decline of this sector, it is not assumed to have had an important role in changing residential segregation within the Tel-Aviv MA, as most public housing were located in peripheral areas. However, it may have played a role in the positioning of Israel's central urban area as increasingly wealthier.

10.3 Inequality Among Socio-demographic Groups in Israel

In many cities, income disparities among ethnic groups generate complex patterns of segregation that involve both the socioeconomic dimension and the ethnic dimension. The effect of increasing income inequality on the segregation of disadvantaged social groups depends on whether disparities are growing between or within sub-groups. In addition, there is also a question of whether groups compete in the same housing sub-markets. The less the groups are constrained to separate sub-markets, the stronger the link between income inequality and segregation within each sub-market (Reardon and Bischoff 2011).

The Israeli population is very heterogeneous in terms of ethnic origin and religious identity. Income inequalities are related, to some extent, to disparities among population sub-groups. The two most disadvantaged groups are Arabs[2] and ultra-orthodox Jews,[3] which together account for approximately 30% of the total population, and are both characterized by low education levels, low participation in the labour market and high fertility rates. Poverty rates among these groups (based on disposable incomes) significantly increased during the period 1992–2011 and reached a high of 50% and 57%, respectively (Ben-David and Bleikh 2013). The popular belief is that the high overall poverty rates in Israel (among the highest in OECD countries[4]) and the high inequality levels can be attributed to the effect of those disadvantaged sub-groups. A simulation of poverty rates excluding those sub-groups revealed that in such case poverty rates would not show important increases since the late 1990s and that the rate as of 2011 would be 8.5% points lower (ibid.). Similar simulations (excluding Arabs and ultra-orthodox Jews) with respect to inequality levels show a relatively modest reduction in the Gini index which would, nevertheless, still be very high compared to OECD countries (Ben-David and Bleikh 2013; Cornfeld and Danieli 2015).

Arabs and ultra-orthodox Jews are extremely segregated spatially. Of the total Arab population, at least 65% live in separate towns and villages[5] (in which the population is almost 100% Arab). The rest who live in a few mixed cities are also highly segregated, mostly in separate neighbourhoods (Falah 1996). Of the ultra-orthodox Jews population, it has been estimated that during the period 2002–2009 around 75% lived in cities or neighbourhoods identified as relatively homogeneous

[2]The Arab ethnic category composes approximately 20% of the Israeli population. It consists of Muslims, Christians, Druze and more, of which the former is the largest (82% of total population with Arab ethnicity, according to 2008 census) and the most disadvantaged.

[3]Ultra-orthodox Jews accounted for approximately 10% of the population in 2008. Identifying the group of ultra-orthodox in statistics is very complex. These figures are estimated by Friedman et al. (2011).

[4]Around 18% in 2011, according to OECD data, retrieved from OECD.Stat.

[5]Estimated by the author based on published census data from 2008.

ultra-orthodox.[6] Economic inequalities are not the main driver of segregation of either of these groups. The segregation of Arabs has been shaped by historical settlement patterns and by the ongoing political tension between the Arab minority and Jewish majority. The segregation of ultra-orthodox Jews is voluntary and is based on their rejection of secular western values, culture and lifestyles and as a means of limiting external influence on the community (Shilhav 1993). Even though segregation in these two cases is not driven by economic factors, the groups may contribute significantly to indices measuring economic segregation given their spatial isolation and distinct socioeconomic disadvantage. Since these groups do not compete in the same housing sub-markets as the majority group, their increasing relative disadvantage may manifest as increasing income segregation, whereas the sorting processes itself would not necessarily be highly affected by increasing income disparities.

Being an immigrant society, Israel's Jewish population is also very diverse in terms of ethnic origin. The main ethnic division is between Jews that originated from Europe and America and those that originated from countries in Africa and the Middle East. Those originated from Europe and America consistently held a higher socioeconomic status than those from Africa and the Middle East and income gaps are persistent (Haberfeld and Cohen 2007). The socioeconomic gap plays a role in the residential segregation of the two ethnic groups (Kraus and Koresh 2012). In contrast with Arab and ultra-orthodox Jews, those ethnic groups take part in the same housing market. Socioeconomic disparities are assumed to take the lead in residential sorting processes between those sub-groups, but prejudice and discrimination are not likely to be substantial in the housing market within Israel's central region compared to the context of non-Western immigrants in other developed countries and compared to the context of racial divisions in North America.

10.4 The Tel-Aviv MA: Development and Transition

The Tel-Aviv MA is Israel's financial and cultural centre. Its core city was established in 1909 as a Jewish suburb of the historical Arab city of Jaffa. The urban area developed along the Mediterranean seashore to the north and south. According to current delineations, the MA stretches between the 'Hefer Valley' regional council in the north (bordering the city of Netanya) and the city of Ashdod in the south (Fig. 10.1). The metropolitan area unites 30 cities and towns, and 183 rural settlements. The population of the Tel-Aviv MA increased from 2.45 million in 1995 to 3.23 million in 2008, constituting 44% of the Israeli population in both years. As of 2008, 90.4% were Jewish, 5.4% Arabs and 4.3% 'others' (a category which commonly refers to non-Arab Christians). More than 60% of Arabs live in six Arab towns/villages and the rest live in three mixed cities: Tel-Aviv, Lod and Ramla, where they constitute 4%, 30%

[6]These figures are based on estimates by Gurovich and Cohen-Kastro (2004) who used voting patterns to identify ultra-orthodox geographic concentrations in 1996 and updated estimates for the period 2002–2009 (Friedman et al. 2011).

Fig. 10.1 Map of the Tel-Aviv MA (*Source* Tal Modai-Snir, Maarten van Ham, Neighbourhood change and spatial polarization: The roles of increasing inequality and divergent urban development, Cities, Volume 82, 2018, Pages 108–118, ISSN 0264–2751, https://doi.org/10.1016/j.cities.2018.05.009, under a Creative Commons CC BY 4.0 license)

and 20% of local populations, respectively, and mostly live in predominantly Arab neighbourhoods. Of the Jewish population, approximately 8% are ultra-orthodox that live in predominantly ultra-orthodox cities and neighbourhoods.

Due to the increasing connectivity with global markets, Tel-Aviv has evolved as a world city (Kipnis 2004). While in 2000, it was classified as a Gamma city based on global connectivity rankings,[7] in 2008 and 2016 it was classified Beta+ and Alpha−, respectively. These leaps in rankings exemplify the intense effect of globalization processes on the city of Tel-Aviv as well as its increasing importance worldwide. One of the claimed developments of globalizing cities is the changing income structure

[7] Based on The Globalisation and World Cities Research Network (https://www.lboro.ac.uk/gawc/).

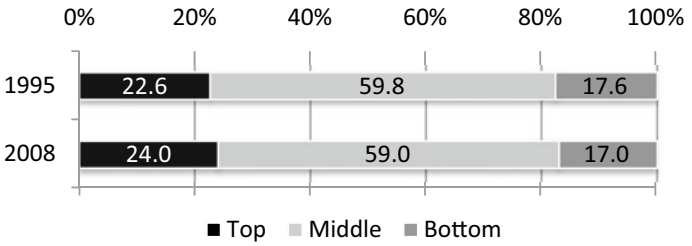

Fig. 10.2 Distribution of income groups and change over time (Processed by author based on the census data acquired specifically for this research from the Israeli CBS)

which is also evident in the Tel-Aviv MA. The top income quintile, based on the national income distribution, has gradually increased, whereas the bottom income quintile has slightly dropped (Fig. 10.2). It means that higher income groups were over-represented and lower income were under-represented in the MA. These figures indicate higher productivity and higher wages in the core region. They also most likely indicate that income sorting processes within the MA are intertwined with sorting processes occurring at the inter-regional level.

The increasing economic dominance of the MA has manifested in increasing housing demand. This led to extensive growth and expansion outwards which involved the massive conversion of agricultural land to residential use in the less urbanized periphery of the MA (Razin 1996; Bittner and Sofer 2013). This expansion reproduced the socioeconomic landscape of the historical north–south disparities that were prevalent since the establishment of Tel-Aviv city in 1909 along the historical railway to Jerusalem. The patterns of new development intensified disparities such that the MA can be considered as highly polarized between north and south (Modai-Snir and van Ham 2018).

Given the background of Israel's inequality trends, its unique socio-demographic context and the patterns of urban development in the Tel-Aviv MA, the chapter will address the following questions:

(1) *How did the segregation of different income classes evolve and how did segregation patterns correspond to inequality trends?* In the absence of housing policies to counteract segregation, inequality trends are expected to have translated into increased segregation of top and bottom classes. Also, the segregation of affluence is expected to increase given the increasing upper tail inequality in Israel. As the concentrations of income among the top decile are not extreme in Israel, this will manifest in the segregation of affluence which does not necessarily increase at the extreme of the income distribution.

(2) *Did the increasing relative disadvantage of Arabs and ultra-orthodox Jews play a role in increasing income segregation?* The modest effect of those groups on the overall inequality is expected to be replicated in the context of income segregation. Since the groups (especially Arabs) are underrepresented in the Tel-Aviv MA, the effect might turn out as negligent.

(3) *How are the different income classes spatially distributed? Is this distribution indicative of spatial patterns of poverty/affluence concentration?* There is already evidence that the socio-spatial structure of the Tel-Aviv MA has developed in a spatially polarized manner. Addressing this question, additional spatial aspects of the clustering of income classes are examined, which cannot be explored using dissimilarity indices alone.

10.5 Data and Methods

This study is based on data from the two recent censuses, 1995 and 2008, which were processed by the Israeli Central Bureau of Statistics (CBS). Compared to other countries, therefore, census data is less updated, and the 13-year time gap between censuses is longer than the 10-year standard gap in most countries. The research area is the Tel-Aviv MA as delineated by the Israeli CBS. Its boundaries are based on functional relationships among localities that surround the city of Tel-Aviv and are identical in 1995 and 2008. The basic spatial unit used is the census tract, which is a close approximation of a neighbourhood. The division to census tracts is only available in localities with more than 10,000 residents. Smaller localities are considered one census tract.

In this study, income data was used to analyse residential segregation. The dataset comprises of counts of individuals pertaining to each income decile, of those who were employed and whose monthly income exceeded 100ILS,[8] including all employment statuses. Income data from the 1995 census were collected from a 20% sample. The 2008 census data were collected for the whole population from administrative sources. Income decile cut-offs are based on the national income distribution of each year, respectively. Census tracts with less than 30 employed individuals were excluded from the analysis. Also, illegal workers and asylum seekers are not included in census data, and so their effect on segregation is not accounted for. The number of census tracts, as well as the number of employees, have substantially grown between the two censuses. This reflects extensive metropolitan development during that period. The final dataset includes 900 census tracts in 1995, in which the average number of employees was 949, and 1027 census tracts in 2008, in which the average number of employees was 1484.

Income quintile counts are used for mapping location quotients and neighbourhood income compositions. Segregation is measured using dissimilarity indices for different pairs of income classes, using various aggregations of the data.

[8] ILS—Israeli new shekel. 100 ILS was equivalent to 20 EUR in 2008 (around 25 Euros as of 2019).

10.6 The Segregation Between Income Classes in the Tel-Aviv MA

Dissimilarity indices (DI) for different combinations of income groups for the years 1995 and 2008 (Table 10.1) reveal the trends in income segregation. The most dominant trend is the increase in the segregation of the top group (deciles 1 and 2) from middle and middle-high groups, increases of more than 20%. There were also more moderate increases in DI concerning the bottom and middle/top deciles. Those trends are also evident when focusing on aggregate income groups; the DI of the top and middle groups increased by 18%, while those of top/bottom and middle/bottom groups increased by only 12% and 10%, respectively. Another interesting finding is that, in 2008, the DI of the top and middle groups is not much lower than the index computed for the top and bottom groups (0.26 vs. 0.28, respectively).

The level of aggregation is an important issue to consider. The segregation of top and bottom income groups appears to have increased the most when operationalized as the top and bottom quintiles (from 0.28 to 0.33, 18%, compared to 15% when operationalized as the top and bottom deciles and 12% when operationalized as three top and three bottom deciles). It appears that in the case of the Tel-Aviv MA, the top quintile is the most important aggregation to focus on when dealing with the segregation of affluence. The trends in income segregation, as shown in the changes in DI among income groups, conform to the evolution of inequality in Israel which has been characterized by increasing income gaps at the top of the distribution, with less extreme concentration of income at the top decile and top percentile compared to several OECD countries.

Another feature of Israel's inequality is the contribution of two disadvantaged groups, namely Arabs and ultra-orthodox Jews, to the level of inequality in Israel.

Table 10.1 Dissimilarity indices (multiplied by 100) for income groups in Tel-Aviv, 1995 and 2008 (below and above the diagonal, respectively). Top and Bottom groups refer to deciles 1–3 and 8–10, respectively, and Middle group refers to deciles 4–7. (Processed by author based on the census data acquired specifically for this research from the Israeli CBS)

	1	2	3	4	5	6	7	8	9	10	TOP	MID	BOT
1		22	30	36	41	42	44	43	42	39			
2	20		16	21	26	28	30	30	29	27			
3	25	13		15	18	20	23	22	22	22			
4	30	18	14		14	16	18	18	19	19			
5	34	21	16	13		14	15	16	16	17			
6	36	24	18	15	13		14	15	16	18			
7	38	26	21	16	14	13		15	15	17			
8	39	27	21	17	15	13	14		14	17			
9	38	27	21	17	16	13	14	13		15			
10	34	23	18	16	16	15	16	15	15				
TOP												26	28
MID											22		11
BOT											25	10	

Table 10.2 Dissimilarity indices computed for top and bottom income groups (three different classifications) in the Tel-Aviv MA, 1995 and 2008, after excluding tracts which are predominantly Arab or ultra-orthodox (Processed by author based on the census data acquired specifically for this research from the Israeli CBS)

	1995	2008	% change (%)
Top/botom decile	0.33	0.38	15
Top/botom 2 deciles	0.28	0.32	14
Top/botom 3 deciles	0.24	0.27	13

Table 10.2 presents a simulation that aims to examine whether income segregation levels in the Tel-Aviv MA are affected by the presence of these populations. DI of top and bottom income groups, using different aggregations were computed after excluding tracts which are predominantly Arab or ultra-orthodox. In the case of the Arab minority, tracts in ethnically mixed cities were excluded if the minority accounted for more than 60% of the local population. In total, 49 tracts out of 900 were excluded in 1995 and 60 tracts out of 1027 in 2008. Excluded ultra-orthodox tracts were those identified as such by Gurovich and Cohen-Kastro (2004) based on voting patterns. The results of the simulation indicate slight reductions in income segregation levels. For example, the simulated DI of top and bottom deciles in 2008 is 0.38, compared to 0.39 for the total sample of tracts. The simulation for 1995 reveals the same reduction of DI (0.01), 0.33 compared to 0.34 for the total sample. The indices computed for top and bottom quintiles and for the top and bottom 3 deciles show a consistent reduction of 0.01 for both 1995 and 2008. Altogether, the simulated DI show reductions ranging between 2 and 4% when excluding tracts which are predominantly Arab or ultra-orthodox, indicating a weak effect of the presence of those specific populations on income segregation in both years.

10.7 Changing Spatial Distributions of Top and Bottom Income Quintiles in the Tel-Aviv MA

The period 1995–2008 was not only dramatic in terms of the growth and expansion of the MA, but also in terms of change in the socio-spatial structure. The change is very much evident in maps that portray the spatial distributions of the top income quintile (Fig. 10.3, top panel). In 1995, census tracts that were characterized by the highest Location Quotient (LQ) of the top income quintile (i.e. those with the highest concentration of high-income residents) were scattered and quite uniformly spread throughout the MA. In 2008, such census tracts were substantially more clustered, and their spatial distribution was skewed to the north; most large clusters of neighbourhoods of the highest LQ can be found in the northern part of the MA, while in the south such neighbourhoods remained scattered. The visual impression of the differences between the maps, however, is distorted by the significant increase in the

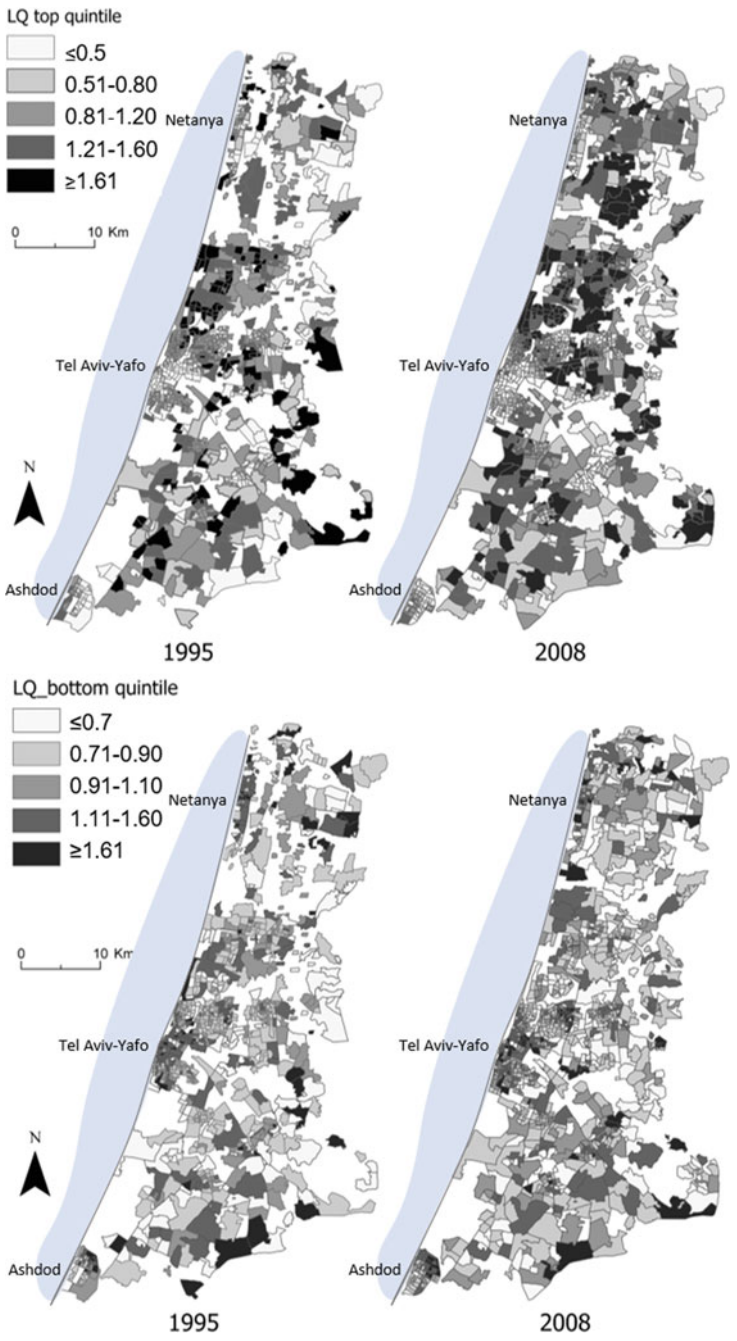

Fig. 10.3 Location quotients of the top and bottom income quintile (top and bottom panels, respectively) in the Tel-Aviv MA, 1995 and 2008 (Processed by author based on the census data acquired specifically for this research from the Israeli CBS)

number of neighbourhoods during that period. Both the numbers of neighbourhoods characterized by the highest and lowest LQ increased. However, in percentage terms, the former increased from 12 to 17%, whereas the latter stayed stable. Further examination reveals that neighbourhoods with very high concentrations of high-income residents increased at the expense of more mixed neighbourhoods with moderate concentrations, as will also be confirmed in subsequent analysis. As for the spatial distribution of the bottom income quintile, (Fig. 10.3, bottom panel), there is no substantial change over the study period in clustering patterns and locations of neighbourhoods with different relative shares of low-income residents. Moreover, the shares of each LQ categories were similar in 1995 and 2008.

10.8 Changing Socioeconomic Compositions in Tel-Aviv Neighbourhoods

The changing spatial distribution of income groups is also reflected in how they mix within neighbourhoods. Based on a typology of neighbourhood socioeconomic compositions from Marcinczak et al. (2015), which is based on occupational groups, in this chapter, the neighbourhoods are classified according to the composition of income classes. Each neighbourhood type is characterized by a distinctive mix of income classes which is defined by the shares of individuals pertaining to each class. Income classes to which individuals pertain were defined based on income deciles: Those pertaining to the three top and three bottom deciles were considered as pertaining to 'high' and 'low' income classes, respectively. Those pertaining to the four middle deciles (4–7) were considered as pertaining to the 'middle' income class.

During the study period, the share of neighbourhoods that were classified as 'mixed' decreased significantly (from 33.6 to 22.7%). This decrease was accompanied by a substantial increase in the proportion of neighbourhoods with high and middle-high statuses (from 36.3 to 45.9%) and a lesser increase in the proportion of middle-low neighbourhoods. Interestingly, the proportion of low-income neighbourhoods slightly decreased, but it was very small in the first place (2.4% in 1995 and 1.6% in 2008).

The changing distribution of metropolitan neighbourhoods among types involved distinctive spatial patterns (Fig. 10.4). While the decrease in the proportion of mixed neighbourhoods seems to be uniformly spread, the increase in high and high-middle neighbourhoods is not even. The emergence of high-income neighbourhoods was mainly in the north part of the MA, closer to the core. Middle-high-income neighbourhoods emerged in the southern part of the metropolitan area and in its northern outskirts. Middle-low-income neighbourhoods continued to cluster in the most urbanized areas (visually they can be identified as the smaller tracts). Polarized neighbourhoods changed locations completely between 1995 and 2008, implying that polarization characterizes neighbourhoods in transition. A close inspection reveals

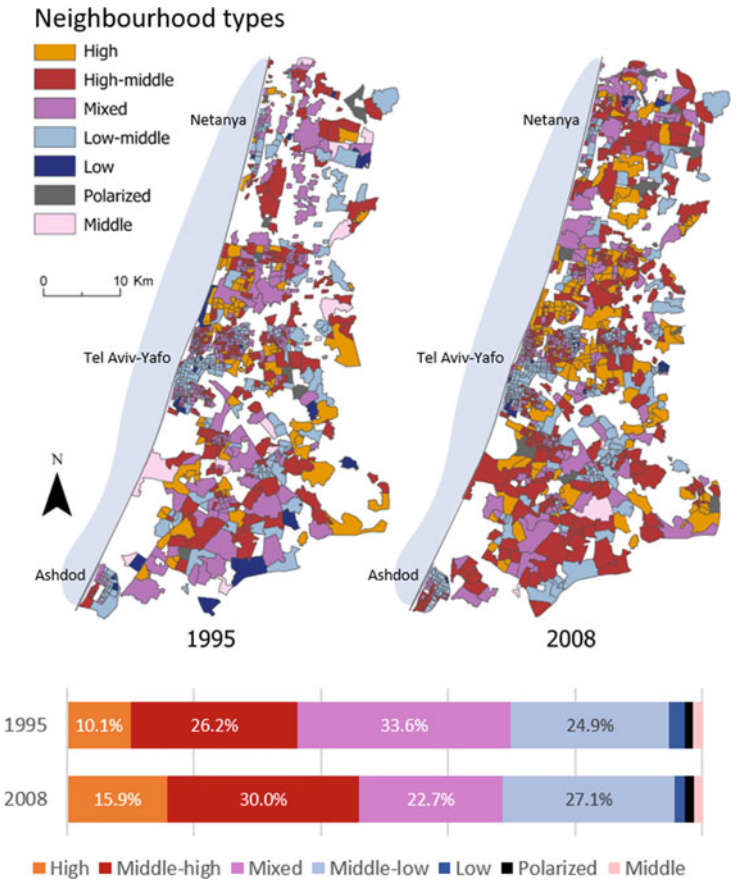

Fig. 10.4 The distribution (bottom panel) and spatial distribution (top panel) of neighbourhood types based on their income composition in the Tel-Aviv MA, 1995 and 2008 (Processed by author based on the census data acquired specifically for this research from the Israeli CBS)

that neighbourhoods that were polarized in 1995 were predominantly middle-high- or high-income in 2008. Polarization can be thus considered a temporary phase that characterizes upgrading neighbourhoods. While in most urban areas, this process would be associated with gentrifying inner-city neighbourhoods, in the Tel-Aviv MA at that period this process is rather associated with the upgrading of rural places at the outskirts of the MA. Those places did not only experience generational replacement but also expansion and development following the massive conversion of agricultural land to residential use.

10.9 Conclusions

This study explores the changing spatial distribution of incomes in the metropolitan area of Tel-Aviv, Israel. It is focused on the period between 1995 and 2008 during which inequality increased substantially. The study addresses a series of questions of which the first deals with the segregation of different classes and the connection to inequality trends. Predictions regarding this question were quite correct. Segregation of top and bottom income groups significantly increased between 1995 and 2008, for all group definitions (narrower and wider), as reflected in dissimilarity indices. The segregation of top and bottom quintiles was larger than the segregation of top and bottom deciles, which corresponds to the fact that Israel does not stand out in income shares held by the top decile or centile. The segregation of affluence was much higher than the segregation of poverty in both years, and its rate of increase was the highest. This corresponds to the trends in upper tail inequality. Trends in income segregation also correspond to the changes in the distribution of neighbourhoods among neighbourhood types according to their income composition. A decline of around 50% in the proportion of neighbourhoods which were 'mixed' is quite a dramatic change in the socio-spatial structure which inevitably means an increase in segregation.

The second question was whether the increasing relative disadvantage of Arabs and ultra-orthodox Jews played a role in increasing income segregation. The simulation of dissimilarity indices after excluding predominantly Arab and ultra-orthodox tracts revealed that the two distinct populations seem to not have a significant effect on income segregation in metropolitan Tel-Aviv; the exclusion of those tracts reduced between 2% and 4% of segregation measures. The effect of the presence of those disadvantaged groups on residential segregation is much weaker than we would expect, given the substantially higher poverty rates among those groups and the significant increase in poverty rates during the period 1992–2011 (Ben-David and Bleikh 2013). This may be related to the under-representation of the groups in the Tel-Aviv MA (especially the Arab group which makes up around 5% of the metropolitan population compared to 20% in the total Israeli population). Another possible explanation is that disparities between those groups and the majority population within the MA are lesser than at the national level. This possibility should be addressed in further research provided that sufficient individual-level data of these groups can be collected, which is especially challenging in the case of ultra-orthodox Jews.

The last question deals with how income classes were spatially distributed across the MA over time, and whether there are indications of changing spatial patterns of affluence/poverty concentration. The maps provide preliminary indications regarding the changing socio-spatial structure of the MA and the changing concentration of affluence and poverty over the research period. Location quotient maps show that low-income classes were quite evenly spread both in 1995 and 2008, whereas high-income classes became very spatially clustered in 2008. The clusters of affluent groups are much larger in 2008 than in 1995 and indicate that they no longer concentrate in specific neighbourhoods but in entire districts or cities. This change may have a

negative impact on the potential interaction among classes and on the distribution of economic and political resources featured at the municipality level.

The numbers of high- and middle-high-income neighbourhoods increased significantly over time and so did their shares of total metropolitan neighbourhoods. The changing distribution of neighbourhoods among types involved particular spatial patterns. The map of neighbourhood types highlights a distinction between the spatial distributions of high- and middle-high-income neighbourhoods. In 1995, both were evenly spread across the MA, apart from a slight under-representation of high-income neighbourhoods in the far north of the metropolitan area. In 2008, high-income neighbourhoods were clustered across the entire northern part of the metropolitan area, and especially close to the core; middle-high-income neighbourhoods emerged in the southern part of the metropolitan area and in the northern outskirts. This finding adds insight into the patterns of north–south polarization.

Poverty rates in Israel are among the highest in the OECD, but both the location quotient map and the neighbourhood types map indicate that there was hardly any concentration of poverty in the MA in either year. There were very few scattered poor neighbourhoods. The lowest prevalent neighbourhood status was low-middle-income neighbourhoods. In that respect, it can be said that the socioeconomic landscape of the Tel-Aviv MA, despite the high inequality and poverty rates in Israel, is different than urban areas in the United States where concentrated poverty is an issue of great concern. There is, however, some difference between the classification of 'concentrated poverty' in the United States and 'low-income' neighbourhoods in the context of this study, which should be considered. Neighbourhoods of concentrated poverty in the United States are usually characterized as those with at least 40% poor (e.g. Jargowsky 2013). In this study, low-income neighbourhoods are those in which at least 50% of the residents are low income. However, low-income residents in this classification are those pertaining to the three bottom deciles, which is a much wider group than those defined as strictly poor. With poverty rates in Israel of around 18%, the poor can be defined approximately as those pertaining to the two bottom deciles. The inclusion of low-income people who are not considered strictly 'poor' should compensate for the reductionist 50% definition of neighbourhoods with concentrated poverty.

Altogether, this study reveals trends of increasing income segregation in Tel-Aviv MA, which conforms to other cities in the developed world. However, the fine-grained picture of segregation reflects particular inequality trends in Israel, as well as the interaction with its particular socioeconomic landscape and patterns of urban development.

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Chapter 11
Changes in Occupational Structure and Residential Segregation in Tokyo

Masaya Uesugi

Abstract Similar to other industrialized countries, Japan has experienced a growth in income inequality since the 1980s. Furthermore, in the past few decades, Tokyo has come to adopt a more liberalist position for not only welfare and housing policy of the state but also to urban policy. This chapter examines the changes in socio-spatial inequality in Tokyo from 2000 to 2015. During this period, segregation indices confirm some level of residential separation between the top and bottom occupational groups, and segregation is fairly stable over time. This suggests that certain factors counteract the increase of residential segregation. A comparison between the Tokyo Metropolitan Region and the core city reveals that the core city amplifies spatial inequality. In contrast to the limited change in the city-wide levels of segregation, the changes in the residential patterns show that people with high occupational status tend to concentrate around the main railway station in suburban areas in the region and inside the core city, especially adjacent to the central neighborhoods.

Keywords Occupational structure · Residential segregation · Neighborhood · Tokyo

11.1 Introduction

Since the 1960s, a robust middle class has developed along with the growth of the economy in Japan. Around 1970, Japan belonged to the group of the lowest economic inequality among the OECD countries, along with the Nordic countries (Sawyer 1976). However, the Gini coefficient and the relative poverty rate increased and became higher than the OECD average in the 2000s, which evoked public and political discourse on various forms of inequality (Chiavacci and Hommerich 2017).

An important manifestation of inequality from a geographical perspective is residential segregation. Recent international comparative studies suggest that levels of residential segregation depend not only on levels of economic inequality but also

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on contextual factors such as welfare, housing regimes, and political and institutional environments (Tammaru et al. 2016). Tokyo is not only Japan's center of economy, politics, and culture but also one of the most global cities with New York and London, as highlighted by Sassen (1991), whose examination of social polarization and its impact on social geography has attracted abundant interest from scholars. In the central part of Tokyo (Tokyo City area consists of 23 special wards; hereinafter, referred to as City), a distinct pattern of socio-economic segregation has been identified for several decades: white-collar workers are concentrated in the upland area (*Yamanote*) and spread from the center to the west of the city, and the blue-collar workers live principally in the lowland downtown area (*Shitamachi*) in the east (Kurasawa and Asakawa 2004). In the early 2000s in particular, managerial workers tended to concentrate in the city center (Wakabayashi and Koizumi 2018). On the other hand, although acknowledging such a contrast in general, Fujita and Hill (2012) and Wissink and Hazelzet (2012), who investigated the proportion of different social classes at the neighborhood level, suggested that neighborhoods in Tokyo are socially mixed.

Another definition of the Tokyo area is the Tokyo Metropolitan Region (hereinafter, referred to as Region), which includes suburban areas of neighboring municipalities. Studies at the level of municipalities found that the distribution of high-income residents shifted from the suburbs to the city from the 1980s to the 2000s (Jacobs 2012; Toyoda 2007). They also stress that residential segregation has increased with elevated income levels in *Yamanote* and the city center, and decreased income levels in *Shitamachi* and the peripheral area.

We must ask ourselves if the level of residential segregation in Tokyo is greater than in cities of other countries. Fielding (2004) demonstrated that although there is a certain degree of socio-economic segregation at neighborhood level in Japan, it is lower than that of a British city. As reasons for this, he refers to the smaller income disparity in Japan compared to Great Britain. In addition, Fujita and Hill (2012) argued that several factors, including a centralized tax system and public housing policy, prevent income inequality from leading to class-based segregation in Tokyo. Jacobs (2005, 2012) confirmed that residential segregation in Tokyo was less than in the larger US metropolitan areas, despite the fact that income disparity between municipalities expanded in the Tokyo metropolitan area after the 1980s. He emphasizes the significance of severe restrictions on immigration (the number of migrant workers is very low in Tokyo) and the government policy to prevent socio-economic fragmentation of municipalities in Japan.

Previous studies on segregation in Tokyo covered its changes until the mid-2000s, but since the late 2000s, Tokyo has experienced some major socio-economic changes, such as the global financial crisis triggered by the bankruptcy of Lehman Brothers in 2008, the M9.0 Great East Japan earthquake[1] of 2011, and unprecedented monetary easing by the central bank of Japan from 2013. Income inequality, the welfare system, and the housing system are also changing. In this chapter, based on these contextual changes, we elucidate the process of social–spatial change in Tokyo from 2000 to

2015. In addition, this study will contribute to the field of socio-economic segregation by emphasizing the relationship between city and suburb based on two different definitions of Tokyo (Region and City).[2]

11.2 Context

11.2.1 Income Inequality

Since the 1980s, income inequality has been increasing in many countries (OECD 2015). During this time, income inequality has also been on the rise in Japan, albeit slightly, as indicated by the Gini coefficients of equivalent disposable income. However, the size of the coefficient varies somewhat depending on which data are used. OECD data indicate the coefficient increased from 0.30 in 1985 to 0.34 in 2000 and decreased slightly to 0.32 in 2003. After that, the coefficient rose to 0.34 again in 2009. Nevertheless, the Gini coefficient of 0.33 in 2013 remained higher than the OECD average of 0.32 (OECD 2015). Japan's Gini coefficient, based on the National Survey of Family Income and Expenditure provided by the Ministry of Internal Affairs and Communications, is smaller in size, but indicates a similar trend: it increased from 0.25 in 1984 to 0.28 in 2009 and remained flat in 2014.

The publication of statistics indicating growing income inequality in Japan from the 1980s until the 1990s provoked strong reactions; for example, Tachibanaki's (2005) assertion that Japan is no longer a middle-class society. However, the reasons for these changes are not universally agreed upon, with some also pointing a finger at the aging population and the shrinking size of households (Ohtake 2008). Nevertheless, Shikata (2013) argued that income inequality began to increase within age groups after 2000 and that this was due to factors such as the increase in irregular employment in all age groups, rather than demographic causes. In fact, since 2007, over one-third of all workers have been irregular workers, and their number has doubled since the 1990s (MHLW 2013).

11.2.2 Welfare System

There is no consensus regarding which of the three main types of welfare regimes of Esping-Andersen (1990) corresponds to that of current Japan. As described below, the characteristics of the Japanese welfare state can be aligned with multiple welfare regimes (MHLW 2012). First, policy in Japan has emphasized employment security, protecting employment through measures such as minimizing layoffs by companies and public work projects. Japan also guarantees a pension, health insurance, and services to all its citizens. As a result, the country has maintained a low unemployment rate on par with that of countries with social democratic welfare regimes. Conversely,

Japan's system includes characteristics of a conservative welfare regime; for example, the generous social security benefits for the elderly and its strong emphasis on the family. However, the system also contains elements peculiar to a liberal welfare regime. Social security expenditure, as a whole, is relatively limited and medical benefits (universal health care) in Japan are comparable to those in the US and the UK as a share of GDP.

Since the 1990s, however, increasing globalization of the economy and intensified international competition among companies as a result of the government's liberal policies, have fostered an increase in the number of irregular workers, who can be utilized flexibly and cheaply. Widespread layoffs of temporary workers became a social problem during the 2008 economic crisis, highlighting the limited institutional support available to those who have left the labor market. As social security expenditure balloons to keep pace with the aging population, calls for fiscal reform have increased and benefits, such as medical benefits and pensions, are being reduced. Consequently, for example, individual pensions have become smaller for nearly 20 years.

11.2.3 Housing System

Japan's post-WWII housing policy was drawn up with the aim of improving deficient housing and ameliorating housing shortages. Under the principle that every family should have its own home, the core of the housing policy was that such housing systems should ultimately allow individuals to acquire their own housing via the market, principally by providing support in the form of mortgage loans. The government provided the middle-income households with long-term and low-interest loans to buy their own home through the Government Housing Loan Corporation. In addition to that, the government encouraged housing ownership with a tax reduction.

The population living in urban areas increased rapidly in Japan during the period of high economic growth from the 1950s to the 1960s. As the economy grew, residential developments in the suburbs, featuring mainly detached single-family homes, served to house the rapidly expanding middle class. During the 1980s economic bubble, soaring land prices further accelerated the move to the suburbs. An overview of the Tokyo metropolitan area suggests that homeownership developed chiefly in the suburbs. In the city center and adjacent areas, where land prices were high, affordable land and housing were in short supply. Consequently, homeownership rates limped behind those observed in the suburbs (Takagi 2012).

Therefore, Tokyo, to this day, has a relatively small stock of public housing, including housing aimed at the middle-income bracket, and the percentage of people who own their houses is almost the same as the percentage of people using the private rental market. In spite of the weak support for the private rental market and the absence of rent regulation, the proportion of private rental housing tends to be high in urban areas. On the contrary, public housing provided by local governments has an income ceiling for tenants and the rents are regulated. The census revealed

Table 11.1 The number of households by housing tenure, 2000–2015

		Owned houses	Private rented houses	Public rented houses	Others
Region	2000	6,957,839 (54%)	4,247,686 (33%)	928,973 (7%)	780,023 (6%)
	2005	7,878,778 (57%)	4,418,882 (32%)	957,324 (7%)	671,051 (5%)
	2010	8,604,807 (56%)	5,063,638 (33%)	957,222 (6%)	682,040 (4%)
	2015	9,151,634 (57%)	5,328,063 (33%)	903,839 (6%)	584,339 (4%)
City	2000	1,535,209 (42%)	1,552,984 (43%)	308,846 (8%)	255,952 (7%)
	2005	1,802,545 (46%)	1,594,717 (41%)	317,194 (8%)	222,169 (6%)
	2010	1,974,012 (44%)	1,928,585 (43%)	320,316 (7%)	244,417 (5%)
	2015	2,131,735 (45%)	2,060,441 (44%)	308,212 (7%)	222,845 (5%)

Source Population census

that in 2010, 44% of households in the City-owned their own houses, while those in private rental housing comprised 43%, and those in public housing 7%, indicating that little has changed since 2000 (Table 11.1).

However, this system has been gradually crumbling since the mid-1990s. The 5-year housing plans, which were implemented by the goverment from 1961 during a period of high economic growth in order to supply sufficient housing stock, took a more market-oriented turn in the 2000s. Another development was the Basic Act for Housing, enacted in 2006 amid trends such as population decrease, a declining birthrate, and an aging population. This law aims to improve the environment of the housing market by, for example, ensuring a stable supply of housing loans and implementing tax-related measures.

11.2.4 Urban Policy

In Tokyo, Urban Regeneration was launched by the state as a policy to reverse the long-term recession that followed the collapse of the bubble economy in 1991 and that dragged on throughout the 1990s. The "emergency development areas for urban regeneration" were designated principally in the three central wards, with the aim of attracting private investments in urban development. By the first half of the 2000s, these areas experienced a marked increase in the supply of office buildings and condominiums (Ueno 2008). During the same period, deregulation of urban

planning encouraged private investments in urban redevelopment. Deregulation, as part of urban policy, is commonly considered to be an important factor behind social and spatial changes (van Kempen 2007). In fact, although some urban redevelopment projects are implemented jointly by private developers and public sectors in Tokyo, most are undertaken by the private sector, mainly by large Japanese corporations, backed by the Tokyo Metropolitan Government. This has played a large role in urban restructuring in Tokyo (Waley 2007), mainly taking place in the center of the city and by Tokyo bay.

The above-mentioned developments changed the urban landscape and the spatial structure of Tokyo (Waley 2013). Lützeler (2008) suggested that this kind of middle class-oriented development of a city center risks triggering class-selective migration and increases the overall level of residential segregation. Hirayama (2005) highlighted urban renewal policy implemented from the late 1990s to the early 2000s stimulated the housing market, which resulted in the simultaneous emergence of "hot spots" in the city center and "cold spots" in the surrounding areas as a noticeable example of residential inequality. The "hot spots" were characterized as clusters of condominium skyscrapers, such as Roppongi, Shinagawa, and Toyosu districts (see Fig. 11.2). As one of those urban development projects—Roppongi Hills that consists of a mix of office, commercial, and residential functions with 720 thousand m^2 of floor space implemented by a private developer—became a symbol of those high-end neighborhoods of Tokyo. In Shinagawa District near Tokyo bay, several private developers built high-rise buildings for offices and residences, using the site of Japan National Railway. The Japanese National Railway, a former government-owned company, has been privatized in 1987 and disposed of some railway yards that were no longer used in order to reduce the debt. High-rise condominiums have also been on the rise in the waterfront area around Toyosu. Conversely, the market was stagnant in the "cold spots." In the early 2000s, some cities located in the suburban area, such as Sayama City and Konan Ward in Yokohama City, had lost their population despite their advantage of access to the city center.

11.3 Data and Methods

In this research, we used census data from 2000, 2005, 2010, and 2015. Tokyo is defined in two ways: Region and City. The Region is the functional urban area (FUA) and comprises Tokyo and certain areas in Kanagawa, Chiba, Saitama, Ibaraki, Yamanashi, and Tochigi prefectures, as defined by the OECD (2013). The City is the central area of the Region and consists of 23 special wards. As of 2015, the population of the City is 9.3 million and the population of the Region is 35.7 million, accounting for approximately one-quarter of the entire Japanese population. In the census, the number of employed persons by occupation is available at *cho* district level (hereinafter, referred to as neighborhood level), which is the smallest census tract. The average number of residents of this unit is approximately 1,700 for the Region and approximately 3,000 for the City.

However, there are two problems with this data. First, since the boundaries of some neighborhoods were changed between 2000 and 2015, in this study, we re-aggregated the census data from 2010 and before according to the latest 2015 census boundaries. Second, the Japan Standard Occupational Classification, which does not necessarily correspond to the International Standard Occupational Classification (ISCO), was revised in 2009 (Ministry of Internal Affairs and Communications 2009). Some major groups of blue-collar workers were abolished and restructured to new groups. Moreover, classifications of some sub-major groups were revised, although the label did not necessarily change. In this study, major occupational groups are assigned to three socio-economic groups as follows: the top group consists of administrative and managerial workers and professional and technical workers; the middle group of clerical workers, sales workers, security workers, and service workers; and the bottom group of transport and communication workers and production process and related workers (manufacturing process workers, construction and mining workers, and carrying, cleaning, packaging, and related workers in 2010 and 2015).

We first examined the polarization thesis of Sassen (1991), starting from the 2000s, based on the changes in occupational structure. Subsequently, we measured residential segregation between the top and bottom occupational categories using the dissimilarity index (DI) (Duncan and Duncan 1955), which is a traditional indicator of residential segregation between two specific groups. Next, from a geographical point of view, we used three kinds of maps to verify the spatial patterns of residential segregation: concentration of the top occupational group, location quotient (LQ) for the top and bottom occupational groups, and classification of neighborhoods by socio-economic composition. First, the areas where the top group are concentrated are identified and sorted in a descending order based on the number of people in the top group. Neighborhoods including a cumulative population of one-fifth of the top group are labeled Q1, neighborhoods that contain the next one-fifth population in the top group are labeled Q2, and so on. If the number of Q1 neighborhoods is small, it means that top occupational groups are residentially concentrated only into a few neighborhoods.

Second, the spatial distribution of the LQ at both ends of the occupational hierarchy or top and bottom occupational groups is explored. LQ or the ratio of a certain occupation group in each neighborhood divided by the ratio of the same occupation group occupying the whole area is a well-known method for representing the spatial distribution of socio-economic segregation (Tammaru et al. 2016). When the LQ ratio for a certain group is greater than one, the group is over-represented in the neighborhood.

Finally, we investigated the within-neighborhood socio-economic intermixing from the spatial distribution of neighborhood classifications by socio-economic composition. According to the classification based on the proportion of the three socio-economic groups of Marcińczak et al. (2015), all neighborhoods fall into seven types: high socio-economic status (SES) neighborhoods, middle to high SES neighborhoods, mixed neighborhoods, middle SES neighborhoods, low to middle SES neighborhoods, low SES neighborhoods, and polarized neighborhoods.

11.4 Occupational Structure

Sassen (1991) highlights that global cities have taken on a new role of strengthening and controlling global networks since the 1970s. In Tokyo, however, although globalization and de-industrialization have progressed, clear social polarization has not been observed. Machimura (1994) and Sonobe (2001) suggested that there were some signs of polarization in the 1980s because both the number of professional/technical workers and the number of labor workers increased, although the number of intermediate workers did not decrease. Nevertheless, subsequent development, including the impact of the collapse of the bubble economy in the 1990s, has not been investigated sufficiently.

Figure 11.1 shows changes in the occupational structure after 2000 for the Region and the City. Although it should be noted that the occupational classification was revised between 2005 and 2010, the occupational composition in the Region and the City has remained stable over time. In both the Region and the City, the proportion of professional and technical workers has been increasing and the proportion of production process and related workers has been decreasing. At the same time, administrative and managerial workers constitute only a small percentage of the population, which, to some extent, has been declining in the 2000s. In the recession following, the bursting of the bubble in the early 1990s, many industries promoted the reduction of managerial and administrative positions by corporate restructuring. There was also an increase in business closure amongst small and medium enterprises. Thus, these processes suggested professionalization (Hamnett 1994) rather than polarization. Additionally, this tendency constantly continued until 2015, despite changes in socio-economic circumstances, such as the financial crisis of 2008 and the great earthquake of 2011.

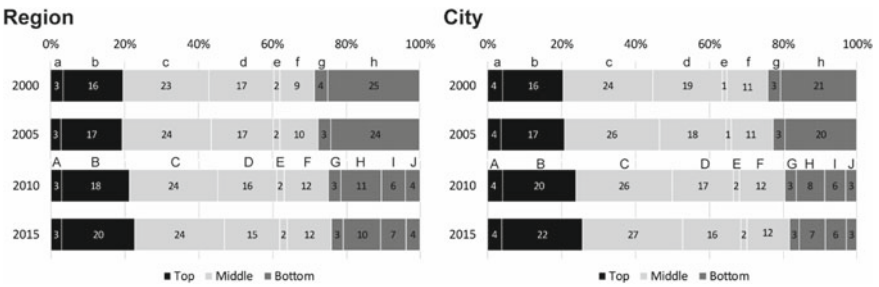


Fig. 11.1 Occupational structure in the Region and the City, 2000–2015. *Notes* Agriculture, forestry, and fishery workers and workers not classifiable by occupation are not included. 2000 and 2005: (a) Administrative and managerial, (b) Professional and technical, (c) Clerical, (d) Sales, (e) Security, (f) Service, (g) Transport and communication, (h) Production process and related. 2010 and 2015: (A) Administrative and managerial, (B) Professional and technical, (C) Clerical, (D) Sales, (E) Security, (F) Service, (G) Transport and machine operation, (H) Manufacturing process, (I) Construction and mining, (J) Carrying, cleaning, packaging, and related

11.5 Residential Segregation

We used the DI to identify the extent to which the top and bottom socio-economic groups are residentially separated in the Region and in the City. The DI values range from 0 to 1, with a higher value representing greater levels of segregation. Table 11.2 shows the changes in the DI in both the Region and City between 2000 and 2015. The DI for the City is greater than that for the Region. Interestingly, Musterd and van Gent (2016) found a higher level of segregation for the metropolitan region than for the municipality of Amsterdam. For Tokyo, it seems the City amplifies residential inequality through the unique urban policies rather than serving as a "melting pot." In the Region, the DI has been stable, ranging from 0.26 in 2000 to 0.28 in 2005. Similarly, in the City, the DI has stayed almost unchanged at around 0.30. All in all, the range of change for both scales for the 15-year study period is quite small. Considering the limited change in the Gini coefficient, residential segregation might reflect the stability of income inequality rather than the change in occupational structure.

Table 11.2 Dissimilarity index (multiplied by 100) in the Region and the City, 2000–2015

Region

	a	b	c	d	e	f	g	h	TOP	MID	BOT
a		17	17	18	37	22	34	31			
b	16		10	12	33	16	30	26			
c	16	11		7	30	12	25	21			
d	17	12	7		31	11	24	21			
e	38	34	31	32		32	32	29	DI for 2005		
f	21	17	13	11	29		21	17			
g	33	30	24	24	33	23		13			
h	30	26	20	21	30	19	13				
TOP										11	27
MID				DI for 2000					11		20
BOT									26	19	

	A	B	C	D	E	F	G	H	I	J	TOP	MID	BOT
A		17	17	19	35	23	33	35	34	31			
B	17		9	12	30	17	29	32	30	27			
C	17	9		8	29	14	26	28	27	23			
D	19	12	8		27	11	23	25	24	20			
E	37	32	30	29		27	28	29	29	27	DI for 2015		
F	22	17	13	11	25		18	20	19	15			
G	33	29	25	23	29	19		15	16	13			
H	35	32	27	24	31	20	16		15	13			
I	33	30	26	23	30	20	16	16		16			
J	31	27	22	19	28	15	14	13	16				
TOP												10	28
MID					DI for 2010						11		20
BOT											28	20	

City

	a	b	c	d	e	f	g	h	TOP	MID	BOT
a		15	19	20	39	24	41	34			
b	15		10	13	35	17	35	28			
c	18	12		7	31	11	28	21			
d	19	13	7		31	9	27	19			
e	40	37	33	33		34	35	32	DI for 2005		
f	22	17	12	9	31		26	17			
g	40	35	27	27	37	29		14			
h	34	29	20	19	34	20	15				
TOP										12	30
MID				DI for 2000					13		20
BOT									30	20	

	A	B	C	D	E	F	G	H	I	J	TOP	MID	BOT
A		15	18	20	37	25	34	41	38	34			
B	15		8	11	32	17	27	35	30	28			
C	18	9		7	29	13	22	30	26	22			
D	20	12	7		28	9	19	27	22	19			
E	39	34	31	30		30	29	33	30	28	DI for 2015		
F	23	17	12	9	27		15	23	19	15			
G	35	30	24	20	32	18		17	14	12			
H	41	36	30	27	35	25	17		15	14			
I	37	31	25	22	32	20	15	16		15			
J	34	28	22	19	31	16	12	15	15				
TOP												11	29
MID					DI for 2010						12		20
BOT											30	20	

2000 and 2005: (a) Administrative and managerial, (b) Professional and technical, (c) Clerical, (d) Sales, (e) Security, (f) Service, (g) Transport and communication, (h) Production process and related. 2010 and 2015: (A) Administrative and managerial, (B) Professional and technical, (C) Clerical, (D) Sales, (E) Security, (F) Service, (G) Transport and machine operation, (H) Manufacturing process, (I) Construction and mining, (J) Carrying, cleaning, packaging, and related

11.6 Spatial Distribution of Occupational Groups

11.6.1 Concentration of the Top Occupational Groups

Figure 11.2 illustrates the geographical distribution of the top occupational group in 2000 and 2010. The two main findings are as follows: first, top occupational groups are concentrated in the City, particularly in the central and western areas; and second, small clusters are formed along the railroads, in particular around some specific stations in the suburbs. It seems that the top occupational groups prefer to live around the railway station and commute to the city center by rail. Since 2000, there has been no major change and spatial patterns as of 2000 have been maintained throughout the 10-year study period. However, there is little change in the number of neighborhoods in Q1 inside the City—Q1 neighborhoods near the southern part of the City center increased and those around the western area decreased from 2000 to 2010, resulting in the growth of concentration for the top occupational group in

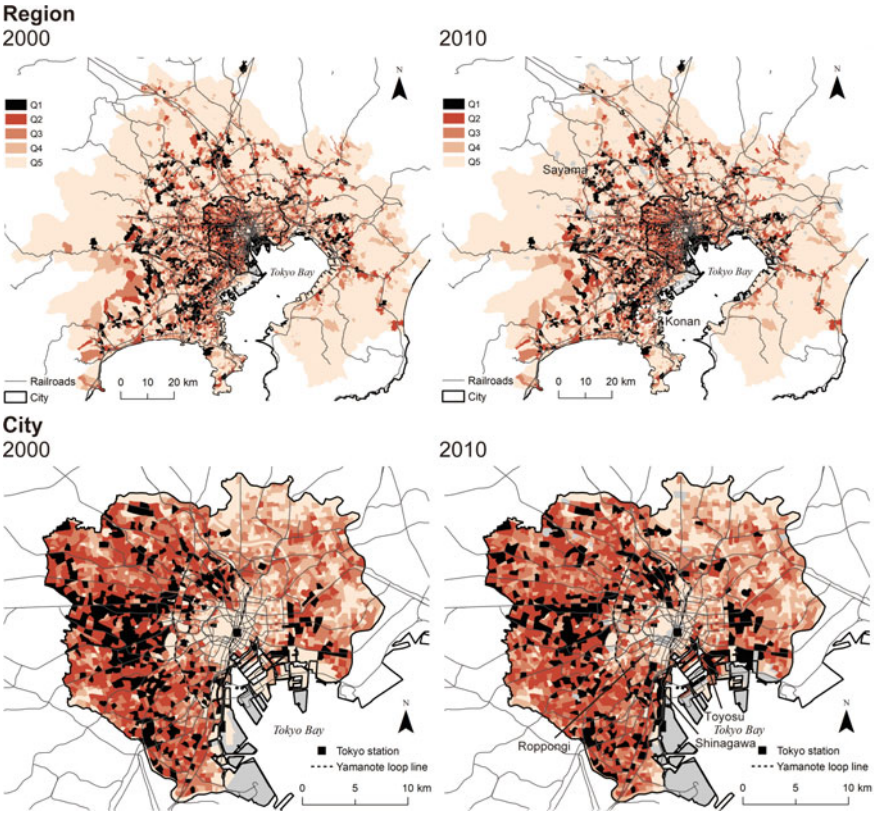


Fig. 11.2 Location of the top occupational group in 2000 and 2010

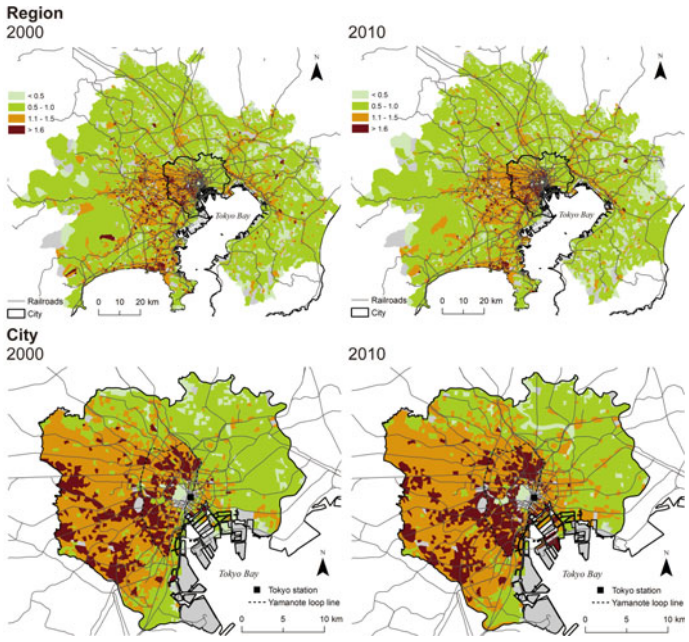
the central districts of Tokyo. This demographic change is partly associated with gentrification that accompanied the upward shift in the socio-economic structure of residents. For instance, more and more wholesale shops and factories have been replaced by condominiums in such districts as Nihonbashi, Tsukishima, and Minato (Fujitsuka 2017). These districts are located within 2 or 3 km southeast of the business district surrounding Tokyo station.

11.6.2 Location Quotient for the Top and Bottom Occupational Groups

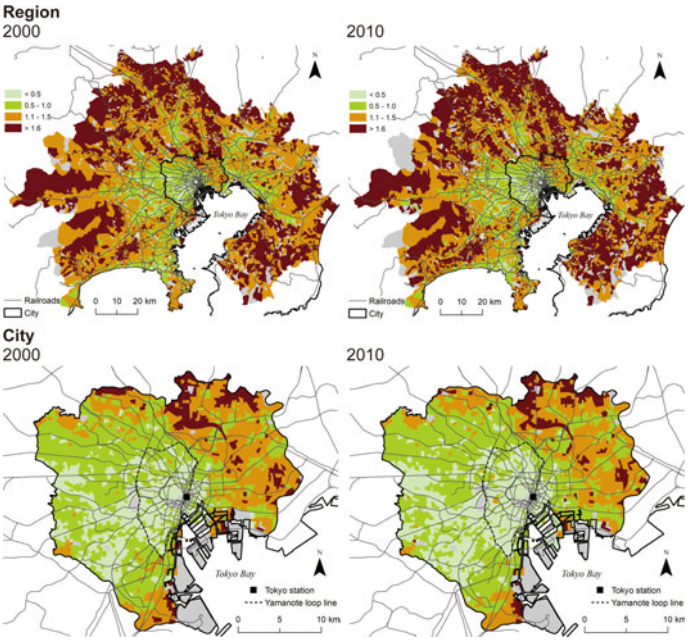
Figure 11.3 shows the LQ for the top and bottom occupational groups in 2000 and 2010.[3] In terms of the residential location of the top occupational group, in line with the findings of the previous section, there were several clusters in the Region, including in the center of the City. The residential patterns based on the concentric structure around the city center and railroad network have remained robust over time. Within the City as well, the top occupational group was concentrated in the city center. Neighborhoods with a high LQ prevailed in the center and became geographically agglomerated, especially inside the southern half of the Yamanote loop line. On the other hand, neighborhoods with a high LQ for the bottom occupational group spread to the suburbs, to the periphery of the Region, avoiding areas along the railroad lines. These sorts of low socio-economic neighborhoods are growing where the proportion of the bottom occupational group was already above average and the concentration continues to increase.

11.6.3 Classification of Neighborhoods by Socio-economic Composition

Figure 11.4 presents the geographical distribution of seven neighborhood types based on socio-economic composition. As confirmed in the previous section, high SES and high-middle SES neighborhoods are spreading from the center of the City to the west side and are scattered along the railroad toward the suburbs. Low SES and low-middle SES neighborhoods are distributed to the peripheral area. In the Region as a whole, there has been a remarkable growth of high-middle SES neighborhoods since 2000. Thus, while the absolute number of people in the bottom occupational group is decreasing, they are being pushed to peripheral areas of the Tokyo metropolitan area. In the City, the high SES and high-middle SES neighborhoods filled the inside of the Yamanote loop line to the west part of the City, including Roppongi, Shinagawa, and Toyosu districts. Additionally, as mentioned above, gentrification is generally considered to have occurred from the southern part of the city center to the east side. Although it is not shown on this map, the spatial patterns of 2010 are almost maintained in 2015.



(a) The top occupational group



(b) The bottom occupational group

Fig. 11.3 Location quotient for the top and bottom occupational groups in 2000 and 2010

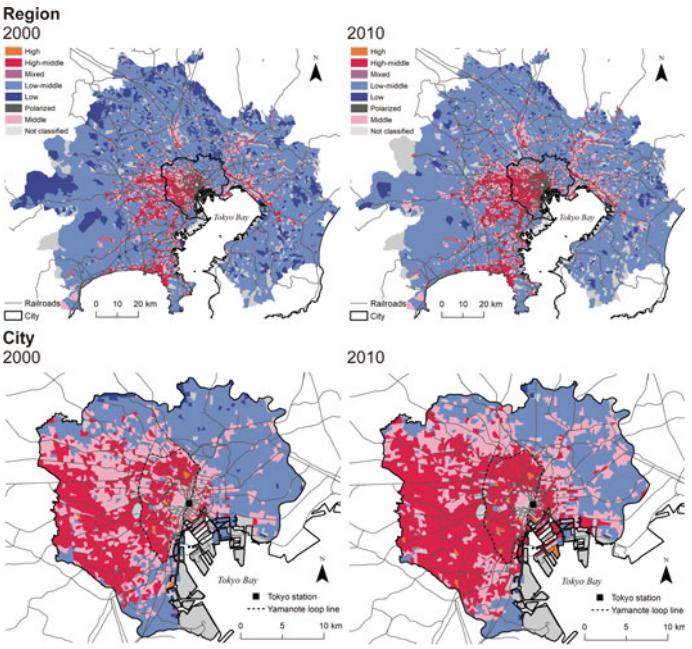


Fig. 11.4 Classification of neighborhoods by socio-economic composition in 2000 and 2010

11.7 Discussion and Conclusions

The results of the analysis of this chapter can be summarized as follows: A slight increase in income inequality that began in the 1980s continued apace during the early 2000s, spurred by the introduction of liberal welfare and housing policies. However, the trend somewhat reversed itself during and after the latter half of the 2000s, when the global financial crisis and the great earthquake occurred. Because the most recent data used in this study were from 2015, they may not fully reflect the impact of the large-scale monetary easing that Japan's central bank began in 2013. Nevertheless, the examination of the occupational structure in the Region and the City indicated that the social polarization thesis is not necessarily supported. The results of this research rather suggest that the occupational structure has been stable and a trend toward professionalization has occurred.

From a geographical perspective as well, the overall levels of residential segregation observed in Tokyo are very stable, with no sudden changes. One characteristic of metropolitan areas in Japan is that trains are the preferred mode of transport for people commuting to school and work, regardless of social class. This tendency is particularly strong among high-income people, as supported by the fact that the area with higher per-capita income is associated with shorter commuting time in the Tokyo metropolitan area (Yoshida and Endo 1999). Beginning from the period of high economic growth in the 1950s, urban areas have expanded along railway

lines, resulting in the development of city structures defined by railway lines and concentric circles expanding from the city center into the Region. Nevertheless, the constant level of residential segregation in the Region and the City during the 2000s suggests that small variations in residential segregation may reflect limited changes in income inequality and not so much the changes in occupational structure. During this period, Tokyo follows several trends identified by previous research (Koizumi and Wakabayashi 2015): for example, people in the high socio-economic group became concentrated even further in established, convenient, high-density areas. Trends such as gentrification may have an important influence on residential moves through exclusionary effects, which would be in line with the gentrification of the top and suburbanization of the bottom occupational groups observed in Western cities (Hochstenbach and Musterd 2018).

These results suggest that in Tokyo, social polarization and residential segregation did not increase as predicted by the global city thesis. Some studies have identified the strength of government control as the cause for this observation (Jacobs 2005; Waley 2013). Although, and as mentioned above, government regulations relevant to the labor market, the housing market, and urban policy are evolving in a more liberal direction, there has not been a complete turn toward neo-liberalism (Waley 2013). Strict regulations towards immigration still play an important role since in many global cities immigrants from low-wage countries often take on low-skilled, low-wage jobs in growing personal and production services. This makes an influx of immigrants: one of the main causes of social polarization in many other global cities (Sassen 1991). The census indicates that foreigners comprised 2.1% of the total population of the Region in Tokyo in 2015, which is very low compared to other countries. Even within the City, the 2.1% figure only increased to 3.4% between 2000 and 2015. According to the latest census, most of the foreign population living in the city came from Asian countries and, in particular, Chinese and Korean people account for about 60% of the foreign population. Because they tend to be employed as non-regular workers, who are usually paid less than regular workers, an increase in foreigners has the potential to affect social polarization in Tokyo in the future. While residential segregation of the foreign population is certainly confirmed in both the Region and the City (Kurasawa and Asakawa 2004; Wakabayashi and Koizumi 2018), this has only a limited influence on the overall levels of residential segregation because the absolute number of foreign residents is currently small.

The relatively limited correlation between income and occupational status may also be the reason that income inequality, occupational structure, and residential segregation are not strongly linked. One possible cause for this may be time lag effects. Tammaru et al. (2020) found that there is roughly a decade between inequality and segregation based on a comparative study of European cities. From a different point of view, Fujita and Hill (2012) proposed that Japan's compressed wage system is the primary reason income inequality does not translate into class-based residential segregation in Tokyo. Many companies in Japan still use a job evaluation-based wage system, which is partly because of the nature of the welfare system. It appears that as a consequence, disparities in income are more related to differences in the type of employment and seniority than differences between occupations. In fact,

the weekly wages by occupations in Tokyo calculated according to the Employment Status Survey (Ministry of Internal Affairs and Communications) indicate that, while there is some correlation between occupation and income, the average wage of the highest occupational status (Administrative and managerial workers) is 3.0 times higher than that of the lowest occupational status (Production process and related workers) in 2012. This is still a modest difference compared to the European countries (Tammaru et al. 2016).

However, the above observations do not imply that occupational structures or residential segregation have not changed at all over 15 years. One particular cause of changes in residential segregation seems to be changed in land prices influenced by the overall socio-economic situation. The decline in land prices increased the supply of condominiums, which, in turn, helped in the recovery of population numbers in central Tokyo begin in the second half of the 1990s. By 2004, prices for residential land in the city had fallen to less than a third of what they were at the peak due to the economic bubble in 1992. Although the subsequent "mini-bubble" that took place in 2006–2008 somewhat helped prices recover by 2008, the financial crisis that struck that year pushed them down again, and the 2011 Great East Japan Earthquake ensured that prices continued to stagnate. In 2014, land prices began to climb as a result of the monetary easing that began in 2013. The level of residential segregation observed in the Region and the City has remained constant since the mid-2000s, which implies that the stagnation of the housing market and segregation is linked. While land prices increased in the center of the city and the bay area during the mini-bubble and resumed their climb after the monetary easing policy was implemented, in the surrounding areas real estate prices have continued to decline, with suburban condominium buildings constructed during the bubble era being severely affected (Hirayama 2017). Although Tokyo is located far away from the areas affected by the 2011 earthquake and tsunami, residents of the city have also become more safety-conscious, which has negatively affected land prices in low-lying eastern parts of the city that are vulnerable to disasters (Yamada 2015). It should be noted that although this study did not indicate the impact of the recovery period that came after 2014 if concentrated investment in "hot spots" recover along with the economy, residential segregation may once again become more pronounced.

Another important factor responsible for changes in residential segregation is residential preference. A survey among owners of new condominiums in the Tokyo region by Recruit Sumai Company Ltd. indicated that "walking time to the nearest station" is becoming an increasingly important factor for people planning to buy and rent houses: 75.5% rated it as important in 2005, which increased to 84.0% in 2010. This indicates that mainly high-income households, are choosing to live in highly convenient areas because such areas are relatively expensive. As the suburban population returns to the city center, suburban residential areas are also undergoing increasing selection and elimination as the overall demand for housing decreases.

Population decrease and declining birth rate in Japan will no doubt spur more changes in welfare and housing policies. For example, as the revised Immigration Control Act was approved at the end of 2018, the decline of the labor force has forced the Japanese government to open doors for low-skilled immigrants, a category

that had hitherto not been admitted. Insufficient development of housing policies toward them remains another issue. As for urban policy, in 2014, the government revised the Act on Special Measures concerning Urban Reconstruction to realize compact cities suitable for the declining population. The Act gave each municipality the ability to designate specific areas where city functions and residential housing could be consolidated to encourage residents to move there. Such policies stimulate the selection and concentration of population in city centers, meaning they could accelerate residential segregation. In short, future trends in economic inequality and residential segregation in Tokyo will be an important topic of study.

Notes

1. Tokyo was not a direct disaster area, but the earthquake influenced the energy policy and real estate market nationwide.
2. This corresponds to the relationship between New York City and New York Metropolitan Area in the US as an example.
3. Neighborhoods with fewer than 50 workers are not reported.

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Part IV
Australia

Chapter 12
The Land of the 'Fair Go'? Mapping Income Inequality and Socioeconomic Segregation Across Melbourne Neighbourhoods

Michelle Sydes and Rebecca Wickes

Abstract Despite enduring political rhetoric that promotes Australia as 'the lucky country' and 'the land of the fair go', recent decades have seen a noticeable increase in levels of income inequality. This growing economic divide has driven housing prices up and left lower-income families unable to access the housing market in inner-city locations. In contrast to other countries, Australia's socioeconomic segregation does not overlap with ethnic segregation. Australia's highly regulated immigration program has resulted in a relatively well-educated and employable foreign-born population who largely reside in middle-income neighbourhoods. These particularities make Australia an interesting context to explore patterns of socioeconomic segregation over time. In this chapter, we will utilise both traditional measures of segregation (such as the dissimilarity index) as well more spatialised measures (such as location quotients and Local Morans *I*) to assess socioeconomic segregation at the local level. Drawing on four waves of census data (2001, 2006, 2011 and 2016), we explore how socioeconomic segregation has changed over time across nearly 500 neighbourhoods in Melbourne. We further examine the degree to which socioeconomic segregation aligns with ethnic segregation patterns and levels in this city. We find patterns of socioeconomic segregation remain relatively unchanging over time in Melbourne. Additionally, our findings highlight important differences in patterns and levels of socioeconomic and ethnic segregation in the Australian context.

Keywords Melbourne · Socioeconomic segregation · Inequality · Geocoded census data

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12.1 Introduction

In the 2019 federal election campaign, opposition leader Bill Shorten promised Australian voters a 'fair go' government if elected. While campaigning, Shorten assured voters, 'if we win this election, our priority is not making the very rich even richer… it is getting wages moving again for working people' (Benson 2019). Shorten went on to accuse current Prime Minister Scott Morrison of only 'defending the top end of town', positioning himself and the Australian Labour Party as the key to a fairer, more egalitarian society (Bagshaw 2019). This campaign strategy is not unprecedented. Australian politicians from both sides of the political spectrum have long capitalised on the general public's attachment to the 'fair go' sentiment. In fact, polling data shows that over 90% of Australians perceive the 'fair go' to be a core Australian value (Gough 2006).

Given the importance of the 'fair go' to Australians, many have voiced concerns about growing levels of income inequality. In fact, 78% of Australians believe the current gap between the rich and the poor is too large (Douglas 2018). Public perceptions of growing inequality are reflected in the data. Income inequality, as measured by the Gini coefficient, has increased from 0.313 in 1981 to 0.358 in 2014 (World Bank 2019). At the same time, house prices in Australia's capital cities have skyrocketed—growing by 250% since the 1990s (OECD 2017). Growth in house prices has outpaced growth in incomes, leaving many lower-income households struggling to access the housing market, especially in inner-city locations where jobs and services are concentrated (Spiller 2014). Consequently, lower-income households and younger generations are increasingly forced to live on the outskirts of the city in neighbourhoods that offer fewer employment opportunities, particularly in high skilled jobs (Randolph and Tice 2014). This trend reflects a growing spatial divide between the haves and the have nots—a process described by Randolph and Tice (2014: 385) as the 'suburbanisation of disadvantage'.

Set against this backdrop of growing inequality and increasing house prices, this chapter examines trends in socioeconomic segregation over time across Melbourne—Australia's second-largest city. Using occupational categories as a proxy for socioeconomic status, we draw on both traditional measures of segregation (such as the dissimilarity index) as well as more spatialised measures (such as location quotients and Local Morans *I*) to assess socioeconomic segregation across nearly 500 neighbourhoods over time. We further consider whether trends in socioeconomic segregation align with ethnic segregation patterns in the Australian context. The findings demonstrate relatively stable, albeit slightly increasing trends in socioeconomic segregation over time in Melbourne and highlight differences in patterns of socioeconomic segregation and ethnic segregation.

12.2 Welfare in Australia

There are two primary objectives that underpin tax-transfer systems globally. The first is referred to by Barr (2001: 1) as the 'piggy bank objective' whereby the system is designed to provide insurance against unemployment, disability or sickness—that is, periods during an individual's life cycle when they have greater needs or lower-income (Barr 2001). The second is described as the 'Robin Hood objective' (Barr 2001: 1) whereby taxation is used to redistribute wealth amongst residents by taking from the rich to give to the poor. To achieve this, high-income earners are taxed at a much higher rate than low-income earners and lower-income households receive a greater proportion of social benefits.

According to Whiteford (2010), Australia's welfare system strongly emphasises the latter objective, offering a safety net to those unable to support themselves. Those eligible for welfare payments in Australia include the elderly, persons with a disability, carers, families with children, veterans, and unemployed persons (AIHW 2017). Income support payments are fully funded by government revenue generated through the tax system (AIHW 2017). As such, Australians are not required to make individualised social security contributions and income support payments are set at a flat rate rather than linked to past earnings (Whiteford 2015).

Expenditure on welfare in real terms has risen over the past decade. In 2016, the Australian government spent $6,566 AUD per resident, up from $5,663 AUD in 2006 (AIHW 2017). Yet compared to other OECD countries, Australia is a relatively low social spender (Whiteford 2017), with social spending as a proportion of GDP well below the OECD average (17.8% compared to 20%) (OECD 2019). Whiteford (2017) attributes this low social spending to Australia's relatively efficient welfare system, which utilises means-testing to determine eligibility. While means-testing is not unique to the Australian context, it is more widely used in Australia compared to any other OECD country, with approximately 80% of cash benefits means-tested (AIHW 2017). In 2011, the most disadvantaged households in Australia (the lowest quintile) received 42% of social benefits, while the most advantaged households (the highest quintile) received only 3.8% of social benefits (Whiteford 2017). In other words, the poorest 20% received 11 times more in social benefits than the richest 20% (Whiteford 2015). Given Australia's social spending is largely directed towards the poorest quintile, Whiteford (2017: 1) argues that 'an across-the-board reduction in social security spending in Australia would increase income inequality more than in any other OECD country'.

12.3 Income Inequality in Australia

Since the 1980s, Australia's income distribution has gradually grown more unequal—rising from 0.313 in 1981 to 0.358 in 2014 (World Bank 2019). Globally this places Australia behind France (0.323), the United Kingdom (0.34) and Canada (0.34) but

ahead of the United States (0.41[1]) (World Bank 2019). Although household incomes[2] experienced growth between 1993–94 and 2013–14, the degree of growth was not uniform across all quintiles. The highest quintile experienced the greatest amount of growth, with incomes rising by 80% (AIHW 2017), doubling the gap between the highest quintile and the lowest quintile over this time period (AIHW 2017). While Australians wish to see the gap close (Douglas 2018), there is limited support for the tax increases necessary to allow for greater social spending. In fact, 50% of Australians believe they pay too much tax and an additional 34% believe they pay enough (Herscovitch 2013).

12.4 The Australian Housing System

This growing inequality directly threatens the 'great Australian dream' of home-ownership—a widely held aspiration amongst Australians dating back to the mid-twentieth century (Gurran and Phibbs 2016). Colic-Peisker and Johnson (2010: 352) suggest that 'the importance of homeownership in Australia is closely associated with a perception of an egalitarian society where everyone can become a homeowner'. Unfortunately, this dream has become increasingly unattainable in recent years. The last two decades have seen astronomical increases in house prices—growing by 250% since the 1990s (OECD 2017). Even after adjusting for growth in income between 1980 and 2015, a 78% increase in Australian house prices remains (AIHW 2017). As rising house prices have outpaced household incomes, homeowners have become increasingly reliant on mortgages to finance housing. In 2016, 32.8% of households owned their home outright, 35.7% owned their home with a mortgage and 31.5% were renting (ABS 2016).

Overall rates of homeownership have moderately declined over the last twenty years in Australia (Burke et al. 2014). Indeed, 71% of Australians owned their home either with or without a mortgage in 1994–95 compared to 67% in 2013–14 (AIHW 2017). Sharper decreases in homeownership are evident amongst young people. While 60% of persons between 25 and 34 years owned their own home in 1988–89, this number fell to just 39% in 2013–14 (AIHW 2017). This downward trend suggests housing affordability issues have created a barrier to accessing the housing market for younger generations, giving rise to intergenerational inequities (Saunders 2017).

For the average Australian household, housing costs (either rent payments or mortgage repayments) account for approximately 18% of total household expenditure and represent the largest household expense (ABS 2011; Saunders 2017). Homeowners that spend over 30% of their gross income on housing costs are deemed to be experiencing mortgage stress. In 2017, one in four households with mortgages were

[1] 2013 World Bank estimate.

[2] Measure of equivalised household weekly income which is the total household income after adjusting for differing household size and composition (ABS 2006).

considered in financial distress (Hughes 2017). Low-income renters are also struggling. In 2013–14, 50% of lower-income rental households reported spending more than 30% of their gross income on housing compared to 42% in 2005–06 (AIHW 2017). There are no national-level rent control systems for the private rental market in Australia, with the rental market overseen at the state level.

For those unable to afford housing through the private market, public housing is provided by the state and federal government (Morris 2018). Low-income households are prioritised for public housing, particularly those who also have special needs such as Indigenous Australians, young people, old people, persons with disabilities, victims of domestic and family violence and the homeless (AIHW 2017). Rents are monitored to ensure that eligible tenants pay no more than 30% of their gross income (AIHW 2017). Yet demand for public housing far exceeds supply, with almost 200,000 households on waiting lists in 2015. Further, wait times are long, with almost 50% of households waiting for more than two years (AIHW 2017).

12.5 Greater Melbourne

Melbourne is the capital of the state of Victoria and is the second most populated city in Australia. Melbourne has been ranked as one of the world's most liveable cities by the Economist Intelligence Unit (EIU) (The Economist 2018). Indeed, Melbourne held the number one ranking across 140 cities for seven years. Greater Melbourne spans nearly 10,000 km^2 and is home to a residential population of approximately 4.5 million persons (ABS 2016) (see Fig. 12.1). Similar to other Australian cities, Melbourne is a low-density city—with the average household comprising 2.7 persons and the majority of residents (66%) living in detached houses on suburban blocks (ABS 2016).

Between 2001 and 2011, the median house price in Melbourne increased by 163% (Department of Transport, Planning and Local Infrastructure (DTPLI) 2012). At the same time, wages increased by just 57% (DTPLI 2012). As a consequence of soaring house prices, inner-city neighbourhood housing is largely inaccessible for homebuyers on low to moderate household incomes (Goodman 2018). While those on an average household income could afford to buy a residence within 10 kms from Melbourne's central business district (CBD) in 1994, by 2009 this distance increased to 40 kms (DTPLI 2014). Low-income renters are similarly struggling to find housing close to the city centre. According to Hulse, Reynolds and Yates (2014), the shortage of affordable and available rental dwellings exceeds 20,000 in the middle suburbs of Melbourne. Given the majority of jobs and services in Melbourne are concentrated in and around the CBD, lower-income households are left at a significant disadvantage (Spiller 2014).

The Residential Tenancies Act (1997) provides the legislative framework which guides the rental market in Melbourne. In 2017, these rental laws were reviewed with a series of reforms set for implementation by July 2020 (Victoria State Government 2019). Most notable of these reforms was a reduction in how often landlords can

Fig. 12.1 Greater Melbourne

increase rent (previously every six months, now every 12 months). Further, several reforms focused on improving the long term suitability of rental properties for households by introducing long term leases, permitting minor modifications and allowing pets (Victoria State Government 2019).

As a longstanding gateway city for new immigrants arriving in Australia, Melbourne is renowned for being a progressive city with a strong history of ethnic diversity and inclusion (ABS 2014). In many countries, socioeconomic and ethnic segregation patterns are largely indistinguishable with certain ethnic groups living in the more disadvantaged areas (Iceland and Wilkes 2006). However, Australia's highly controlled immigration program has resulted in a relatively well-educated and employable foreign-born population who largely reside in middle-income neighbourhoods (Sydes 2018). Between 2006 and 2016, the proportion of Melbourne's population born overseas increased from 28.9% up to 33.9% (ABS 2016). In Australia, immigrants who arrive through the skilled stream are required to speak English proficiently, and thus the number of linguistically isolated immigrants is relatively small. While 38% of Melbourne's population spoke a language other than English in 2016, just 5.6% reported not speaking English well or not at all (ABS 2016). In 2016, the top five countries of birth residing in Melbourne included India (3.6%), China (3.5%), England (3%), Vietnam (1.8%) and New Zealand (1.8%) (ABS 2016). In contrast to the immigrant population, Indigenous Australians experience high levels of disadvantage (Altman, Biddle, and Hunter 2018). In 2016, Indigenous Australians comprised just 0.5% of the total population in Melbourne—a much lower percentage

compared to other capital cities such as Sydney (1.5%) and Brisbane (2.4%) (ABS 2016).

12.6 Neighbourhoods in the Australian Context

The unit of analysis used in this chapter is the state suburb—an approximation of localities gazetted by the Geographical Place Name authority in each State and Territory (ABS 2019). State suburbs are the most equivalent Australian unit to census tracts in the United States and Middle Layer Super Output Areas in the United Kingdom. In the Australian context, the state suburb is synonymous with the neighbourhood and is widely used in neighbourhood-based research (Benier and Wickes 2016; Foster et al. 2010; Wickes et al. 2013; Zahnow et al. 2013). Census data are also available at the state suburb level at each census. In 2016, 561 state suburbs comprised the Greater Melbourne region. However, some neighbourhoods are inappropriate for inclusion due to small residential populations. To avoid skewing the results, neighbourhoods were considered non-residential if they had less than 300 persons, usually resident (Sydes 2018). This process resulted in a total neighbourhood sample of N = 474 in 2001, N = 487 in 2006, N = 479 in 2011, N = 486 in 2016. The total persons residing within these neighbourhoods ranged from 305 to 50,479 persons, with an average population of 7,993 residents. Recognising that neighbourhood boundaries shift over time, data from 2001, 2006 and 2011 census were concorded to the 2016 state suburb boundaries using a proportional approach (ABS 2018).

12.7 Change in Occupational Structure in Melbourne

In this chapter, we use occupation categories as a proxy for measuring neighbourhood advantage and disadvantage. The ABS broadly classifies occupations under eight categories: (A) labourers; (B) machinery operators and drivers; (C) sales workers; (D) clerical and administrative workers; (E) community and personal service workers; (F) technicians and trade workers; (G) professionals; and (H) managers (ABS 2016). We collapsed these broad occupation categories into three key socioprofessional groups. To represent the top socioprofessional group, we combined managers and professionals. To represent the bottom socioprofessional group, we pooled labourers and machinery operators and drivers (also referred to as unskilled workers). All other remaining categories were merged to represent the middle socioprofessional group.

To demonstrate the utility of occupation categories as a proxy for measuring advantage/disadvantage, weekly personal income by group was examined. In doing so, we find clear differences in personal weekly income across the three groups. In 2016, 29.8% of the top socioprofessional group in Melbourne reported receiving a weekly income greater than $2,000 per week compared to just 2.9% of the bottom

socioprofessional group. Alternatively, while over a quarter of the bottom socioprofessional group received an income of less than $500 per week, just 7.5% of the top socioprofessional group reported such earnings (ABS 2016).

Figure 12.2 demonstrates the changes in Greater Melbourne's occupational structure over the period of study. Here it is evident that the size of the bottom socioprofessional group has reduced over time. In 2001, the bottom group comprised 16.5% of Melbourne's workforce. By 2016, this figure dropped to just 13.9%. Both occupation categories that comprise the group—labourers and machinery operators and drivers—experienced a reduction in group size between 2001 and 2016. Reductions in size are also seen in the middle socioprofessional group—moving from 57.0% in 2001 to 47.2% in 2016. All occupation categories within the middle group declined in size over time with the exception of community and personal service workers. Rather, this group experienced growth, increasing from 7.6% in 2001 to 10.4% in 2016. The size of the top socioprofessional group increased by almost 5 percentage points between 2001 and 2016. While both managers and professionals increased as a share of the labour force overtime, the greatest amount of growth was apparent amongst professionals—increasing from a 21.6% share in 2001 to a 25.4% share in 2016. Taken together, these results show a gradual move towards professional and managerial positions—a trend that likely reflects growing education levels amongst the Australian population more broadly over time (AIHW 2017).

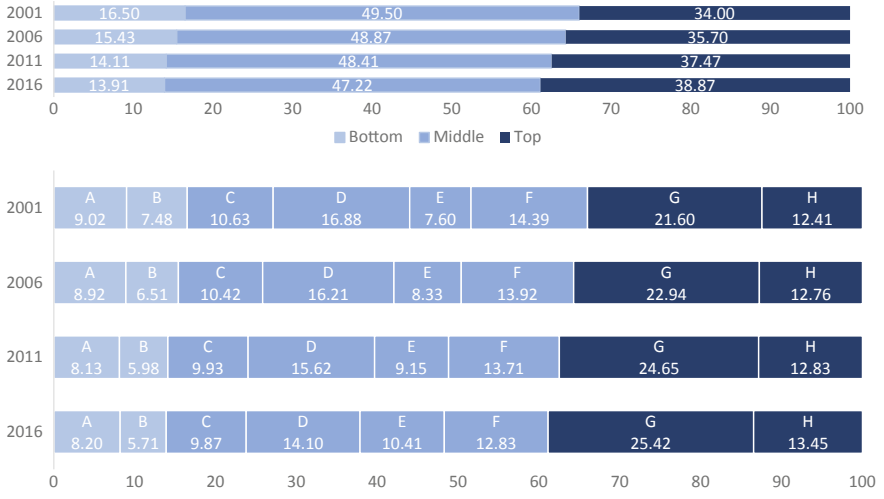

Fig. 12.2 Distribution of occupational groups and change over time in Melbourne

12.8 Socioeconomic Segregation in Melbourne

In their landmark review, Massey and Denton (1988) identified five different dimensions of residential segregation—evenness, exposure, concentration, centrality and clustering. With these different dimensions in mind, Massey and Denton (1988: 312) argue that segregation should be measured by 'a battery of indices' rather than a single measure. Recognising the need to tap into these multiple dimensions of segregation, we utilise a wide range of segregation measures in this study, including the Dissimilarity Index, Location Quotients (LQs) and Local Moran's I (LM-*I*) to capture socioeconomic segregation patterns in Melbourne.

12.8.1 Dissimilarity Index

Tables 12.1 and 12.2 present the dissimilarity indices across the four census waves (2001, 2006, 2011 and 2016). In comparing the dissimilarity indices for the top, middle and bottom groups, there appears to be little difference over time. The dissimilarity indices for the top–bottom comparison ranges from 0.38 to 0.39 overall time points. In other words, almost 40% of the bottom group would have to move to another neighbourhood to make the top and the bottom group evenly distributed across all neighbourhoods. The dissimilarity score for the top-middle (0.21) and middle-bottom (0.20) comparison is much lower and does not change over time.

Limited change over time is also apparent when examining the occupation categories. The greatest score in dissimilarity is between professionals and machinery operators and drivers (slightly increasing over time from 0.44 to 0.46); followed by

Table 12.1 Dissimilarity index (multiplied by 100) between the occupational groups

2001	MAN	PRO	TEC	COM	CLE	SAL	MAC	LAB
MAN		12	24	17	15	15	39	32
PRO	13		33	22	21	23	46	39
TEC	24	33		12	13	12	20	12
COM	17	21	14		7	8	27	20
CLE	15	22	12	8		6	28	21
SAL	16	23	12	9	5		28	20
MAC	38	44	18	27	26	26		10
LAB	32	39	13	22	21	20	8	

2006	MAN	PRO	TEC	COM	CLE	SAL	MAC	LAB
MAN		10	25	18	14	16	41	32
PRO	11		31	22	20	21	46	36
TEC	25	32		10	13	12	22	13
COM	17	22	11		8	8	26	16
CLE	14	20	12	7		5	29	20
SAL	15	22	12	8	5		29	18
MAC	41	46	22	27	29	29		14
LAB	32	38	13	18	21	20	12	

2011	MAN	PRO	TEC	COM	CLE	SAL	MAC	LAB
MAN		10	25	18	14	16	41	32
PRO	11		31	22	20	21	46	36
TEC	25	32		10	13	12	22	13
COM	17	22	11		8	8	26	16
CLE	14	20	12	7		5	29	20
SAL	15	22	12	8	5		29	18
MAC	41	46	22	27	29	29		14
LAB	32	38	13	18	21	20	12	

2016	MAN	PRO	TEC	COM	CLE	SAL	MAC	LAB
MAN		10	25	18	14	16	41	32
PRO	11		31	22	20	21	46	36
TEC	25	32		10	13	12	22	13
COM	17	22	11		8	8	26	16
CLE	14	20	12	7		5	29	20
SAL	15	22	12	8	5		29	18
MAC	41	46	22	27	29	29		14
LAB	32	38	13	18	21	20	12	

Table 12.2 Dissimilarity index (multiplied by 100) between top, middle and bottom groups

	2001	2006	2011	2016
TOP - MID	21	21	21	21
TOP - BOT	38	39	39	38
MID - BOT	21	20	21	20

managers and machinery operators and drivers (also increasing over time from 0.38 to 0.41). While Tables 12.1 and 12.2 provide some insight into socioeconomic segregation in Melbourne, traditional segregation indices like the dissimilarity index are often criticised (Wong 2016). First, the dissimilarity index is aspatial in nature, with each neighbourhood unit treated independently without considering the characteristics of nearby areas. Second, the dissimilarity index is global and thus provides a single score to summarise segregation patterns for the entire city and thereby fails to capture variations at the local level. Third, the dissimilarity index represents just one dimension of residential segregation—evenness. Given these limitations, we next consider other more spatialised measures of local segregation to more fully explore trends in socioeconomic segregation over time across Melbourne.

12.8.2 Location Quotients (LQs)

As a measure of relative concentration, LQs provide a clear visualisation of residential distributions—tapping into both the concentration and evenness dimensions of segregation (Brown and Chung 2006) (please refer to Chap. 1 for further information on LQs). Figure 12.3 shows the residential distributions of the top socioprofessional group and the bottom socioprofessional group in 2001 and 2016. As illustrated in

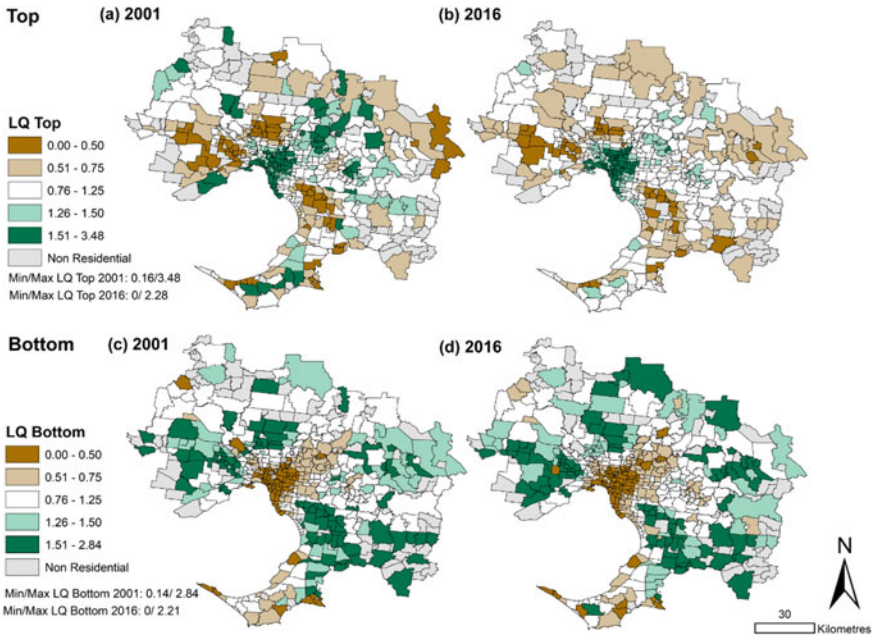

Fig. 12.3 Location quotients

Fig. 12.3, the top socioprofessional group are heavily overrepresented in neighbourhoods in and around the city centre at both time points. This trend is not surprising given that neighbourhoods closer to the city centre boast higher real estate values and are conveniently located near jobs and services (Goodman 2018). However, while a number of neighbourhoods outside of the CBD are highlighted as having more than their expected share of managers and professionals in 2001, in 2016, areas with high LQ values are restricted largely to the inner city region. This suggests that these slightly more distal neighbourhoods have become less popular for managers and professionals over time. By comparison, areas with low LQ values tend to be middle to outer ring neighbourhoods. Areas with low LQ values are relatively consistent over time.

Compared to the top socioprofessional group, unskilled workers occupy vastly different areas of Melbourne. In fact, neighbourhoods with an overrepresentation of the bottom socioprofessional group tend to be located on the fringes of the city—reflecting more affordable housing options. Some areas, particularly in Melbourne's east and/or on the outskirts of the city, have seen increasing levels of overrepresentation over time. Neighbourhoods with less than their expected share of unskilled workers (in other words, have LQ scores of less than 0.75) are largely co-located and situated in Melbourne's CBD area. Over time, there appears to be a spatial spillover with LQ values increasing in nearby neighbourhoods. Overall, these maps present clear trends in residential segregation linked to socioprofessional status. The areas *least* populated by the bottom socioprofessional group are the same areas that are *most* populated by the top socioprofessional group and vice versa.

12.8.3 Local Moran's I (LM-I)

While LQs show how a population is distributed across a city, LM-I captures the co-location of neighbourhoods which share similar characteristics—depicting the clustering-exposure dimension of segregation (Brown and Chung 2006). LM-I examines each neighbourhood in relation to the characteristics of surrounding areas and highlights the incidences of spatial clustering (Anselin 1995; Brown and Chung 2006). The LM-I procedure was computed in ArcGIS and used a rook spatial contiguity matrix due to its more conservative approach in identifying neighbouring areas (Dubin 2009). The LM-I procedure allocates neighbourhoods to one of five clusters: High High (HH) clusters (high concentration surrounded by high concentration); Low Low (LL) clusters (low concentration surrounded by low concentration); High Low (HL) clusters (high concentration surrounded by low concentration); Low High (LH) clusters (low concentration surrounded by high concentration) and non-significant neighbourhoods.

Figure 12.4 presents the LM-I results for the top and bottom socioprofessional groups in 2001 and 2016. In 2001, 107 neighbourhoods are identified as a HH cluster for the top socioprofessional group. These neighbourhoods are located in one of three locations—in and around Melbourne's CBD, in Melbourne's east and in Melbourne's

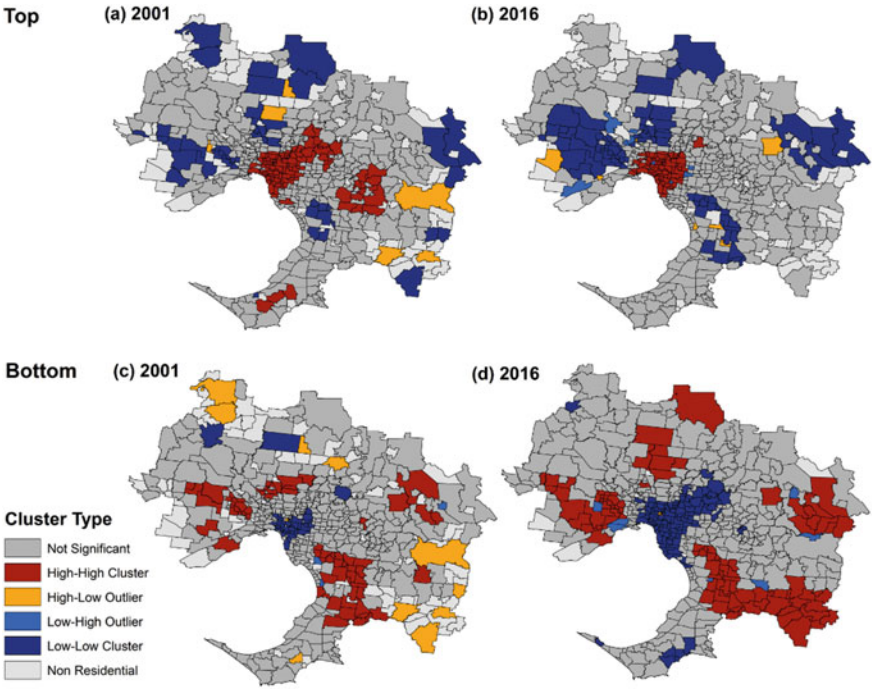

Fig. 12.4 Local Moran's I

south. However, the majority are situated close to the CBD. While HH clusters were largely located in Melbourne's CBD again in 2016, the size of the HH grouping has reduced considerably—with only 77 neighbourhoods classified as a HH cluster. The areas previously highlighted as a HH cluster in 2001, that are no longer HH clusters in 2016, are typically further away from the CBD. No HH clusters in the east or south remain in 2016. While six HL clusters were identified in 2001 and seven in 2016—the neighbourhoods highlighted as a HL cluster are not consistent over time. While the neighbourhoods classified as HL clusters change over time, they are largely located on the outskirts of the city at both time points. Neighbourhoods categorised as a LL cluster are spread across the city—although they are largely located in middle and outer ring suburbs. In contrast to HH clusters, the number of LL clusters has increased over time from 61 neighbourhoods in 2001 to 83 neighbourhoods in 2016.

The LM-I results for the bottom socioprofessional group reveal notably different segregation patterns. In 2001, the neighbourhoods identified as HH clusters for unskilled workers are located in the middle and outer ring. Areas highlighted as a statistically significant LL cluster are mainly located in and around the city centre—directly overlapping the areas classified as HH clusters for the top socioprofessional group. Several HL clusters are identified on the outskirts of the city in 2001. In 2016, a greater number of LL clusters was found for the bottom socioprofessional group—increasing from 41 in 2001 to 131 in 2016. For the most part, these LL clusters again

cover the area surrounding Melbourne's CBD. Also increasing is the number of HH clusters for the bottom socioprofessional group in 2016, from 70 to 86. Compared to 2001, these HH clusters are slightly further away from the city centre and largely located on the fringes of Melbourne. No HL clusters for the bottom socioprofessional group are identified in 2016. Taken together, these findings likely reflect the inner city's growing house prices over time and the limited affordable housing options for the bottom socioprofessional group.

12.8.4 Classification of Neighbourhoods by Socioeconomic Composition

Using the criteria outlined in Chap. 1, Fig. 12.5 displays the classification of Melbourne neighbourhoods by socioeconomic composition in 2001 and 2016. In 2001, most neighbourhoods within the Melbourne context meet the criteria of either a middle-income neighbourhood (N = 156) or a middle to high-income neighbourhood (N = 259). Only 9 neighbourhoods meet the criteria of a high-income neighbourhood. In 2001, 38 neighbourhoods are classified as low to middle income and 10 neighbourhoods are considered mixed. No low income or polarised neighbourhoods are identified. In 2016, middle income and middle to high-income neighbourhoods continued to represent the majority of neighbourhoods in Melbourne (N = 123 and N = 307, respectively). By comparison to 2001, the number of high-income neighbourhoods has increased in 2016 (N = 24) while the number of low to middle-income neighbourhoods has decreased (N = 26). Similar to 2001, no neighbourhood in 2016 is classified as a low income or polarised neighbourhood.

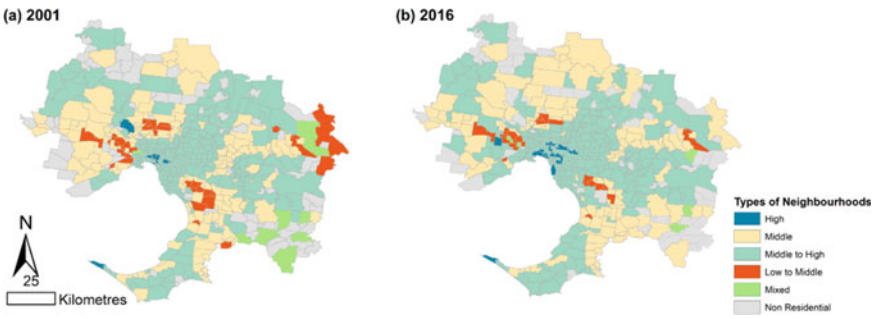

Fig. 12.5 Classification of neighbourhoods by socioeconomic composition

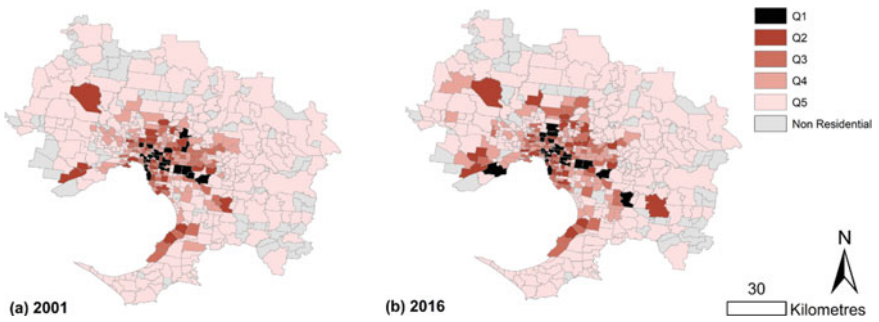

Fig. 12.6 Location of the top socioeconomic group

12.8.5 Location of the Top Socioprofessional Group

Lastly, we examined the degree of spatial concentration of the top socioprofessional group in Melbourne (see Chap. 1 for further methodological explanation). Figure 12.6 illustrates the location of the top socioprofessional group in 2001 and 2016. In 2001, Q1 comprises 20 neighbourhoods. In other words, 20% of Melbourne's top socioprofessional group resides in just 4% of Melbourne's neighbourhoods. These neighbourhoods are largely proximate to one another and located nearby the city centre. In 2016, the number of neighbourhoods that fall within Q1 remains largely unchanged at 21. Again, these neighbourhoods are largely located near the city centre. However, two areas, further away from the CBD are highlighted as Q1 in 2016. These neighbourhoods—Berwick and Point Cook—were two of the five most highly populated Melbourne neighbourhoods in 2016, with populations exceeding 45,000.

12.9 Socioeconomic Segregation and Ethnic Segregation Patterns

To provide a visual representation of how socioeconomic and ethnic segregation trends overlap in the Australian context, an additional series of maps were created. Figure 12.7 highlights areas that are HH clusters for linguistically isolated residents (i.e. those who are not proficient in English) and Indigenous residents. As can be seen in Fig. 12.7, areas that are popular for persons who are not proficient in English are relatively consistent over time. Neighbourhoods identified as a HH cluster are largely co-located in one of three areas, all located in middle-ring suburbs. By comparison, neighbourhoods identified as a HH cluster for Indigenous residents are notably different in 2016 compared to 2001. Additionally, fewer HH clusters were found in 2016. Nevertheless, at both time points, HH cluster neighbourhoods for Indigenous residents tend to be located on the outskirts of the city. Interestingly, there is limited overlap between areas identified as a HH clusters for non-English

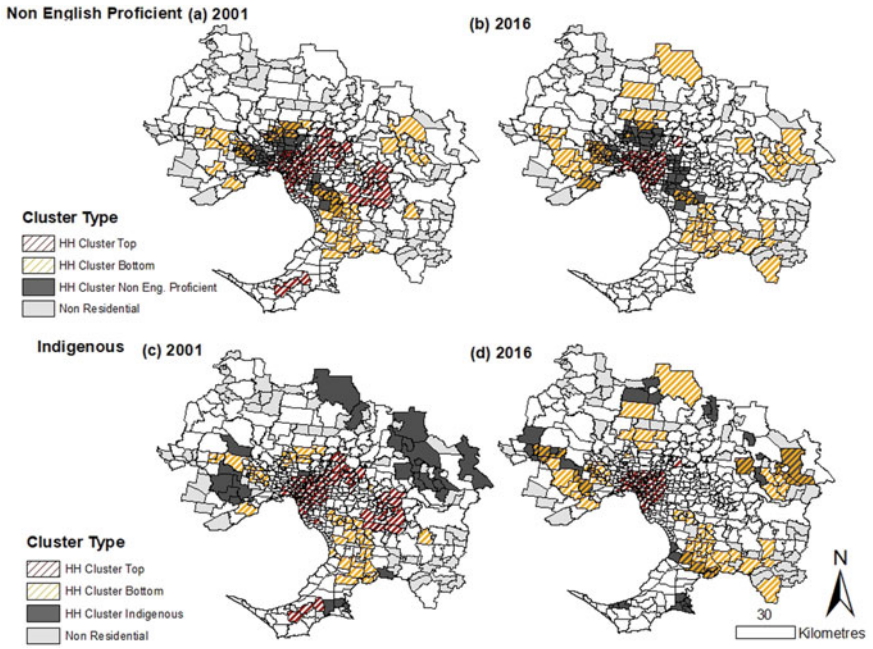

Fig. 12.7 Socioeconomic segregation and ethnic segregation

proficient residents and Indigenous residents. In 2001, just four neighbourhoods were classified as HH clusters for both group. In 2016, there was no overlap between the groups. This suggests Indigenous Australians and linguistically isolated residents occupy different areas of the city.

Overlayed on these maps are areas highlighted as HH clusters for the top socioprofessional group and bottom socioprofessional group. While some neighbourhoods deemed to be HH clusters for Indigenous residents or non-English proficient residents are also identified as HH clusters for the bottom socioprofessional group, these neighbourhoods are not completely overlapping. However, it is clear that Indigenous residents and non-English proficient residents are largely absent from the top socioprofessional neighbourhoods. In 2001, nine neighbourhoods were classified as both a HH cluster for the top socioprofessional group and linguistically isolated residents. By 2016, this overlap was reduced to just three neighbourhoods. Further, no neighbourhood deemed a HH cluster for the top socioprofessional group is also classified as a HH cluster for Indigenous persons. Thus, while these ethnic groups are not necessarily restricted to residing in just the poorest neighbourhoods, they lack presence in the top socioeconomic areas.

12.10 Conclusions

While the overwhelming majority of Australians perceive the 'fair go' to be a core Australian value, the growing levels of income inequality, issues with housing affordability and increasing socioeconomic segregation outlined in this chapter present a threat to its longevity. Melbourne is expected to be the largest city in Australia in the coming decades and is predicted to grow to a population of 8 million people by 2051 (Victoria State Government 2016). Therefore a key priority for government and urban planning is to maintain liveability and ensure that access to housing and employment does not fall outside of the reach of 'ordinary' Australians.

The results of the analyses undertaken for this chapter highlight clear trends in socioeconomic segregation in Melbourne. Traditional measures of segregation like the dissimilarity index indicate that almost 40% of the bottom socioprofessional group would need to move to another neighbourhood in order to make the top and the bottom group evenly distributed. However, the dissimilarity indices show a limited change in socioeconomic segregation over time.

By comparison, the more spatialised measures reveal a growing spatial divide between the top and bottom socioprofessional groups. Looking first to location quotients, the top socioprofessional group are overrepresented in neighbourhoods closest to the centre of the city. Results also show that top socioprofessional group and unskilled workers inhabit different parts of city, with the bottom socioprofessional group residing in the city's outer suburbs. Put simply, those areas least popular for the top socioprofessional group are the areas where unskilled workers are most likely to live. Similar patterns are found when looking at the LM-*I* results. Taken together this demonstrates a growing geographical distance between the 'haves' and the 'have-nots'. This increasing segregation is likely to be further compounded by the expected population growth of Melbourne.

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Part V
Europe

Chapter 13
Making Sense of Segregation in a Well-Connected City: The Case of Berlin

Talja Blokland and Robert Vief

Abstract This chapter analyses socioeconomic segregation and segregation by migration background for Berlin, Germany. Berlin's history of division and reunification affected suburbanization patterns and the unequal economic restructuring of the city over time. Within this historical context, we present our empirical results on segregation, and we reflect on the implications of segregation for the daily use of the city. Arguments that segregation affects access to amenities (as in the literature on 'food deserts') or reduces access to jobs (as in spatial mismatch theories) are not so useful for Berlin with its strong public transport infrastructure. We find that socioeconomic segregation was moderate and stable for the working-age population between 2007 and 2016, whereas segregation of poor children increased. At the same time, segregation of foreigners and segregation by migration background strongly declined. And yet, even though segregation levels are low and public services are present everywhere, the social use of the city, we argue, may be more segregated than statistical indicators suggest. Drawing on various case studies, we suggest that the use of the overall city reflects segregation patterns of the use of space for other reasons than commonly suggested.

Keywords Residential segregation · Social segregation · Berlin · Child poverty · Resource access

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13.1 Introduction

Residential segregation means that people put in a box of statistical similarity (socioeconomic or racially/ethnically constructed categories) live closer to people in that same box than to others. Living is measured in most segregation studies by where one is registered. In most cases, that is where we sleep.

Policymakers and politicians see segregation as problematic for roughly three sets of reasons. First, segregation can reinforce inequalities if it constitutes differential access to urban amenities, as discussions of, for example, 'food deserts' and spatial mismatch in the labour market suggest (Holzer 1991; Wrigley 2002). Especially in non-European cities, the presence and quality of formal amenities connect directly to segregation patterns (Marques 2012). Second, whether from a perspective of containment and punishment of the poor in the hyper-ghetto (Wacquant 2008), or conservative versions of the culture of poverty thesis (Herrnstein and Murray 1996), segregation discussion may include cultural worries (Sampson 2012; Gould 1999): isolation reduces connection to mainstream values, with various ascribed negative consequences. Third, worries about segregation premise that negative consequences occur as neighbourhood effects. Living among others with similar limitations, so the argument goes, would further limit chances to get ahead (Souza Briggs 1997), or hamper collective efficacy (Sampson et al. 1997). In European cities especially, segregation of income groups correlates with segregation of people without and with (recent) migration histories or 'ethnic minorities', which is a result of specific racialized logics of capitalism and colonialism and thus of global inequalities. Many European public discussions thus express worries about segregation not simply because of poor people's isolation. Instead, these discussions at times disguise a cultural-racist debate when labels of disadvantaged neighbourhoods or concentration areas point to where the poor live in higher densities but primarily draw attention to ethnic minority concentration.

All these approaches share the assumption that where we sleep has high relevance for our lives. This seems obvious in a favela where the bus may only come twice a day (or not at all). It may even apply to Chicago (but not New York; Small 2009). But what does residential segregation mean in a well-connected and not-so-huge city? Do residential segregation patterns matter? What for?

Berlin, as a medium-sized city with a well-functioning public transport system and infrastructure, serves as a case to reflect on these questions. Its history as a divided city makes it an exceptional case, provoking questioning of some standard segregation arguments. This chapter aims to explore whether Berlin has segregation patterns at all, how these patterns may have developed over time, and how to interpret them. We first discuss the German and Berlin historical context. After describing Berlin's data-shortage and our analytic choices, we analyse indicators for socioeconomic and migrant segregation. Finally, we connect statistical findings to city use as a daily routine, pleading for more focus on social rather than residential segregation.

13.2 From Divided to Gentrified City

Germany's socioeconomic inequality, measured by the GINI index (G), decreased from 1990 to 1998 and increased from 1998 to 2005 (28.3 in 1998 to 32.3 in 2005).[1] Scholars using different data acquire different results, but sketch a similar trend of strongly increasing inequality from the 1990s to 2005. Since then, World Bank data suggest a drop in income inequality from 2005 to 2010 (32.3 to 30.2) and an increase until 2015 (31.7). Although the GINI coefficient cannot be reported for all years of our analysis for lack of data (2007, 2012, 2016—see methods section below), the trend lagged by one year shows a slight U-shape (2006: 31.3; 2011: 30.5; 2015: 31.7). Most statistical offices also computed a minor drop after 2005 but underline a mostly stable situation from 2005 to 2016, around a GINI coefficient of 0.29 (Grabka et al. 2019). In contrast, some researchers emphasize that affluent households profited most from wage increases over the last twenty years, while in the lowest deciles of the income distribution, hardship remained. Income inequality since 2010 sharpened, especially in major cities in Germany, where low-income households have become disproportionally numerous (ibid.). Berlin's statistical office highlights an increase of the GINI coefficient until 2003 and stability since then (Amt für Statistik Berlin-Brandenburg 2017a: 48), showing a very similar stable pattern for our period of interest as for Germany overall (G = 30.0 for 2006, 2011 and 2015). Berlin's *Bezirke* (12 districts of around 300.000 inhabitants) have higher income inequality in the West than in the East. East Berlin's Lichtenberg (G = 23) or Marzahn-Hellersdorf (G = 25) have much lower levels of income inequality than for example Charlottenburg-Wilmersdorf (G = 35) in the West (ibid.: 49). This inequality, and forms of segregation connected to it, must be understood in Berlin's peculiar context.

After the Second World War, Soviet Union, France, UK and USA divided Germany into two: German Democratic Republic (GDR) and Federal Republic of Germany (FRG). Berlin, as capital, was divided into four sectors, one in East (under Soviet control) and three in West Berlin (under control of France, UK and USA). Soon, the tension between the USSR communist project in East Berlin and the predominantly USA project of market capitalism in West Berlin created a peculiar situation for residents. The breaking up of Germany (and Berlin) was an imposed political project against its unity, not a fortification of a boundary that in any sense was lived—ideologically, religiously, or else—by people or their movements. Notwithstanding regional differences, nation-state building since the late nineteenth century had worked effectively towards the creation of German unity. Berlin's division thus resulted not, as former divided cities like Belfast or Mostar, from activation of symbolic boundaries of ethnicity, religion or both. Figure 13.1 shows Berlin's current *Bezirke* and the Wall's location.

Of all Germans, Berliners experienced the artificiality of the divided life most extremely. With the construction of the Berlin Wall in 1961, places and people in the daily lives of Berlin residents were suddenly separated. To understand contemporary Berlin, this division matters in various ways. First, the building and then the removal

[1] https://data.worldbank.org/indicator/SI.POV.GINI?locations=DE.

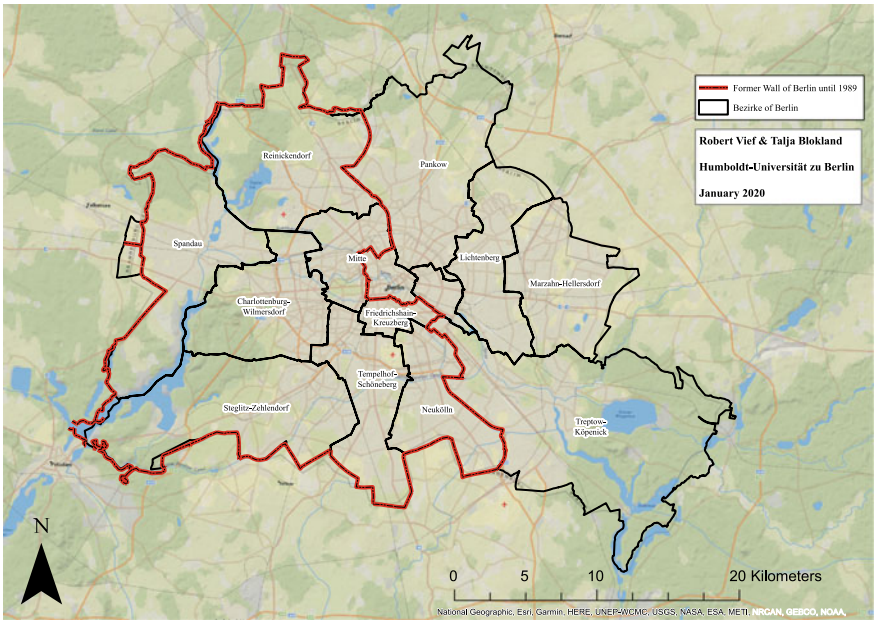

Fig. 13.1 Berlin's *Bezirke* (today) and the Wall until 1989

of the Wall through the city's (war-damaged) heart moved the city's core. Today's central sites used to be dead-end streets facing the Wall, which had a ca. 100-m-wide 'Dead Strip' on the East. This vacant land strip was a waiting opportunity for developers in the 1990s (Fig. 13.2).

GDR politics of a classless society favoured massive apartment constructions, especially in Lichtenberg and Marzahn-Hellersdorf, while ignoring, for example, Prenzlauer Berg with its bourgeois housing. Low levels of maintenance and investment (Dahn 1987: 39 in Häußermann and Kapphan 2002: 71) caused major housing deterioration. People living there were denied access to the new higher-quality apartment blocks for lack of state compliance, voluntarily distanced themselves from the state, or temporarily waited there for better housing (ibid.). In the 1990s, these dilapidated buildings with desirable 1800s *Altbau* designs provided excellent investment opportunities. After the fall of the Berlin Wall (the *Wende* in 1989), the area near the Wall, which for decades was two cities' edge, became a central district with high-quality amenities, international schools, bilingual kindergartens, yoga-classes for toddlers, etcetera. Especially since the early 2000s, the central city attracted a middle class and saw its public and private service sector changing tremendously.

Third, politics of representation in West and East Berlin before the *Wende* had created two divergent urban landscapes (see Häußermann and Kapphan 2002: 62–4). After the *Wende*, a quick expansion and integration of infrastructures and public transport in what was to become the capital of reunited Germany became politically urgent. The move of the federal parliament's seat and most West-German government

Fig. 13.2 Berlin Wall, 1986. *Source* https://en.wikipedia.org/wiki/File:Berlinermauer.jpg, by user: Noir/WikiCommons, 22-Mar-2004, GNU free under a CC BY-SA-3.0 Unported license. *Photographer* Thierry Noir/Bethaniendamm, Berlin-Kreuzberg, Germany, 1986

institutions from Bonn to Berlin in 1991 strengthened this process (Kemper 1998b: 1766). Political choices in housing policies since the unification (see Bodnar and Molnar 2010) produced a housing system dominated by private rental apartments. Homeownership remained hard to realize within the city. Especially the privatisation of GDR state-owned areas where rents had been fixed at very low rates before reunification produced an exception to common understandings about housing markets. Privatisation of public housing to reduce the city's financial problems and restitution of buildings collectivized under communism to previous owners, also impacted the rental market. In short, Berlin's contemporary housing situation results from a combination of investments of second circuit international capital (Harvey 1978) at a historical moment of an ideological belief in the superiority of market capitalism, a need to increase state revenue because of the historically conditioned need for public investment, and unprecedented freedom of residential choice. Berlin's gentrification—the increase of middle and upper-class residents displacing lower-income residents—occurred in this context.

Meanwhile, the Wall's disappearance made suburbanization possible overnight, causing a sharp population-decline in 1990s Berlin (Beyer and Schulz 2001: 123 quoted in Kirchner 2009). In Germany's specific suburbanization trajectory (Matthiesen and Nuissl 2002), Berlin was even more specific (Bluth 2004). In pre-1989 East Berlin, limited possibilities of homeownership and strict state-led distribution of rental dwellings had prevented market-led suburbanization. In West Berlin, the Wall had prevented all outward expansion. Berlin's population dropped between 1990 and 2004 while surrounding Brandenburg saw a sharp population increase

(Beran et al. 2015). For example, Falkensee, bordering directly at West Berlin's Spandau, grew in a decade from 22,087 to 40,511 residents, causing challenges to cohesion, identity and infrastructure (Kirchner 2009: 41f). Since 2004, more people move from Berlin to Brandenburg than in the other direction (Beran et al. 2015). And yet, the influx from other German states and abroad made Berlin grow from 3.3 to 3.75 million between 2004 and 2018 (Amt für Statistik Berlin-Brandenburg 2019).

Both in the East and the West before the *Wende*, industries received politically motivated state-support. As this disappeared after the *Wende*, deindustrialisation followed, especially but not exclusively in the East, causing high unemployment rates and the lowest GDP of all European metropoles compared to their nationwide averages (Bernt et al. 2013: 16; Gornig et al. 2013: 8f). In the early 2000s, sociologists predicted growing economic marginalization (Kronauer 1997 in Häußermann and Kapphan 2002: 18). Instead, in the last decade, Berlin grew economically, land values increased, and unemployment rates declined. This decrease in unemployment partly results from growth in flexible service-jobs with little income security. In East Berlin, pre-1989 full employment with absolute job security and low income and little consumer goods availability has now turned into low unemployment but high job insecurity, continuous low or moderate incomes, rent increase and endless consumer goods—unaffordable for many. Additionally, younger and new Berliners face precarity in self-employment in the creative sector.[2]

Berlin has moved from a politically divided city to a city with new divisions. It undergoes well-documented gentrification (Holm 2013), to which political initiatives seek answers, including housing development in selected surrounding Brandenburg areas, which will further affect its demography. But Berlin also moved from a city initially divided only by political decision to a city of distinctive social lives. We explore what segregation may mean in this context after presenting Berlin's statistical development of segregation.

13.3 Methods

German scholars and journalists vigorously debate segregation but lack precise, small-scale data to demonstrate the existence of poverty pockets before 1998 (Kemper 1998a: 22) and have limited data since then. Some described a stable rate of socioeconomic segregation between 1990 and 2005 for Berlin (Friedrichs and Triemer 2009: 120), but only based on analysis of large spatial units (ibid.: 20) or argued that in the 1990s, poverty increasingly concentrated in specific neighbourhoods (Häußermann and Kapphan 2004) and produced social problems, but again drawing on limited

[2]Figures suggest weak correlations between education and income for residents without migration background or European Union backgrounds (especially Italy, Spain, Greece since 2008s crisis) (Gathmann et al. 2014).

data. Others found that social segregation by Sozialgesetzbuch II[3] slightly increased between 2005 and 2014 (Helbig and Jähnen 2018: 139).

Germany has poor statistics. Before 1989, the FRG and the GDR had their own ways of collecting census data. After reunification, Germany delayed the census to 2011, leaving a 24 year gap (Statistische Ämter des Bundes und der Länder 2015: 9). Berlin does not have a useful panel of census data since 1989. Germany does not collect census data on income. It does not publish data on occupational status for cities (which it collects; Eisenmenger et al. 2014; Heckel and Heyde 2015). On the local level, census data regulations are stricter than in other countries. The *Mikrozensus*, Germany's largest household survey, allows predictions of income distributions but does not publish data for spatial units smaller than Berlin's 12 *Bezirke*. The spatial sampling of the *Mikrozensus* is on the same scale, so we cannot infer to smaller levels.

Berlin answered in 2006 to the lack of data with the *Monitoring Soziale Stadtentwicklung*, an initiative of academics and city planners to join available data sources on a low spatial scale to assess neighbourhoods' relative positions. The LORs (*Lebensweltlich-Orientierte Räume*) in the *Monitoring* provide 447 spatial units (*Planungsräume*) with 7,500–10,000 inhabitants (Bömermann et al. 2006).[4] The data do not include income. Fortunately, income is only one indicator suggesting where the rich, the poor and others live. As proxies for economic status, the *Monitor* contains information on unemployment, state family subsidies and child poverty.

We analyse data for three time points (2007, 2012, 2016) with four indicators of socioeconomic segregation: unemployed persons among people aged 15–65; long-term[5] unemployed persons among those aged 15–65; non-unemployed recipients of state subsidies in all age groups (for example when people work but make too little to reach the minimum state-guaranteed standard, receive very low pensions, or have children living in a poor household); and poverty among children aged 0–15. These indicators allow an estimation of the lower part of the income distribution. They cannot show polarization of the rich within neighbourhoods and throughout Berlin.

Scholars have also investigated 'ethnic' segregation of legally defined foreigners in neighbourhoods. Kemper (1998a, b) found ethnic segregation to be stable during the 1990s in West Berlin and to decline in East Berlin until 1996. Overall, ethnic segregation rates were higher in East Berlin, where residential mobility was very low. Friedrichs and Triemer (2009: 120f) observed an increasing level of segregation until the mid-2010s. Helbig and Jähnen (2018) observed a decrease since 2002. Again, both used data on a high spatial scale. Häußermann and Kapphan (2002: 212) underlined the increasing concentration of foreign-born residents since the 1970s (with only 20,000 foreigners in entire East Berlin), then stability since the 1990s, but on *Bezirke* scale. Existing studies thus do not report consistent results and use different spatial scales—we aim to clarify the recent development on a small spatial scale.

[3] *Sozialgesetzbuch II* only covers a part of the unemployed population.

[4] We exclude 14 *LOR-Planungsräume* with fewer than 300 inhabitants in our analyses.

[5] Unemployed over one year without interruption, *Sozialgesetzbuch* II and III (Nagel 2018: 16f).

Germany collects no data of racialized categories, but we can compute segregation of foreigners and Germans with a migration background, also clustered by country -of -origin groups. We analyse such segregation using proportions of foreigners and persons with a migration background,[6] and by country groups (European Union and Turkey/Muslim States).[7] We are aware of the ways in which statistics construct categories: as our last section will show, for Berlin's *social* landscape, or how the city is lived and used, these social constructions and their imaginations matter: stereotyping people with certain passports as 'Muslim' is an act of othering.

We calculated residential segregation using the segregation index (IS)[8] and the location quotient (LQ) with the Geo-Segregation Analyzer (Apparicio et al. 2013). We cannot report indices of dissimilarity between groups of our analysis, because the groups partly overlap (long-term unemployed residents count also as unemployed; poor children may also be residents receiving subsidies, etc.).

13.4 Socioeconomic Segregation

Figure 13.3 shows the IS for 3 years of data for socioeconomic and ethnic indicators: Berlin's moderate unemployment and long-term unemployment segregation was stable between 2007 and 2016, with a tiny drop between 2007 and 2012. Poor children and state support recipients became slightly more segregated over time, especially between 2007 and 2012. Poor children lived overall much more segregated than other categories (IS .43/42 in 2012/2016). As school-aged children typically have high neighbourhood use (Blokland 2003; Karsten 2002), this may affect social segregation (see Table 13.1).

Figures 13.3, 13.4, 13.5, 13.6 and 13.7 map the distribution of the LQs of our indicators in both 2007 and 2016. In Fig. 13.3, LQs of unemployment for 2007 and 2016 reveal a very slight decrease in poverty concentration areas. The index went up in areas at the city borders far from the new centre such as the South-West, where we now observe less concentration of employed people without benefits and without poor children than in 2007. Other outskirts (as the North of Marzahn-Hellersdorf) desegregated somewhat. Formerly deprived inner-city neighbourhoods (parts of Kreuzberg and Neukölln) now have intermediate values, but pockets of high concentrations of unemployment remained. Land values and rents increased disproportionally here

[6]Foreigners and Germans born outside of Germany with second nationality, naturalized citizens, children of two foreign parents born in Germany since 2000. Changes in data-collection after 2014 ask for cautious interpretation of 2016 numbers (Nagel 2018: 59f).

[7]Egypt, Algeria, Bahrain, Djibouti, Iraq, Yemen, Jordan, Qatar, Comoros, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates.

[8]The IS (Apparicio et al. 2008: 1; Duncan and Duncan 1955) is defined by $IS = \frac{1}{2}\sum_{i=1}^{n}\left|\frac{x_i}{X} - \frac{t_i - x_i}{T - X}\right|$ and the most common one-group segregation measure. In this formula, n is the number of spatial units in the overall city (in our case: Berlin), x_i is the total population of group X in spatial unit i, t_i the total population in spatial unit i, X is the total population of X within the overall city. T is the total overall city population.

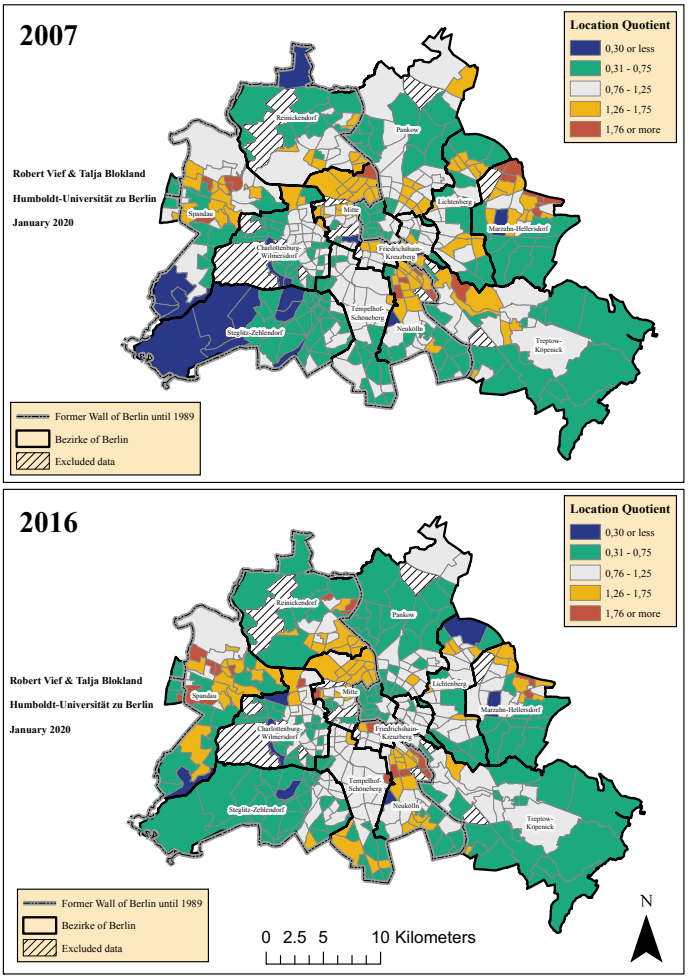

Fig. 13.3 Location quotients of unemployment (among 15- to 65-year-old population), in 2007 and 2016

(Holm 2013). Three factors may explain the invisibility of this gentrification. First, as a strategy to cope with the rent increase, people increasingly share apartments (Investitionsbank Berlin 2019). Second, highly mobile young people and global middle classes tend to prefer them. We have a division here between short-time working residents moving in and out quickly and a stable population for whom the new forms of the social mix have changed nothing for their unemployment rates and little for their children's poverty. Third, Kreuzberg and the North of Neukölln have inner-city modernist housing estates. New rental contracts see sharp rent increases (when new renters move in), but the moderate building structure and relative low level of amenities of these estates made their increase less than in other buildings,

Table 13.1 Indices of segregation in Berlin

	2007	2012	2016	Overall trend
Socio-economic indicators				
-unemployed persons	0.19	0.19	0.18	stable
-long-term unemployed persons	0.20	0.19	0.19	stable
-non-unemployed persons receiving state subsidies	0.28	0.30	0.31	+ slight increase
-child poverty	0.40	0.43	0.42	+slight increase
Ethnic indicators				
-foreigners	0.35	0.33	0.28	- strong decrease
-persons with migration background	0.34	0.33	0.30	- fair decrease
-migration background: Turkey and Arabic states	0.51	0.49	0.41	- strong decrease
-migration background: European Union	0.23	0.23	0.23	stable

and residential stability remained high here. So far, this enabled residents to continue living there, as the German system of rent protection is relatively strong.

The LQ for child poverty for 2007 and 2016 (Fig. 13.4) indicates considerably stronger spatial segregation compared to unemployment, and concentrations in poverty, in contrast to all other indicators, slightly increased. Overall, the outskirts show a high concentration of non-poor children (Steglitz-Zehlendorf, parts of Marzahn-Hellersdorf, the north of Reinickendorf and the North-East of Pankow). These areas have the highest residential ownership rates. They have more single-family dwellings than average, making them preferred locations for affluent-enough families, reducing the likelihood of child poverty. Some of the spatial concentration of unemployment rates in inner-city areas results from the exceptionality of Berlin mentioned before. The current centre of the city has the redeveloped 'dead zone' (see Fig. 13.2) and renovated bourgeois housing ignored by the GDR. As luxury apartments are usually bought by people who work but are not necessarily preferred by parents, child poverty can remain stable while other indicators change.

The slight increase in segregation by child poverty after 2007 also produced new clusters in the outskirts where a large proportion of poor children lives, especially in Spandau's high-rise areas. Here, a closer analysis of suburbanization would be interesting. Located right at the city's edge, the disappearance of the Wall opened a hinterland for anyone who could afford to move, without an extreme increase in, for example, commuting time to workplaces since a regional train—connecting West Berlin with the hinterlands—returned for commuters in 1995. Selective migration from Spandau to Falkensee (noted above) may well help explain this poverty concentration. Kirchner (2009: 39) explained a high proportion of Falkensee's demographic growth as in-migration from Berlin. Spandau, in the 1920s already predominantly

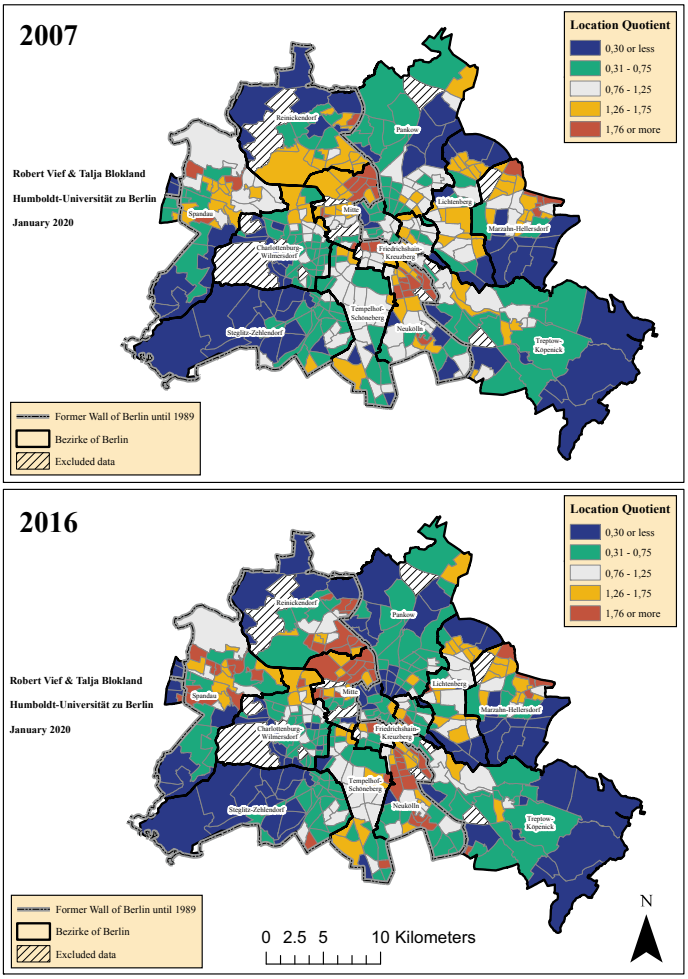

Fig. 13.4 Location quotients of child poverty (among 0–15 years-old population), in 2007 and 2016

working-class (Häußermann and Kapphan 2002: 45), was never a highly attractive city-part. Residents may have found better housing options in the direct geographical presence of their previous apartment after the *Wende*, an exceptional situation with Berlin's sudden opening up of hinterlands. If this is the case—and it begs further research—then social networks and even routines of daily activities may have changed very little. So even though residential segregation measured by child poverty has increased, we do not know what this means for social segregation.

Prenzlauer Berg (south of *Bezirk* Pankow), the gentrified neighbourhood with the highest birth rate for some years, where the stereotype of the latte-macchiato mother with an expensive stroller has been pasted to, saw its child poverty rate decrease. Other

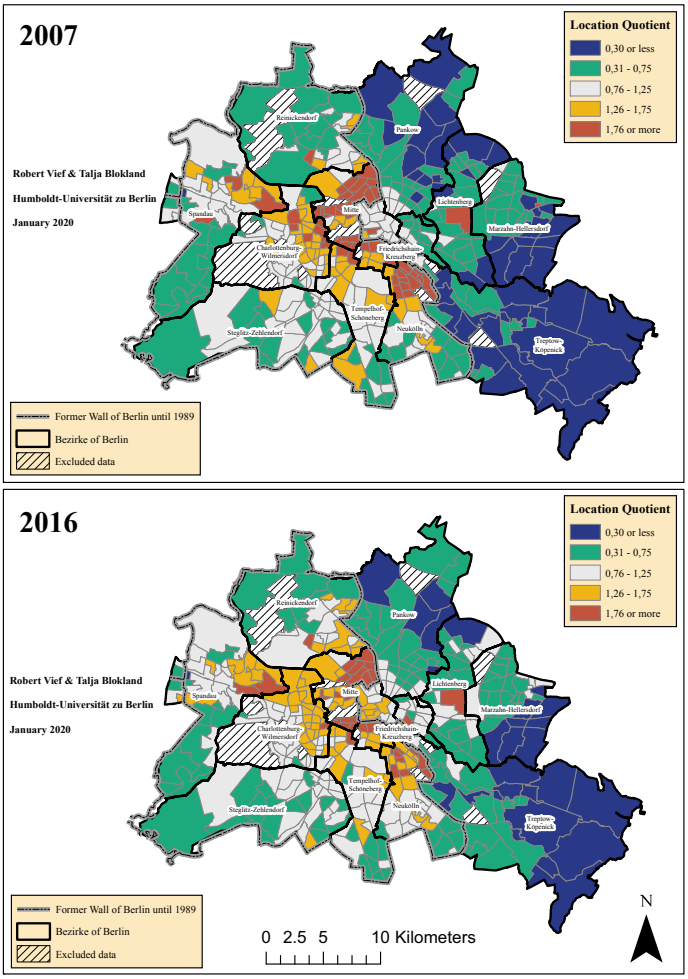

Fig. 13.5 Location quotients of Inhabitants with a migration background, in 2007 and 2016

areas (Charlottenburg-North, Wedding (Mitte), Reinickendorf's South) show much higher child poverty concentration than in 2007. This suggests that poor families increasingly disappear from areas where they lived before: either because they are no longer poor—the overall child poverty decrease suggests this plays some role—or because they moved elsewhere. Poor children may now also have become poor adults—we have no figures to measure this—and children who took their places may come from better-off families. Gentrification suggests that some previous poverty concentration hotspots now host wealthy young professionals and poor families.

When poor children live increasingly in areas with other poor children, does that matter in a city with Berlin's size and infrastructure? Are they able to leave their residential pockets and travel elsewhere in the city, for example? We connected the LQ

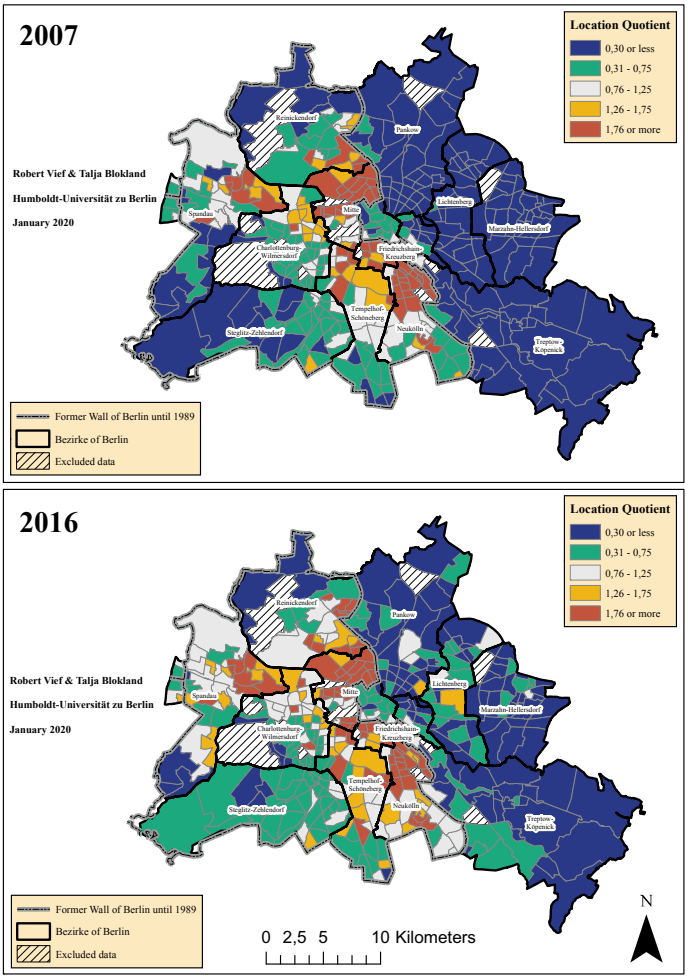

Fig. 13.6 Location quotients of Inhabitants with migration background from Turkey and Arabic States, in 2007 and 2016

data on child poverty segregation, unemployment rates and foreigners with indicators of distance from underground and regional train stations. Over time, concentration areas with few poor children had constant low access to public transport (Table 13.2). This affects their access to the city, but their parents mostly drive, and their access reflects low residential density. Poor children and (long term) unemployed residents now live in areas with worse public transport access than in 2007. As almost all post-reunification train lines re-openings were completed by 2006 and little changed between 2007 and 2016, poor families and unemployed residents thus moved (or had to move) to areas with poorer public transport access.

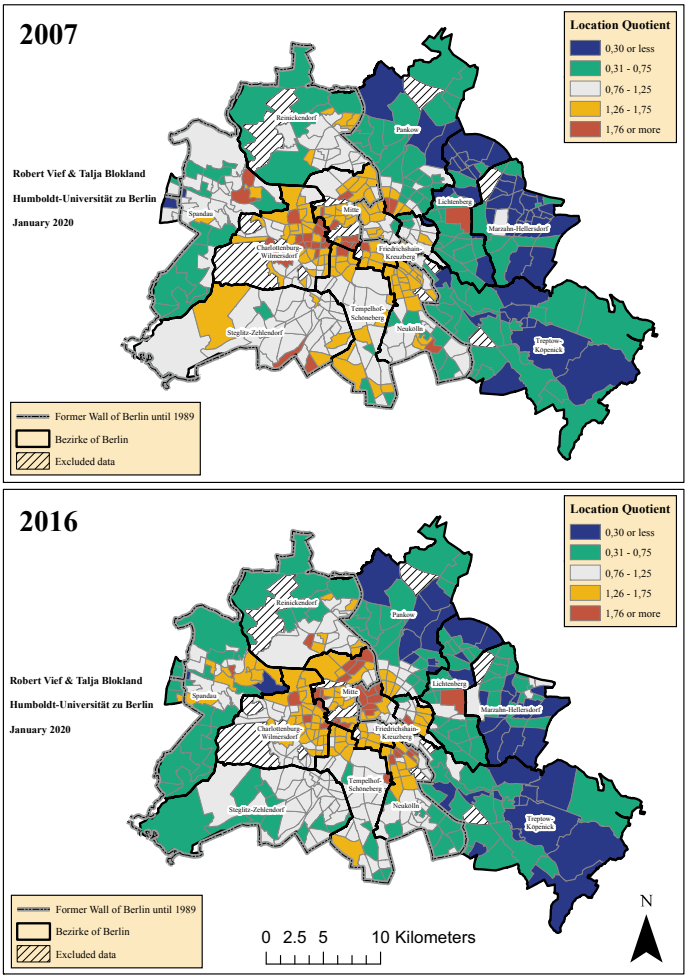

Fig. 13.7 Location quotients of Inhabitants with migration background from the European Union, in 2007 and 2016

13.5 Segregation by Foreigner/Migration Background

German cities always were more segregated by migration background than by socioeconomic groups, scholars claim (Friedrichs and Triemer 2009). In Berlin, both types of segregation approach each other. The IS for foreigners decreased from 0.35 in 2007 to 0.28 in 2016 (see Table 13.1), as did segregation by migration background (from 0.34 in 2007 to 0.30 in 2016).

The dispersion of segregation trends in Fig. 13.5 shows that foreigners and Germans with migration background continue to live more in West than East

Table 13.2 Public transport access by the level of segregation and year

Access to public transport by the level of segregation		Average distance to next U-Bahn, S-Bahn or regional train stop in meters					
Indicator	Year	2007			2016		
	Neighbourhoods with LQ range	Mean	SD	N	Mean	SD	N
Socioeconomic indicators							
– unemployment							
	0.3 or less	1833	1620	19	1204	948	9
	0.31–0.75	1006	886	147	1090	1022	156
	0.76–1.25	770	751	152	733	673	162
	1.26–1.75	735	625	96	691	538	82
	1.76 or more	876	613	19	1214	1021	24
– long-term unemployment							
	0.3 or less	1497	1360	39	1739	1619	39
	0.31–0.75	1019	941	135	929	809	127
	0.76–1.25	775	698	152	788	703	153
	1.26 1.75	622	564	77	689	545	85
	1.76 or more	1036	821	30	1183	929	29
– child poverty							
	0.3 or less	1512	1322	75	1197	1244	86
	0.31–0.75	851	799	125	849	705	145
	0.76–1.25	864	753	101	836	764	70
	1.26–1.75	731	572	97	774	549	70
	1.76 or more	608	595	35	805	748	62

Berlin.[9] Between 2007–2016, some clusters of foreigners remained. Others acquired a more balanced LQ (such as Kreuzberg). More foreigners now also live in Eastern areas. Foreigners is a broad concept. For example, in gentrifying Neukölln and Kreuzberg, 'foreigners' include more and more EU and US citizens. Over 10,000 of the 13,263 residents who moved to Neukölln between 2011–2017 carry these passports. People from 'Muslim countries' went up by only 2,600 (Amt für Statistik Berlin-Brandenburg 2012, 2017b). Our analysis of segregation by migration background from Turkey/Arabic States underlines this aspect (Fig. 13.6). The IS for this group dropped sharply from 0.51 to 0.41 in nine years. More persons from this group left formerly very segregated inner-city pockets (such as Wedding, Kreuzberg or Neukölln-North). The overall segregation for EU-citizens is moderate and stable (around 0.23), but the development of their segregation shifts to inner-city areas (Fig. 13.7).

[9]Except for one in Lichtenberg, with Vietnamese residents, an increase of Bulgarians and other Eastern Europeans and a refugee center.

13.6 How Does Segregation Matter?

As Marcuse (1993: 357 in Hamnett 2003: 167) argued 25 years ago, divided cities are nothing new. From ancient Athens and Rome onwards, the poor have lived away from the rich: 'at least from the outset of the industrial revolution, cities have been divided in ways that are quite familiar to us' (ibid.). So how does segregation matter?

Statistics of where people sleep matters when we assume that people do not leave their concentration areas and residents have access to amenities, networks or other resources only through their residential location. This assumption is questionable (Blokland and van Eijk 2010). A mixed environment can be social wallpaper for the better-off (Butler 2003) without them ever building network ties with people in lower social, economic or cultural positions. Curley (2008) showed that people who moved from poverty pockets to mixed areas benefitted because their resources were no longer drained, not because new social capital emerged. Kronauer (2002) suggested that much depends on life conditions: single mothers found best support infrastructures in apartment blocks on the outskirts, single unemployed persons benefitted most from inner-city resources. So, segregation effects on life chances are multi-faceted and dynamic, even within one life-trajectory.

Besides networks, social capital and cultural interpretations, scholars may want to focus much more on urban infrastructure, including its *precise* workings for access to resources. Social segregation, the degree to which people conduct their role repertories (Blokland 2003; Hannerz 1980) in relative isolation or interaction with people with a different class or racial/ethnic position than theirs, emerges through these workings.

Berlin is a well-connected city; public transport is affordable and even free for school children. However, segregated poverty, as we saw before, coincides now with less easy transport access. When moving around the city becomes more difficult for those who are most disadvantaged, it starts to matter *where* things are located. Resource access is central to how segregation matters, especially for resources through which social positions are reproduced: resources for raising kids. Four examples, drawing on students' work at Humboldt, support this claim.

First, this work suggests a congruence of socioeconomic segregation and distribution of certain child-oriented resources. We mapped elementary schools, kindergarten and praxis for speech- and ergo-therapy. The choice of kindergarten types is smaller in high unemployment areas (Fritz 2013). Elementary school access is equal, but high unemployment areas have fewer schools with special profiles. Other indicators (teacher absence, computers in school, teacher/student ratio) show no systematic pattern (Zwirner 2013). People living in affluent areas have a higher chance of having therapists nearby. As high child poverty shifted to locations with worse public transport, this can point to a difference in life chances.

Second, school segregation does not require residential segregation. Berlin's elementary school zoning laws should create schools with the same composition as their catchment zone. Parents cannot simply send children elsewhere. In practice, parents differ in their possibilities to do so (Blokland and Große Löscher 2016).

Especially in *not* segregated neighbourhoods, schools are more segregated than they should be for the residential composition (Vief 2018). As strongest school-neighbourhood segregation gaps occur in mixed settings, residential mix does not necessarily create a social mix in important institutions.

Third, as children's actual neighbourhood use tends to be high (Blokland 2003), the interplay of family and neighbourhood works differently in areas different in poverty concentration. In a middle-class pocket in Lichterfelde (Steglitz-Zehlendorf) and an owner-occupied development in Kreuzberg, qualitative interviews with parents taught us that both lived with people with similar orientations on dominant parenting ideas. Interviewees showed little awareness of the rest of the city and a localness in their use of facilities and non-family networks. The neighbourhood worked as village—or exclusive island. The interviewees did not intentionally avoid mixing with people unlike themselves. But even in a middle-class enclave in a hyper-diverse district, the parents were so oriented on organizing the best resources for their children that it never occurred to them that their practices of secluding (Giustozzi et al. 2016) excluded others (Blokland and Große Löscher 2016: 81–82). Giustozzi concluded (2016: 100): 'Effectively (…) these mothers avoided routes through the city—also shown in their preference for cars over public transport—for fluid encounters (…) with residents unlike themselves. (…) Segregation, then, was actively enhanced and reified by residential choices and everyday practices of these mothers.

Fourthly, social processes affect the relative absence of migrants and foreigners in East Berlin. The long length of residence in some of these areas suggest that few places became vacant, and residential mobility is low there. Häußermann and Kapphan (2002) claimed that foreigners chose not to move to the East because of Neonazis. That certain Eastern parts were 'spaces of fear' for migrants had since become a claim frequently used geographically to address the right-wing extremism and related fears of their potential victims, non-White Germans and immigrants (Lewek 2016: 37), producing imaginaries accordingly. The reproduction of the imagery of racism is a problem of 'the East' locates it away from the core of the city and its proper 'Western' democratic qualities, but the evidence is weak. When we asked people with a Sub-Saharan migration background to draw on a Berlin map where they went or did not go, they excluded Eastern Berlin areas. In the early 2000s, racist violence tended to be stronger in the East of the city. Some nationalist, racist meeting venues moved from Eastern areas to the region around Berlin (Shoshan 2016), but the extreme right-wing political party AFD holds office in Köpenick and focusses electoral propaganda on Treptow-Köpenick and Marzahn-Hellersdorf, making racism *visible.*

That segregation occurs from migrant choices not to move to East Berlin out of a fear of racism (Häußermann and Kapphan 2002) is tentative but a common narrative. This narrative, Lewek (2016) argued, helped the city marketing itself as diverse, hip and tolerant. By effectively spatializing racism in areas with low tourist attractivity anyway, where it was constructed as a problem of the particular backwardness of a particular part of Berlins population, the rest of the city could be marketed as welcoming cosmopolitan. The imagery may have worked: in the last

20 years, migration background only increased slowly and slightly in these areas, although collective performances of right-wing extremists today are less spatially concentrated in the Eastern part of Berlin (ibid.: 248). Most reported racist incidents now happen in Neukölln and the new Mitte, in contrast to the early 2000s.[10]

In another study, lower-class migrant youth reported avoidance of areas where they felt unwelcome (Blokland and Šerbedžija 2018). Young men with Arab and Turkish roots in two Kreuzberg estates curbed their city use to avoid racist encounters. Diego expressed fear in Marzahn: 'five or six Germans who will stand next to you will think: Come on, there is a foreigner, he is going to get beaten'. Another youth had been 'stupidly talked to' by a 'Granny' who scolded that 'you foreigners' made her *Bezirk*, Hellersdorf, *kaputt*. Their local comfort zone (Blokland and Nast 2014) was a response to experiences of discomfort elsewhere, interviewee Serdar suggested:

> *[…] [what causes that] you don't like to go much into other Bezirke?*
>
> 'You can't really put that to words, because I had a job training once (…) in Spandau (…) I felt not at all, *zero well* there, for real. Because you notice like, they look at you differently. (…) we, apparently, the foreigners have something against the Germans, they treat them badly and so on (.) But really (…) the ones that label us that way, these are mostly the people, that live according to the old (…) mentalities, like so GDR, like some of them still have that in their heads. And you see it very well, one recognizes it clearly (…) Even though you're born here, you have no difference form them, only that in your roots you happen to be Turkish (..) they say (…) you aren't a German and so on (…) they want to be the only Germans. (Blokland and Šerbedžija 2018: 35)

Serdar interpreted his Spandau experience through the common lens of East Berlin as a container of racists. Spandau, however, was always *West*-Berlin. These experiences were not at all located in the East only. Two young migrant women felt discomfort in all *Bezirke* with few people with migration background: exactly the locations where mothers quoted above felt so comfortable as they did not 'have to protect' their children, living in a 'village'. Here these women felt 'uncomfortable' and 'as exclusion, to be honest':

> When one gets to places where there are few migrants (…) it is always quite glaring (*krass*). In Zehlendorf (…), I was there (…) because my brother-in-law was in the hospital (…) I walked around with my nephew (…) and two minutes down the street, there is a lamppost, and it has sticker on it, 'Islamist out', 'Migrants out', '*Nafros* go home' - so really *krass*. And then I walked around there thinking, shit, when I would be wearing a headscarf here, what would happen to me? (…) You get a look, I don't know, it is always this *krasse* feeling, then I think, I belong here too, what are you looking at me like that for?'.

The closure of the city goes further than that when migrant youth experience that 'normal' behaviour is demonized. Emre reportedly travelled to his internship but was late, so ran from his train over the platform at a main railway station. He was stopped by police or security. They asked his ID, then to open his bag, then questioned him if he had stolen something—all taking 10 min of Emre's time, making him arrive late at his workplace: 'they did not believe me at first because I was out of breath, because I ran, they thought I must be fleeing'. Not everyone running at a station is

[10] See for example: Register Berlin (2019); Senatsverwaltung für Inneres und Sport (2007).

stopped. Emre sensed that. For these youngsters, the everyday experience of being undesired and put under general suspicion and policing was even stronger outside their neighbourhood. They limited their use of the city for stories told and experiences made with subtle and direct racism. To these experiences, East/West divisions do not apply—but discursively impact imaginaries.

13.7 Conclusion

Berlin's residential segregation is moderate to low, and not univocally increasing, especially not for people with migration background. Socioeconomic inequality by income was stable between 2007 and 2016 but could only be measured at the *Bezirke* level. On a smaller spatial scale, segregation for the working-age population was stable, but slightly increased for poor children. Contrary to public perception, segregation by foreigners/migration background decreased, especially for inhabitants with roots from Turkey and 'Muslim' states. Some pockets of poverty concentration shifted from (well-connected) inner-city areas to (worse-connected) outskirts.

Residential segregation does not necessarily mean social segregation, no more than that, residential mix means social mix. Statistical segregation in terms of where people fitting certain categories spend the nights may have little connection to their actual city use, although neighbourhood use may correlate with our role repertoires, and role repertories change over time (Blokland 2003). We suggested that social segregation, more than residential segregation, is what divides a city. A strong role in how Berliners use the city play, firstly, subtle forms of racism—a sign on a wall, a remark made loudly, a seat changed on the bus to not come near 'a migrant'. Secondly, the middle class, especially German and European, may engage in secluding practices when organizing their daily lives, securing the best resources for their own—excluding others as a consequence.

So social and residential segregation must be analytically separated, especially for understanding (the reproduction of) urban inequalities. We suggest that social segregation in Berlin is a more important theme than the statistical question of who sleeps where. Social segregation of the use of urban places and institutions in the city may influence the reproduction of disadvantage across groups and possibly generations.

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Chapter 14
Socio-spatial Disparities in Brussels and its Hinterland

Rafael Costa and Helga A. G. de Valk

Abstract Brussels' urban and suburban landscape has changed considerably since the 1980s. The consolidation of socioeconomic fractures inside the city, a reinforcement of long-lasting disparities between the city and its prosperous hinterland, as well as the increasing diversification of migration flows—both high- and low-skilled—contributed to these disparities. Recent evolutions of these patterns, however, have not been investigated yet and therefore remain unknown. Besides, the extent to which segregation is primarily related to economic inequalities and to migration flows—or a combination/interaction between the two—so far has not been studied. This chapter offers a detailed overview of the socio-spatial disparities in the Brussels Functional Urban Area. Our analyses relied on fine-grained spatial data, at the level of statistical sections and of individualised neighbourhoods built around 100 m x 100 m grids. We analysed socioeconomic segregation measures and patterns, as well as their evolution between 2001 and 2011. Socioeconomic groups were defined based on individuals' position with respect to national income deciles. In line with previous research, our results show very marked patterns of socioeconomic segregation in and around Brussels operating both at a larger regional scale and at the local level.

Keywords Brussels · Socioeconomic segregation · Inequality · Geocoded census data

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14.1 Introduction

Socioeconomic segregation, its origins and its consequences have attracted the attention of public policy and scientists alike. This also holds for Brussels, where the urban and suburban landscape has changed considerably since the 1980s with the consolidation of socioeconomic fractures inside the city, a reinforcement of long-lasting disparities between the city and its prosperous hinterland, as well as the increasing diversification of migration flows in terms of origin, occupations and socioeconomic position. Recent evolutions in these patterns, however, have not been investigated by the latest research and remain unknown. Besides, the extent to which segregation in Brussels is primarily related to economic inequalities and to migration flows—or a combination/interaction between them—so far remains unclear.

In this chapter, we provide a detailed overview of segregation patterns in Brussels and the hinterland and discuss whether and how these patterns can be linked to economic inequality and migration. We focus on the local level at Brussels' municipalities and the city's outskirts. This level of detail is needed as overall income inequality has remained relatively stable in Belgium over the past decades. Going beyond the national level and looking at processes of spatial inequality at a smaller, local-level scale can help us understand what is driving change or stability.

Our analyses are based on fine administrative units as well as individualised neighbourhoods. We first investigate socio-spatial inequalities in and around Brussels, in particular the residential segregation of high- and low-income groups. For this end, we rely on income data based on tax returns for 2001 and 2011 at the level of the statistical sections in the Brussels Functional Urban Area (FUA). We then concentrate on the deprived and affluent spots that have experienced the fastest improvements or deterioration of socioeconomic composition over the study period. This can help understand what is steering local-level disparities. The use of individualised neighbourhoods based on gridded data from the 2001 to 2011 Censuses allows us to take a closer look at these areas. Looking at socioeconomic segregation at a very detailed spatial level may shed new light on issues that remain unnoticed when taking a higher level of analyses.

14.2 Background

Brussels, such as other Belgian cities, is characterised by relatively high levels of socioeconomic segregation compared to other European cities (Musterd 2005). This is the result of both the specific migration history to the country and the housing policies in which homeownership is key. Housing policies in Belgium are characterised by a deregulated rental market, limited public housing and public policies focused on homeownership (De Decker 2008; Kesteloot and Cortie 1998). Social housing in Belgium in general and Brussels alike is limited and the public rental sector is not well developed. In fact, public housing accounts for only 8% of the housing stock in

Brussels, whereas one-third of the city's households meet the socioeconomic criteria to apply for social housing (Dessouroux et al. 2016). In turn, homeownership was and is seen as the preferred option for a family, whereas suburbanisation was facilitated by investments in commuting facilities. Stimulating homeownership resulted in large-scale suburbanisation and a decline of the inner-city neighbourhoods (De Decker 2008; Kesteloot and Van der Haegen 1997).

Suburbanisation was peaking in the 1960s, an economic boom time at which Belgium, like many other north-western European countries, started to recruit international migrants to fill in the ill-paid low skilled (mostly industrial) jobs (Kesteloot and Van der Haegen 1997; Kesteloot and Cortie 1998; Van Mol and de Valk 2016). These labour migrants mostly came from Italy, Spain, Greece, Morocco and Turkey, and they mainly settled in the central nineteenth-century neighbourhoods left behind by the Belgian middle-class (De Winter and Musterd 1998; Kesteloot and Van der Haegen 1997). Housing in these neighbourhoods was (and still is) characterised by cheap, low-quality dwellings that were part of the private rental market. Since then, migration from the mentioned countries continued, but other migrants, also from more affluent backgrounds, arrived in Brussels. These include a substantial share of European citizens coming to work in Brussels for the European and international organisations in the city (Corijn and Vloeberghs 2013; De Winter and Musterd 1998), mainly settling in the more affluent neighbourhoods of the city and the urban fringes. The different types of migration resulted in a spatial duality in Brussels. Figure 14.1 clearly shows how this is still the case today (Census 2011 data): migrants originating from European and those of non-European countries live in different parts of Brussels.

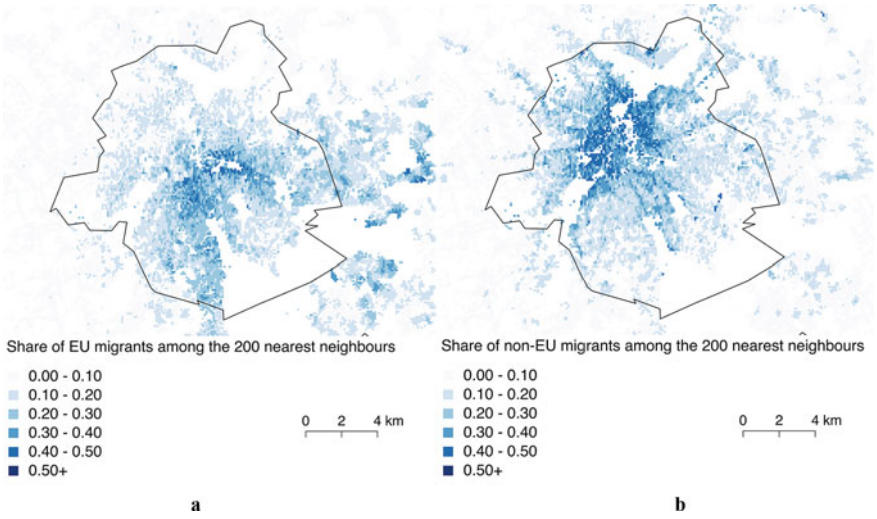


Fig. 14.1 The spatial distribution of European and non-European migrants in Brussels (2011) *Source* Own calculations based on the Census 2011 (Statistics Belgium)

The reported duality was reinforced during the economic transition to a post-industrial economy after the 1970s, which led to a polarisation in terms of settlement and labour market into those with high- and low-skilled jobs. Similar to many European cities, new urban jobs in the post-industrial economy were mainly taken up by high-skilled workers, while the low-skilled urban populations had less opportunities in the labour market. In the case of Brussels, high-skilled jobs were filled especially by suburban commuters and international workers (De Winter and Musterd 1998; Corijn and Vloeberghs 2013). On the other hand, migrants of Turkish and Moroccan origin living in the city were among the groups that suffered most from the urban economic changes. Upward mobility was most difficult for these groups not only due to their low education level but also because they are more likely to face discrimination in the labour market (Rea 2013) as well as in the housing market (Verstraete and Verhaeghe 2019). As such, they were forced to stay in the neighbourhoods where they had initially settled (Kesteloot and Cortie 1998). Research has shown that also to date, newly arrived migrants from non-European countries tend to settle in the same central deprived neighbourhoods, where the housing stock is older and cheaper, where socioeconomic conditions are worse, and where a strong ethnic concentration prevails (Van Hamme et al. 2016; Costa and de Valk 2018). Moreover, due to the lack of public housing in Brussels (and the resulting long waiting lists), these migrants mainly have to rely on the private rental market with the lowest-quality housing stock, often located in inner-city neighbourhoods previously occupied by the industrial workers and earlier migrants.

More recently, Brussels' central neighbourhoods have experienced gentrification processes. Since the end of the twentieth century, Brussels has increasingly attracted young, well-off households composed of childless couples or isolated individuals, mainly highly educated and coming from other parts of Belgium and Western Europe (Van Criekingen 2010). Typically, these households only spend part of their early adulthood in Brussels before relocating to more prosperous areas: the city is thus a stage in their professional and family trajectories (Van Criekingen 2010). These households tend to establish themselves in inner neighbourhoods originally inhabited by low-income households (many from foreign origin), attracted by their central location and cheap rental prices (Van Hamme et al. 2016). The intense coming and going of such households has led to the reinvestment of certain inner neighbourhoods, with a housing offer increasingly targeted at higher-income earners and escalating rental prices—which is facilitated by the deregulated housing market (Van Criekingen 2010). There is, therefore, strong demographic pressure and increasing competition in the rental market in central areas that concentrate deprived households and ethnic minorities. Whereas long-distance displacement of these groups is still limited (Van Criekingen 2009), some low-income households have been pushed to adjacent poor neighbourhoods (Van Criekingen 2008; Van Hamme et al. 2016). But other households find themselves trapped in their neighbourhoods and experience a deterioration of their housing conditions, ending up in lower-quality or overcrowded dwellings (Van Criekingen 2010). At the city level, these gentrification processes in Brussels' inner neighbourhoods may appear as a rise in the social mix since young

professionals share the space with low-income households, but at the local level, they certainly contribute to socio-spatial disparities.

In sum, segregation patterns in Brussels were shaped by urban economic transitions—similar to many other Western cities—combined with specific housing policies and migration background in Belgium. As a result, Brussels is marked by important socio-spatial inequalities inside the city as well as in respect to the hinterland.

In the more recent period, the persistent levels of socioeconomic segregation in European cities have been ascribed to the rise in income inequality produced by economic liberalisation since the 1980s and subsequent economic crises (Marcinczak et al. 2015). However, it is unclear to what extent this also holds for Brussels, as income distribution seems to have remained rather stable in Belgium over the last decades.

Belgium is among the countries with a relatively low level of income inequality worldwide, close to (or even lower than) the Scandinavian countries. The Gini coefficient for disposable income remained stable over time and varied between 30 and 26 in the time period 1995–2017, with even a recent downward trend between 2000 and 2017 (EU-SILC data via Eurostat 2019). In addition, Belgium was the only country in Europe in which the share of the national income captured by the top 10% earners did not increase since the 1980s (Blanchet et al. 2019; Decoster et al. 2017). The few existing studies suggest that, contrary to many other countries, economic liberalisation over the last decades and the economic crises of 1998 and 2008 did not increase overall income inequality in Belgium. This is believed to be due to institutional factors, namely a rigid system that regulates salaries and labour, as well as the importance of the trade unions (Valenduc 2017).

Compared to the national level, income inequality is higher in Brussels, as is the case for most large cities. For comparison, Brussels had a Gini coefficient of 36 in 2013, at a similar level as Paris, and slightly higher than the Scandinavian capitals (OECD 2019). It is unclear, however, how the income distribution evolved over the last decades. On the one hand, the protective systems regulating salaries and labour also hold for Brussels, and they would have prevented inequalities from rising in Brussels as well. On the other hand, it has been shown that the Brussels population in the lowest income decile has been losing purchasing power since the 1980s at a higher rate than the other income deciles (Kesteloot and Loopmans 2009). Furthermore, it is unclear to what extent changes observed in segregation are linked to changes in income distribution.

In the remainder of this chapter, we aim to produce a detailed update of the recent trends in segregation in Brussels and its hinterland. In addition, we look into how these trends are related to income inequalities and what other factors may be at play.

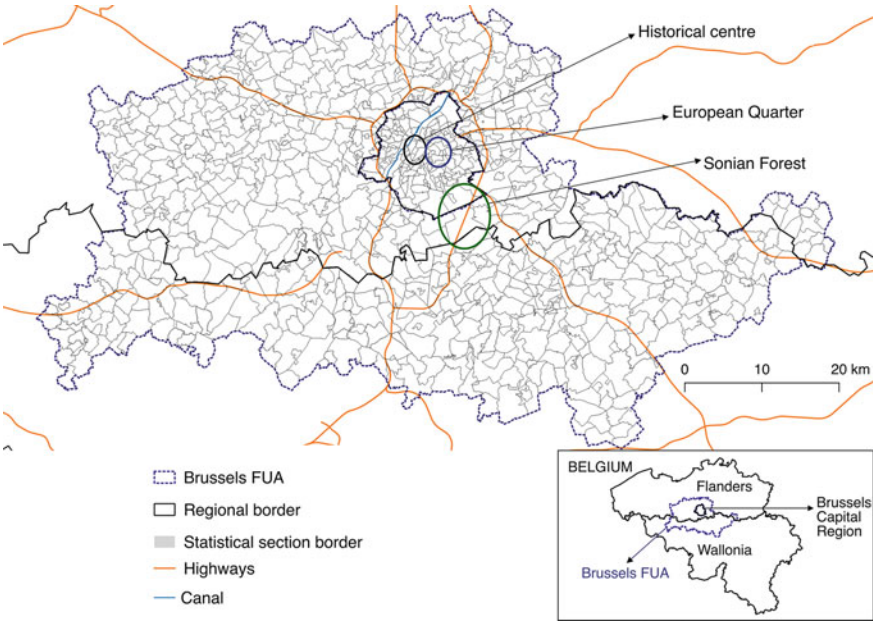


Fig. 14.2 The Brussels functional urban area

14.3 Space, Data and Methods

14.3.1 Space Delimitation and Spatial Units

We focus on the Brussels Functional Urban Area, as defined by the OECD (Fig. 14.2). This area covers a large surface encompassing 10% of the Belgian territory and making up for 23% of the country's population (2,531,106 inhabitants in 2011). It extends over the three administrative Regions of Belgium—Flanders, Wallonia and the Brussels Capital Region[1]—including French-speaking, Dutch-speaking and bilingual zones, and is marked by a highly diverse population in terms of culture and origin. In our analyses, we make use of two types of spatial units: administrative units and individualised neighbourhoods constructed around geocoded grids.

The administrative units chosen for this study are the 'statistical sections' (Fig. 14.2), which are intermediate units between the very small statistical sectors (or

[1]The Brussels-Capital Region is, in fact, one of the three administrative regions in Belgium. It is composed of 19 municipalities, among which is the City of Brussels. Throughout the text we do not make any reference to these municipalities or the City of Brussels; we refer to the Brussels-Capital Region simply as 'Brussels' or 'city'.

wards)[2] and the broader municipalities. The Brussels FUA contains 1,069 sections; from these, 180 were dropped due to the small number of inhabitants (<200 in 2001) in order to avoid random fluctuations. In the remaining 874 sections, the number of residents in 2011 ranged from 222 to 27,217 (average = 2,879; median = 1,546). In addition to sections, we use a nearest-neighbours approach in order to zoom in on the Brussels FUA. This approach implies that we start from geocoded individual data instead of areal units and use these data to construct individualised neighbourhoods with 200 nearest neighbours. These are fine-scale units that are independent of administrative borders (Fig. 14.1). The individualised neighbourhoods were constructed by dividing the territory into grids of 100 m by100 m (resulting in a total number of 79,588 grid cells in the FUA). We then used geocoded individual data to identify the population aged 25–64 inside each grid by their x–y coordinates. Individualised neighbourhoods were constructed for each grid with the EquiPop software (see Östh et al. 2015). This software adds up adjacent grid cells until it reaches the 200 nearest neighbours. If a given grid cell has more than 200 individuals (due, for instance, to the presence of apartment blocks), the software does not add up adjacent cells. Most of the resulting individualised neighbourhoods have around 200 working-age individuals, except for a few outliers.[3]

14.3.2 Data and Definitions

In Belgium, there are no complete data on the professional occupation. Such data are available from surveys but are not representative at a fine spatial level and are thus not suitable for our spatial analyses. Therefore, we use income data as an alternative measure of socioeconomic position. We start from an individual-level dataset containing individuals' position in national income deciles (obtained from tax returns). This dataset, based on the administrative census, contains all individuals residing in Belgium in 2011. Null incomes were excluded from our analyses as they comprise many international employees who do not pay income taxes in Belgium or accompanying spouses with no own income. Excluding them is necessary as otherwise, they would falsely appear in the statistics as being poor. After the exclusion of null incomes, we computed the proportion of sections' population aged 25–64 in each income decile in 2011. Note that the dataset contains individual income and not household income. This is a limitation because high- and low-income earners in the same household are counted separately, as if they were neighbours of different income levels.

[2]We chose not to work with the statistical sectors—which are the smallest spatial units available—because they are often too small: the median population of sectors in 2011 was only 429, whereas one-third of sectors had less than 200 inhabitants.

[3]The active population in individualised neighbourhoods range from 200 to 1,094, with a median of 205; 99% of these neighbourhoods have less than 315 inhabitants. Of note, in the computation of individualised neighbourhoods together with Statistics Belgium, we did not keep the original grids' population (prior to the aggregation of adjacent grids) for privacy reasons.

Table 14.1 Missing individuals by age group in 2001 and 2011 (%)

	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	Total 25–64
2001	25.88	19.41	13.15	9.55	7.13	5.14	4.68	3.77	12.52
2011	1.89	1.77	1.26	0.83	0.48	0.37	0.21	0.12	0.91

Source Own calculations based on tax returns data (IPCAL database) and censuses 2001 and 2011 (Statistics Belgium)

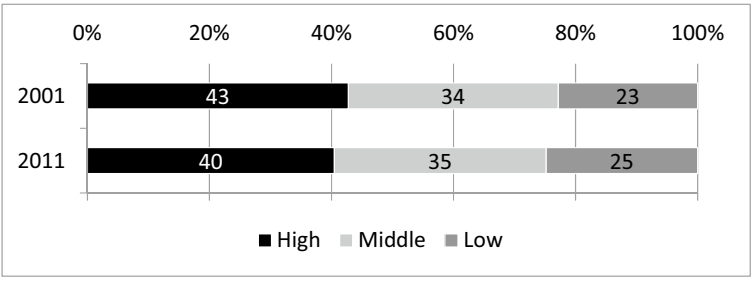
The individual-level dataset also contains past income deciles for individuals who lived in the same place in previous years. Using this information, we computed the share of sections' population aged 25–64 by income decile in 2001 as well. However, information is missing for a considerable number of individuals who lived elsewhere in 2001 (Table 14.1), and this concerns especially the young age groups who are more mobile. Besides, the dataset does not include individuals who were present in 2001 and not in 2011 (i.e. who emigrated or died). Hence, our income data at the section level for 2001 is incomplete and results for that year must be interpreted with caution. In particular, it is important to keep in mind that results for 2001 concern an older and less mobile population, and because of the absence of individuals in the early stage of their career, lower-income groups are likely to be underrepresented.

We defined three income groups as follows. The *high-income* group is composed of the working-age persons in the three highest deciles of national income (8th through 10th); the *low-income* group is composed of those in the three lowest deciles (1st through 3rd); and the *middle-income* group consists of the remaining deciles (4th through 7th). We also refer to *highest-* and *lowest-income* groups as the 10th and the 1st deciles, respectively. Figure 14.3 shows the distribution of the Brussels FUA's population by income groups and deciles. Income groups and deciles are based on the national income distribution, not the FUA's. This means that if income distribution in the FUA were identical to that at the national level, we would have 10% of the active population in each decile, and 30%, 40% and 30% in the high-, middle- and low-income groups, respectively. In 2011, high- and low-income groups comprised 40% and 25% of the FUA's population, respectively. Hence, high-income groups are over-represented in the Brussels FUA, while low-income groups are under-represented.

The distribution of the active population into income groups and deciles varied very little between 2001 and 2011. As expected, the low-income group was smaller in 2001 due to the absence of young, low-earner individuals; however, the difference is very small (only 2% points). This is reassuring for the comparison between 2001 and 2011.

At the level of individualised neighbourhoods, we had access to four indicators that refer to the 200 nearest neighbours for each 100 m $\times$ 100 grid: (i) *high education*: share of persons aged 25–64 with completed tertiary education (2001 and 2011); (ii) *employment*: share of persons aged 25–64 in employment (2001 and 2011); (iii) *high income*: share of persons aged 25–64 with income in the 10th decile (2011); and (iv) *poverty*: share of persons aged 25 and above with income below 60% of the national median income (2011).

a: High, middle and low income



b: National income deciles

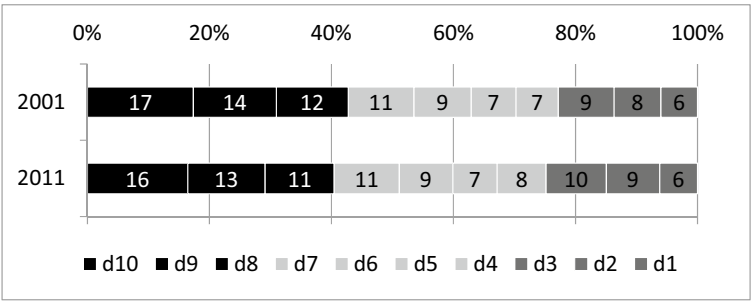


Fig. 14.3 Distribution of the Brussels FUA's active population by income group

14.3.3 Methods

We first focus on the statistical section level to assess segregation patterns using the same techniques as in the other chapters of this book (i.e. location quotients, socioeconomic classification of neighbourhoods, location of high-income earners and dissimilarity indices). Next, we go to a finer level using individualised neighbourhoods based on grid data. We locate the spots where change is happening faster since 2001, that is, affluent and deprived spots that have concentrated more affluent and deprived people between 2001 and 2011.

14.4 Findings

14.4.1 Location Quotients

Segregation in the Brussels FUA mirrors very marked spatial disparities, both inside the city and between the city and the hinterland. These spatial disparities can be

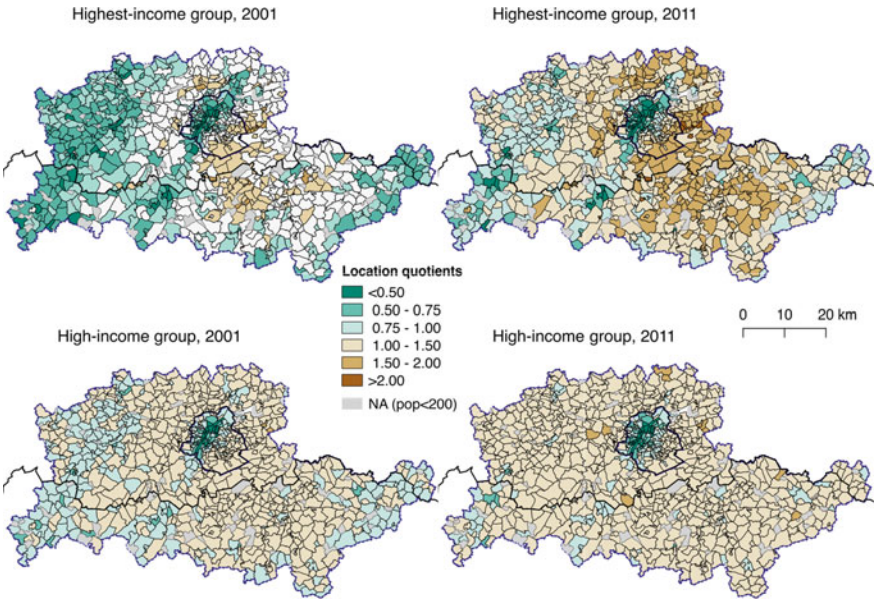


Fig. 14.4 Location quotients the highest-income group (10th decile) and high-income group (8th through 10th deciles), 2001 (left) and 2011 (right)

observed on the maps of location quotients (LQ) for selected income groups in 2001 and 2011 at the section level (Figs. 14.4 and 14.5). The maps report LQs for high- and low-income groups as well as for the highest and lowest income deciles separately. Income groups are underrepresented in the sections depicted in shades of green, and they are overrepresented in sections depicted in shades of brown. The maps reveal marked spatial patterns of segregation. The most obvious pattern is the central zone located north-east of the Brussels historical centre, known as the 'Poor Croissant'. It has the highest concentration of low-income earners and the lowest concentration of high-income earners. This zone stretches along the canal in the nineteenth-century working-class neighbourhoods, which have been inhabited by deprived households since the last decades. Many of these households are of non-European origin (Fig. 14.1). In fact, these are very dense neighbourhoods: areas with LQ > 1.5 of lowest-income decile in 2011 represent only 4% of the statistical sections, but they have 15% of the FUA's population. High-income groups, in turn, have relatively lower LQ values; that is, affluent households seem to be more scattered in less dense areas. Finally, as we would expect, the spatial patterns are the clearest for the highest and lowest income groups.

Furthermore, there is a clear socioeconomic duality between the city and the hinterland. The concentrations of high-income groups are located in peripheral areas, in particular the zone extending south-east from the city centre and into the Flemish region. These are traditionally affluent neighbourhoods dominated by single-family dwellings and green zones. The duality between the city and the hinterland seems

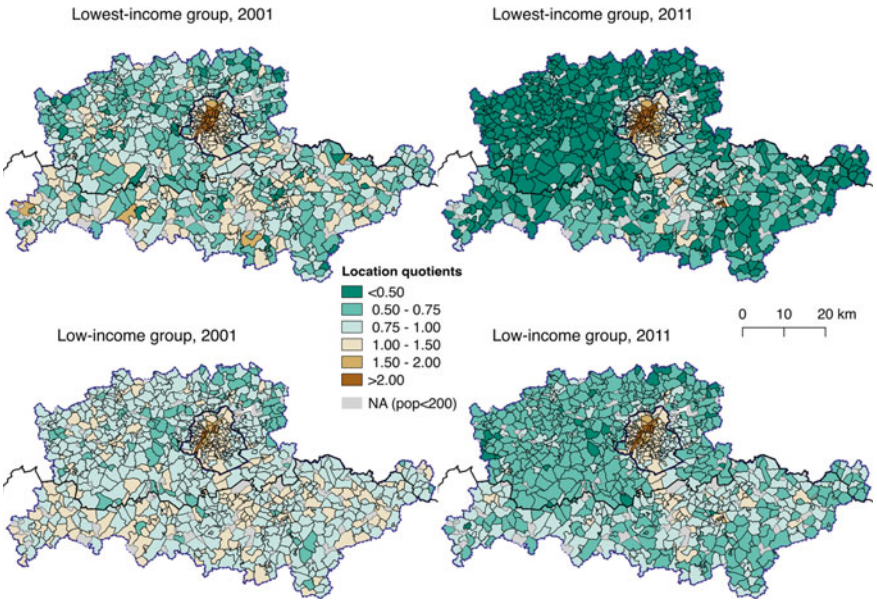


Fig. 14.5 Location quotients of the lowest-income group (1st decile) and low-income group (1st through 3rd deciles), 2001 (left) and 2011 (right)

to have become more marked in 2011 compared to 2001, especially for the highest and lowest income groups.

14.4.2 Income Classification of Neighbourhoods

The segregation patterns in the Brussels FUA are synthesised in the maps in Fig. 14.6, which depict the income classification of neighbourhoods[4] for 2001 and 2011. These maps are consistent with those observed for LQs: they show the duality between the city and the hinterland, with deprived neighbourhoods in central areas and affluent neighbourhoods in the suburbs.

In fact, the socioeconomic geography in 2011 follows a concentric pattern. Low-income earners are clustered in the area stretching along the canal, west from the city centre ('Low'). As we move away from this area, socioeconomic conditions improve. The immediate surroundings have a somewhat lower concentration of low income-earners ('Low to middle'), followed by a layer of neighbourhoods with mixed socioeconomic status. These mixed neighbourhoods extend over a large portion of the Brussels-Capital Region. They are followed by a layer of affluent neighbourhoods

[4]The income classification of neighbourhoods is based on the proportion of income groups in the sections. Income groups are those defined in Sect. 14.3.2. The neighbourhood types were obtained using the same criteria as elsewhere in this book.

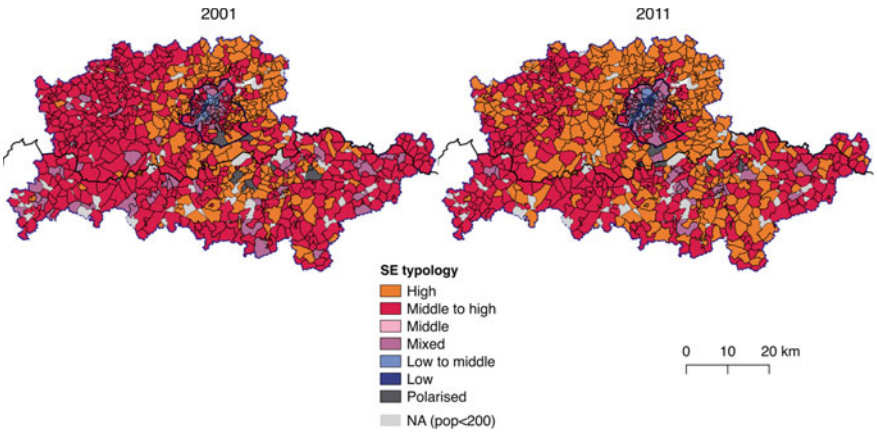


Fig. 14.6 Socioeconomic classification of neighbourhoods in 2001 (left) and 2011 (right)

that surrounds the city. Finally, the rest of the Brussels FUA—further away from the city and its immediate surroundings—is marked by the presence of middle to high-income earners. These general patterns did not vary much between 2001 and 2011, although socioeconomic contrasts became more evident with the demarcation of extreme types ('High' and 'Low'). Finally, it is interesting to notice that that 'Middle SES' neighbourhoods are all but inexistent in the Brussels FUA.

14.4.3 Location of High-Income Earners

As we have seen, the strongest clusters of high-income earners are located in peripherical neighbourhoods around the city, whereas the city itself is dominated by low-income and mixed neighbourhoods. However, this does not mean that the city has fewer high-income inhabitants compared to the hinterland. In fact, it is inside the city that we find the largest absolute numbers of high-income earners (Fig. 14.7). Many of the statistical sections in the first quintile of high-income inhabitants are located in the Brussels mixed neighbourhoods—particularly east from the canal area. This is due to the fact that Brussels is much more densely populated than the hinterland and high-income earners live mixed with or close to low- and middle-income earners. Between 2001 and 2011, the number of sections in the first quintile of high-income earners decreased from 50 to 46; this indicates that high-income earners became more concentrated. Moreover, high-income earners became more and more present in the European Quarter over the study period. These findings are in line with the influx of young high-earners (many from European origin) in Brussels' central neighbourhoods, in particular, the historical centre and around the European Quarter (Van Criekingen 2010; Van Hamme et al. 2016; see Sect. 14.2 and Fig. 14.2).

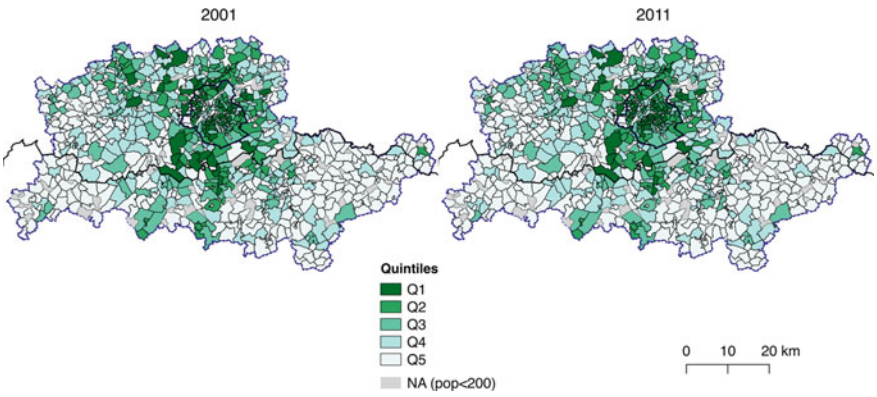


Fig. 14.7 Location of high-income earners (8th through 10th deciles) in 2001 (left) and 2011 (right)

14.4.4 Dissimilarity Indices

Table 14.2 presents dissimilarity indices (DI) between income groups and income deciles in 2001 and 2011. Not surprisingly, segregation is highest between top- and low-income groups. In 2011 the highest-income group (d10) was by far the most segregated from middle- and low-income groups. Due to the limitations in our data for 2001—namely the underrepresentation of young individuals—evolutions over the period must be interpreted with caution. Still, it is telling that DI values in the Brussels FUA increased substantially and consistently between income groups and between most income deciles. DI values for low-income groups increased by more than 70% over the period with respect to both middle- and high-income groups. However, this could be partly due to the structure of our data in which low-income

Table 14.2 Dissimilarity indices (multiplied by 100) between income groups (top of the matrix: 2011; bottom: 2001)

	d10	d9	d8	d7	d6	d5	d4	d3	d2	d1	HIGH	MID	LOW
d10		13	20	19	25	30	35	39	40	42			
d9	9		10	9	14	19	24	28	29	33			
d8	15	10		7	8	12	16	20	21	25			
d7	12	8	10		9	14	19	23	25	30			
d6	15	10	9	7		7	11	16	18	25			
d5	16	11	8	8	6		7	11	13	22			
d4	20	15	11	12	9	7		7	10	20			
d3	23	17	12	15	12	10	6		7	18			
d2	23	18	12	17	14	12	10	8		12			
d1	27	24	18	24	23	22	22	19	14				
HIGH												16	28
MID											14		16
LOW											16	9	

groups were underrepresented in 2001. On the other hand, segregation between (the more reliable) high- and middle-income groups remained stable over the period.

If we look at income deciles, some interesting differences appear. DI scores for the highest income group (d10) increased by more than 50% in respect to deciles d1 through d7. Such substantial increases are also observed between higher-income deciles (d7 through d10) and middle- to low-income deciles (d5 through d3). The fact that DI became consistently higher, also among middle- and high-income deciles, suggests that there was indeed a rise in segregation from 2001 to 2011.

14.4.5 The Local Spots of Change

Next, we take a closer look at the socio-spatial disparities in the Brussels FUA using individualised neighbourhoods. These are built with a nearest-neighbours approach based on 100 m × 100 m grids (see Sect. 14.3). At this fine level of spatial detail, it is possible to locate the affluent and deprived spots where socioeconomic change is occurring more rapidly. In order to identify these spots, we use four indicators: the share of persons with *high income* (2011), the share of persons at risk of *poverty* (2011), the share of persons with *tertiary education* (2001 and 2011) and the share of persons in *employment* (2001 and 2011) among the 200 nearest neighbours (see Sect. 14.3.2).

Figure 14.8a, b depict the distribution of high income and poverty in 2011. The results are consistent with the findings at the statistical section level, yet they give a more nuanced and detailed picture of socio-spatial disparities in the Brussels FUA. These fine-grained measures are independent of administrative boundaries; furthermore, they allow the observation of the places that are actually inhabited. Poverty is highly clustered in dense central neighbourhoods: there is one contiguous zone around the historical city centre where the poor account for more than 40% of working-age residents and where high-income earners are all but absent. These are the old industrial neighbourhoods marked by bottom-quality dwellings from the private rental market; they are since long occupied by low-income households, many from the foreign origin (see Sect. 14.2). In contrast, clusters of high-income earners are scattered over populated areas, especially towards the southeast of the city, around the Sonian Forest.

We classified individualised neighbourhoods by a combination of two features: advantaged/disadvantaged and improving/deteriorating (Fig. 14.8c). An individualised neighbourhood is considered advantaged (disadvantaged) if high income in 2011 is in the top (bottom) quartile *and* poverty in 2011 is in the bottom (top) quartile. Moreover, a neighbourhood is considered to be improving (deteriorating) if the proportion change in tertiary education *and* employment between 2001 and 2011 is in the top (bottom) quartile.[5] For instance, a neighbourhood that is 'advantaged &

[5]Tertiary education and employment are the only SES variable at our disposal in 2001 and 2011. Tertiary education in 2011 is highly correlated with high incomes ($r = 0.83$) and in a lesser extent

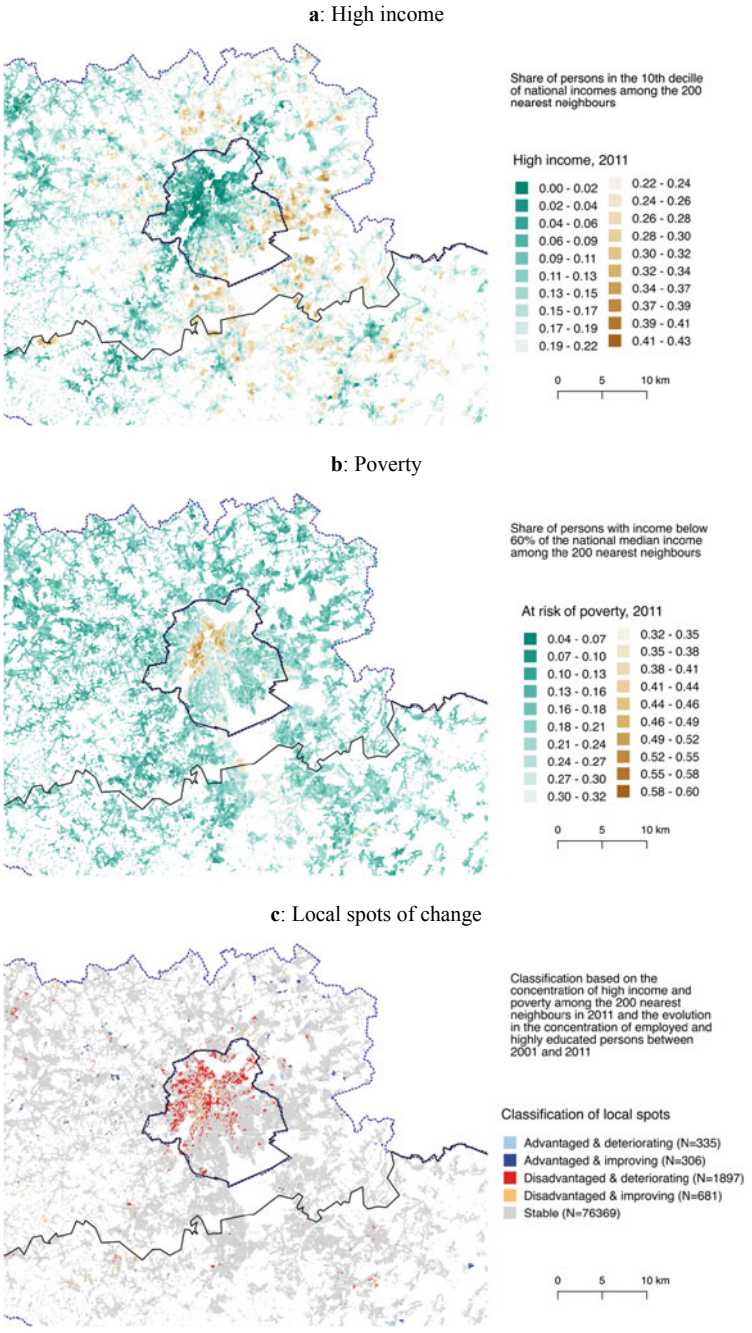


Fig. 14.8 Income distribution by the grid (individualised neighbourhoods)

improving' is *at the same time* among the highest shares of high incomes, the lowest shares of poverty, and the highest improvement in tertiary education and employment. All the individualised neighbourhoods that fall out of the four combinations of advantaged/disadvantaged and improving/deteriorating are considered 'stable'.

The resulting map (Fig. 14.8c) reveals interesting patterns. Disadvantaged spots (both improving and deteriorating) are much more frequent than advantaged ones and the vast majority of them are located within the city. Disadvantaged and deteriorating spots are by far the most frequent type and extend over contiguous zones in and around the city centre, but not in the most deprived neighbourhoods identified earlier. Instead, the most deprived neighbourhoods ('Poor Croissant') are marked by disadvantaged and improving spots. Although these neighbourhoods continue to concentrate the highest proportions of poor households, there seems to be a change in composition locally with an increase in highly educated inhabitants in employment. It is likely that gentrification contributes to these processes of improvement and deterioration of central areas. On the one hand, improvements in socioeconomic composition in the most deprived neighbourhoods may be stirred by new real estate projects in the canal area targeted at young, socially advantaged households; on the other hand, socioeconomic deterioration in adjacent poor neighbourhoods could be partially due to the arrival of low-income households pushed away from gentrified spots in the city centre, thus relocating to less-gentrified affordable neighbourhoods (Van Criekingen 2008; Van Hamme et al. 2016). In contrast to disadvantaged spots, advantaged spots are much less numerous and are scattered outside the city borders: these are isolated spots, each encompassing no more than (portions of) specific streets in wealthy neighbourhoods. In sum, there is a certain stability in wealthy neighbourhoods, whereas change—both improvement and deterioration—is happening faster inside the city among the already deprived neighbourhoods.

Between 2001 and 2011, there was a substantial change in the migration background in deteriorating spots. The average proportion of non-European migrants halved over the period in 'disadvantaged and improving' spots (from 14.2 to 7%), while it doubled in 'disadvantaged and deteriorating spots (from 13.4 to 24.5%). This could indicate that improving spots have attracted Belgian and European households, whereas low-income households of non-European origin have been moving away from gentrified spots towards other deprived neighbourhoods. Of note, the proportion of migrants is very small in the spots that are 'advantaged and improving' (less than 3%).

with poverty ($r = –0.33$). Employment is fairly correlated both with poverty ($r = –0.59$) and tertiary education ($r = 0.53$).

14.5 Discussion

This chapter offers an overview of the socio-spatial disparities in the Brussels Functional Urban Area. Our analyses relied on fine-grained data, at the level of statistical sections and of individualised neighbourhoods built around 100 m × 100 m grids. We analysed socioeconomic segregation patterns and levels in 2001 and 2011 with different methods and using data on income, education and employment. The analyses carried out here provide an update on the situation based on the latest available data and go beyond that of previous studies by using individualised neighbourhoods based on grid data. In line with previous research, our results show very marked and persistent patterns of socioeconomic segregation in and around Brussels, operating both at a larger geographic scale and at the local level.

At the large-scale level, there is a clear divide between deprived central neighbourhoods and prosperous outskirts. Low-income groups are highly clustered in dense neighbourhoods in and around the city centre. In fact, around 15% of the Brussels FUA total population lives in central neighbourhoods where the low-income group is overrepresented (LQ ≥ 1.5). In turn, high-income groups are more sparsely distributed in the south-east neighbourhoods of Brussels and across most of the hinterland. These large-scale patterns of segregation, with a poorer centre and prosperous suburbs, are typical in Belgium, also for other cities; they are due to specific long-term territorial processes and housing policies (see also Costa and de Valk 2018).

Below these large-scale disparities, segregation processes operate at the local level, especially inside the city. Low-income groups are highly clustered in the neighbourhoods around the historical centre—the so-called 'Poor Croissant'. These are the old industrial neighbourhoods, with low-quality dwellings and which also concentrate a large share of migrants from non-European countries. Apart from these poor neighbourhoods, the largest portion of the city is composed of mixed neighbourhoods (with 25–50% of each low-, middle- and high-income group). Interestingly, these mixed neighbourhoods are home to the highest absolute numbers of high-income earners of the Brussels FUA. In contrast with their suburban counterparts, this urban elite share their space with the middle class. Finally, we also find clustering of high-income earners in the green south-east part of the city, where single-family dwellings are most frequent.

Due to limitations with regard to the data on income we have at hand, it is a bridge too far to decisively conclude that segregation levels increased between 2001 and 2011, although our analyses point in that direction. In all cases, our findings show the tenacity of the same patterns of segregation in Brussels over time. Moreover, below these persistent patterns, change seems to take place at the local level in the already deprived areas inside the city. Most of these areas have been deteriorating over time in terms of socioeconomic composition; but interestingly, the most deprived neighbourhoods from the Poor Croissant have improved over the study period.

Although we know that inequalities measured by the Gini coefficient at the national level remained stable, it is yet unclear whether income inequalities have

increased in the Brussels FUA over the last decades. Either way, it is unlikely that variations in income inequalities are the primary cause of the observed segregation patterns. Rather, the persistence of these patterns in Brussels may be driven by migration patterns influencing socio-spatial inequalities, as well as specific housing policies.

First, international migration may fuel the existing segregation patterns (Van Hamme et al. 2016). On the one hand, it is likely that many non-European migrants with a low socioeconomic position establish themselves in the most deprived neighbourhoods. Not only do these neighbourhoods offer affordable housing (albeit of low quality), they can also be an easier gateway to the city because of the existing ethnic networks as well as language (and commercial) facilities. In addition, discrimination in the housing market may limit the residential choices of non-European migrants and thus their access to other neighbourhoods (Verstraete and Verhaeghe 2019). Our results have shown, indeed, that the most deprived neighbourhoods are also those which concentrate the highest proportions of non-European migrants. On the other hand, newly arrived international professionals are likely to choose neighbourhoods with a high proportion of expats, especially those in the European Quarter. These neighbourhoods are close to many international institutions and also to the city centre. In addition, real estate agencies operating in expats networks often attract newcomers to these areas. This explanation is supported by our finding that there was an increase in the top-income group settling in the European Quarter since 2001. In sum, if newcomers establish themselves in the typical concentration neighbourhoods according to their socioeconomic position and transnational networks, their residential choices (or lack thereof) are likely to maintain and even reinforce the existing segregation patterns.

Second, internal migration can also contribute to the observed segregation patterns. Whereas low-income groups are often forced into deprived neighbourhoods, higher-income groups have the choice to live in well-off neighbourhoods. As our results suggest, the richest 10% are by far the most segregated group and are highly clustered in specific spots. In addition, Brussels' central neighbourhoods have increasingly attracted highly educated youngsters who spend a part of their early adulthood in the city, before moving to outer neighbourhoods (Van Criekingen 2010; Van Hamme et al. 2016). The constant renewal of these transient residents has led to reinvestment in central neighbourhoods and consequently to gentrification processes (Van Criekingen 2008, 2009). The increasing competition in the housing market and the resulting rise in rental prices have forced low-income households that stayed in these neighbourhoods into more precarious conditions, while many relocated to other central neighbourhoods with more affordable rentals. These processes are supported by our analysis of local spots of change: some spots in the most deprived neighbourhoods have improved their socioeconomic composition over time—likely due to the arrival of better-off young households—whereas many other central areas have deteriorated their socioeconomic composition—probably aided by the residential move of low-income households coming from gentrified neighbourhoods. All in all, these

selective residential moves might be contributing, at a large scale, to a greater socioeconomic mix in Brussels as a whole, but at the same time, at the local level, they might be fuelling socio-spatial fractures in central neighbourhoods.

Third, the housing market and housing policies do not seem to be effective in reducing socio-spatial disparities, and may even reinforce them. Belgium is characterised by liberal housing policies with a deregulated rental market and a focus on homeownership (De Decker 2008). Deprived neighbourhoods are dominated by bottom-quality dwellings in the private rental market, whereas the affluent neighbourhoods are dominated by owner-occupied dwellings. At the same time, social and public housing remain marginal in Brussels and is way below the population needs, which results in long waiting lists (Dessouroux et al. 2016). More recently, it is likely that regional (neoliberal inspired) housing policies in Brussels have favoured the emergence of large real estate projects targeted to the young middle- and upper class (Decroly and Van Criekingen 2009). These projects are especially situated in the remaining available spaces in the canal area. This could explain our finding that in some deprived local spots in this area, socioeconomic composition has improved since 2001. Such local-level processes driven by liberal policies and private investments may increase and fuel local inequalities.

It is difficult to determine what ultimately drives socio-spatial inequalities at the local level. Local concentrations of socioeconomic groups can be easily altered by small changes, for example, in the housing stock and in population composition due to in- and out-migration or social mobility processes. Future research should make use of longitudinal micro-data linked with fine-grained spatial information in order to understand how individual mobility and migration background interact with the existing segregation patterns as well as how they act to reinforce or attenuate them over time. This type of detailed analyses is much needed and could help clarify the underlying causes of socioeconomic fractures and point to policy interventions that may counteract high socio-spatial disparities and its determinants in Brussels.

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Chapter 15
Residential Segregation in a Highly Unequal Society: Istanbul in the 2000s

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Abstract Contrary to trends in many European countries, income inequality in Turkey, measured by the Gini coefficient, has declined between 1994 and 2014, with a small but consistent increase since then. Turkish income inequality is among the highest in OECD countries, with levels not lower than 0.4. This chapter will examine residential socio-economic segregation in Istanbul against the backdrop of this relatively stable and high-income inequality. The chapter shows signs that residential segregation is on the rise. Istanbul has undergone a radical change in the 2000s thanks to active intervention by the state in the real estate market by opening up large pieces of land in the outskirts and gentrifying inner-city areas once occupied by unauthorized settlements that once were home to the poor. Dynamics of urban development, fueled by rapid urban sprawl in peri-urban areas and ceaseless gentrification of inner-city areas, gave way to diverse patterns of segregation depending on the already existing divisions and physical geography of cities. Given the lack of neighbourhood level data on either occupations or income, this chapter analyses segregation through indices based on fertility and educational level, which we know from detailed household microdata are closely correlated with income. On the basis of 2000 and 2017 neighbourhood data, we show that in Istanbul, there is a clearly visible pattern where the poor are progressively pushed further to the city limits, while some parts of built-up areas once home to middle classes, were recaptured by the poor. The result in some parts of the city is a juxtaposition of seemingly conflicting patterns: parts of the inner city were reclaimed by the poor while some parts were gentrified led by the nascent urban elite. The urban periphery was partly occupied by the bourgeoning middle classes and was also home to the urban poor who were displaced by urban transformation projects.

Keywords Istanbul · Residential segregation · Urban renewal · Neoliberal urbanisation

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15.1 Introduction

Turkey is a land of vast and enduring inequalities. Ever since the first reliable studies were made on income inequality in the late 1960s, the Gini coefficient has not fallen below 0.4 except a few years in the early 2000s, making Turkey one of the most unequal countries in the OECD, and placing it somewhere between European countries with relatively low levels of inequality and Latin American countries where income inequality has been notoriously high. In the face of a state unwilling to take active measures to reduce inequality, the society devised many ingenious ways, especially in the urban labour and property markets, to cope with high levels of inequality and to keep at bay the tensions that may arise therefrom. Things went well till the 2000s and the poor were able to find a place to live for themselves in the rapidly bourgeoning urban property market thanks to networks of solidarity they set up, spanning in most cases the boundaries between the formal and informal and authorised and unauthorised. Thanks to the innovative survival strategies of the urban poor, the problems that are often associated with high inequality and residential segregation went unnoticed for most of society.

The 2000s have been frantic years in terms of urban development in all large cities in Turkey, a period when the mechanisms devised by the urban poor proved inefficient, and the state that had been a silent partner became an active agent in the housing and urban property market. Given the voracious desire on the part of the state to appropriate ever-increasing land values in many gargantuan projects, the poor found it increasingly difficult to maintain their positions in the city and were driven to the city limits where they had to compete with many other agents for land and shelter, finding themselves unable to use space as means of power as they had done in previous periods.

This chapter is an attempt to assess how already high levels of residential segregation have changed in line with the massive urban restructuring of the 2000s. The objective is to understand how the construction frenzy and urban sprawl of the 2000s were articulated with the existing pattern of residential segregation inherited from earlier periods of urban development. Starting with a summary of the basic contours of urban development in Turkey, the chapter discusses the problems of studying segregation with limited available data in Istanbul, where the physical geography has a strong impact on almost every urban process, including residential segregation.

15.2 Background: Frantic years of 2000s

Compared to the 2000s, urban development in Turkey in the pre-2000 period was certainly a calm process, which ensured that some of the big problems encountered by similar countries undergoing a rapid process of urbanisation were solved without causing large-scale unrest. The basic characteristics of this period can be described succinctly in a few statements: An informal job and urban property market which

guaranteed that the ceaseless flux of newcomers would easily find a job and a shelter thanks to the networks of solidarity they set up, though the jobs they found were as shaky as the squatters they built up for themselves on vast state land, mostly at the periphery of cities; a populist-clientelist state apparatus, incapable of responding to the needs of these newcomers, that happily turned a blind eye, in exchange for their votes, to people who squat illegally on state land or who run informal businesses (Işık and Pınarcıoğlu 2009). Things did really go well both for the urban poor and the state till the late 1990s; by exploiting the opportunities of the informal labour and real estate markets, the urban poor were able to transfer part of their poverty conditions to newcomers and thus to climb up the social ladder into the ranks of the rapidly growing middle class. This undeclared alliance between the state and the urban poor secured a decent place for the latter while the politicians were able to maintain their position, thus laying the foundations for a more repressive and populist political climate in the 2000s.

This tacit alliance, whereby the urban poor made use of the informal labour and property markets as leverage to cope with the prevailing levels of inequality, came to an end in the late 1990s due to several intertwined processes. The reasons behind the collapse of this alliance and the ensuing changes that Turkish society has gone through in the 2000s are too large to be summarised in a few words. The 2000s can be best described by rising to the power of the Justice and Development Party (JDP), an Islamist-leaning party, and their desire to mould the society in their vision, in a way described by some rightfully as the marriage of Islamism and neo-liberalism (Gürcan and Peker 2015; Karaman 2013a; Atasoy 2009) with strong populist overtones. The JDP and local governments launched an ambitious 'urban transformation programme' through public–private partnership schemes in most large Turkish cities, under the strong support of the state-run housing administration (TOKI). TOKI undertook huge housing projects at the outskirts of cities and played a leading role in the clearance of formerly unauthorised housing areas in inner cities where land prices had soared (Türkün 2011; Karaman 2013b). TOKI became the most powerful agent in the real estate market, by acquiring the right to transfer public land to private developers for the construction of housing estates on the outskirts through public–private partnership scheme with titles delivered to prospective buyers. In a country where owner-occupation is the rule (nearly 2/3 of the existing stock is owner-occupied) and public housing ownership is an exception, projects undertaken through public–private partnership programmes such as those by TOKI fuelled the fragmentation of the housing market. It is estimated that some 66 million square meters of state land were transferred to TOKI between 2002 and 2008. In inner-city areas, TOKI helped clear former squatter areas and residents' property rights were transferred to housing projects far from the city centre. When considered in combination with the privatisation frenzy of the JDP and their obsession with grandiose urban projects (including renovation of former shipyards, ports and railway stations and large-scale urban renewal projects, shopping malls, colossal luxury hotels and gated communities), this heralded the end of a long period in Turkish history of urbanisation where the migrating masses had used their networks of solidarity as a survival strategy under the harsh conditions of persistent inequality. Devoid of any chance and means to

secure a place for themselves in the property market, the poor were gradually pushed further out of the city and found only limited space of manoeuvre in inner-city areas where the urban elites had no interest for. The urban middle classes seized every opportunity they found and were the main beneficiaries of new housing schemes in both central and peri-urban areas where the poor had been displaced. The nascent urban elites, on the other hand, found themselves unrivalled in both the peri-urban and inner-city areas and continued to live in now poor-proof neighbourhoods.

Figure 15.1 shows the evolution of the Gini coefficient since the late 1980s. With the exception of 2005 and 2014, the Gini has been above 0.4, exhibiting an upward trend in the last few years. In the case of Istanbul, for which we have reliable data only after 2006, the Gini coefficient has been somewhat lower than the one for Turkey but started to rise sharply after 2014. In Istanbul, income inequality seems to have registered a record jump after 2015 and surpassed the Gini of Turkey.

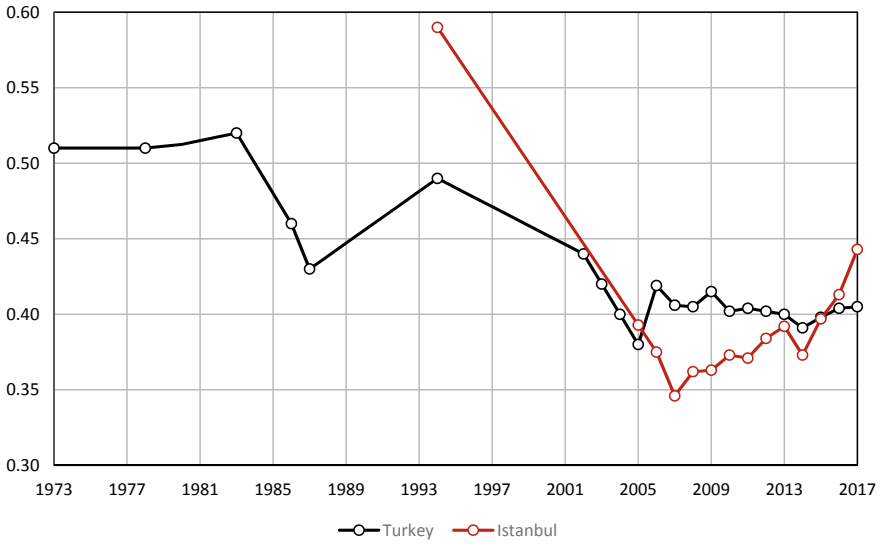

Fig. 15.1 Income inequality in Turkey and Istanbul: Gini Coefficient*. *Source* **a** Figures before 1986 from TurkStat Household Income and Consumption Expenditures Survey, 1986
b 1994 figures from TurkStat Household Income Distribution Survey
c 2002–2017 results from TurkStat Income and Living Conditions Survey
*TurkStat started carrying out income distribution surveys on a regular basis in 2002. The figures obtained after 2002 are reliable and in compliance with EU standards. However, there are significant methodological differences between surveys made before and after 2002. Post-2002 surveys used equivalised disposable income as their basis, while no equivalisation was made for surveys made before then. Therefore, it is reasonable to assume that pre-2002 household surveys tend to overestimate income inequality slightly. The figures before 2002 must therefore be treated with some caution

15.3 Studying Segregation in Istanbul

The study of segregation in Istanbul is beset by a number of difficulties. The first set of problems originates from the fact that Istanbul is literally a city in flux, a site of a never-ending process of creation and destruction. Its population rose from 7.2 million in 1990 to 11 million in 2000 and finally to 15 million in 2017. This refers to an annual growth rate of no less than 2% on most occasions, a rate which is difficult to imagine for many cities of the West. In a similar fashion, the number of neighbourhoods increased from 550 in 2000 to some 780 in 2017, making the measurement of segregation and comparisons over time an arduous task.

The second set of difficulties arises from the unique geographical setting of the city. Built on two continents (Europe and Asia), with an extremely busy seaway (Bosporus) in between connecting Balkan countries and Russia to the rest of the world, Istanbul is divided into two distinct geographical units. For the study of settlement and segregation patterns, this means that Istanbul is destined to be a polycentric city, with each geographical unit having its core and peripheral areas (Dökmeci and Berköz 1994). The uneven distribution of population between these two parts (nearly two-thirds living on the European side and one-thirds on the Asian side) generates an immense volume of traffic and development pressure for the whole city. Fifteen million people squeezed on a piece of land slightly larger than 5,000 km^2 and the existence of numerous naturally and historically important sites in and around the city make land the most precious commodity for Istanbul. Fierce competition for land contributes to the emergence of a segregation pattern resembling a patchwork, especially at the periphery.

Though not peculiar to Istanbul but common to all cities of Turkey, the main challenges arise to those interested in the study of segregation, mostly due to the limited availability of geocoded data. Given the absence of appropriate spatial data and the fact that most cities are in a constant process of building and destruction, one has to find some innovative and particularly indirect ways to decipher the pattern of segregation observed in Turkish cities. It is to this problem of data and methodology that I turn briefly in the following section.

15.4 Data and Method

Although Turkey has gone a long way in the 2000s in assuring the quality of statistical data, there is still a long way to go in what may be called small area statistics. Designation of functional urban areas and NUTS areas has yet to be completed. The only spatial unit where data is available for cities is the ambiguous level of neighbourhoods (*mahalle*). *Mahalle* does not have a clear definition in the administrative system, nor are there any known limits to its population and size. In the case of Istanbul, the population of neighbourhoods in 2017 varied between 50 and 93,000,

with an average of 15,600. Furthermore, local governments may—and usually do—change the number and boundaries of neighbourhoods without any restriction. This generates problems concerning the comparability of datasets, an issue discussed below in relation to dissimilarity indices.

Neighbourhood level data are gathered through the Address-Based Population Registration System (ABPRS). The ABPRS provides only very basic information about the population-merely the educational level and age distribution by gender. No information is available on the occupational status of the population, or on working conditions. With this very limited data, one has to be creative in analysing segregation patterns in Istanbul. With the purpose of finding out which of the few variables available at the neighbourhood level are correlated with income and social status, and thus drawing out the segregation map of Istanbul, 2016 household budget survey microdata sets were used. This data from TurkStat is used for analysing the income distribution and consumption, and information is available on households and individuals. If any of the available ABPRS data is correlated with income and/or socioeconomic status, we can use it as a proxy for socioeconomic status and use it to study residential segregation.

Of the information accessible through the ABPRS, the most promising defines education data, as there is a strong positive correlation between educational attainment and income level. Figure 15.2 summarises the relationship between income and other sets of variables to find out the extent to which they can be used as a proxy for income. The top left figure shows the educational attainment of the adult population (population over the age of 25) by income deciles. Here the educational level is grouped into four categories: no formal education represents those who

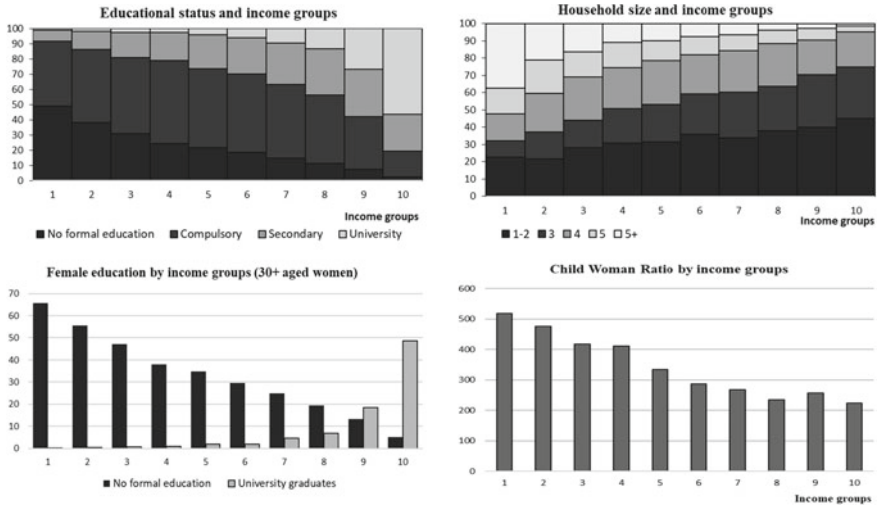

Fig. 15.2 Selected variables and income groups by deciles, 2016. *Source* Calculated from TurkStat, 2016 Household Budget Survey microdata set

have not completed any formal education; the second category represents those who have completed only the compulsory 8-year elementary school; and the other two categories of education are for those who have completed secondary school and university. The figure shows a clear positive correlation between educational level and income level. The share of university graduates is higher than 56% in the 10th decile while it is as low as 1.2% at the lowest. The percentage of those who have completed only compulsory education shows the opposite trend-high in low-income groups and low in high-income groups (43% and 17% respectively). Of course, the relationship between educational status and income or in general socio-economic status is a complex one and is not as straightforward as this figure might imply. But the analyses show that educational level can safely be used as a proxy for the level of income as there is a clear tendency for income to rise with rising education level.

The other variables that can be used as a proxy for income and socio-economic status are also shown in Fig. 15.2. The top right graph shows the relationship between household size and disposable household income by deciles. The better-off households are usually smaller, while low-income groups tend to live in larger households. One to three-person households make up two-thirds of the highest income decile, but their share drops to one third in the lowest decile. The fact that well-to-do families are smaller in size may be regarded as an indication of differences in fertility between low and high-income households. The bottom right graph shows the relationship between the child–woman ratio (CWR) and income level. CWR is defined as the number of children under the age of 5 per 1000 women of reproductive age (ages 15–49) in a population in a given year. It may be regarded as an indicator of recent fertility net of child mortality. A crude and indirect measure of fertility easily obtainable from census data, CWR is frequently used in fertility studies in the absence of such specific measures as total or age-specific fertility rate. The graph shows that there is a strong negative relationship between CWR and income; the lower the income, the higher the level of fertility. As a matter of fact, CWR in the highest decile is smaller than half its level in the lowest decile (519 vs 224, respectively).

The fertility indicator discussed above brings to the fore, though indirectly, the problem of women's position in Turkish society. Turkey's performance has been very poor in terms of gender equality, ranking 130 among the 149 countries for which the *2018 Global Gender Gap Index* is available (World Economic Forum 2018). We know that the participation of woman in the labour force has been traditionally low in Turkey (Göksel 2013) compared to countries of a similar income level and female education in Turkey has lagged considerably behind that of men (Işık and Pınarcıoğlu 2006). Not surprisingly, the participation rate of a woman in education exhibits striking variations between income groups, with the percentage of 30+ aged women with a university degree as high as 49% in the wealthiest decile and as low as 0.1% in the poorest decile. Therefore, variables relating to education, especially for women's education, are adequate proxies to understand segregation along the lines of income and socioeconomic status. For the analyses, university graduates are compared to those without formal education to delve into divisions characterising Istanbul in the 2000s. Other variables referred to above are used for the classification of neighbourhoods.

15.5 Results

Figure 15.3 shows maps with the location quotients (LQ) for university graduates and the population without formal education for 2000, 2010 and 2017. LQ maps give a cursory idea about the segregation pattern of Istanbul. The wealthy segments of the population have settled along the sea, while the lowest income groups (i.e. those groups with low levels of educational attainment) seem to have found a place for themselves at the periphery. These maps reveal that the proximity to the sea is the basic determinant of the pattern of segregation. Here one can also see the impact of city's unique physical geography on segregation patterns, where both Asian and European parts of Istanbul have their own rich, poor and middle-class areas. With some exceptions, especially in the historic parts of the city, better-off groups have settled in neighbourhoods along the sea coast, with low-status groups settling in areas at the fringe. Although at first glance, the pattern of the well-to-do living along with the coast, the poor at the periphery and a mixture of middle-class neighbourhoods between the two does not seem to have changed very much between 2000 and 2017,

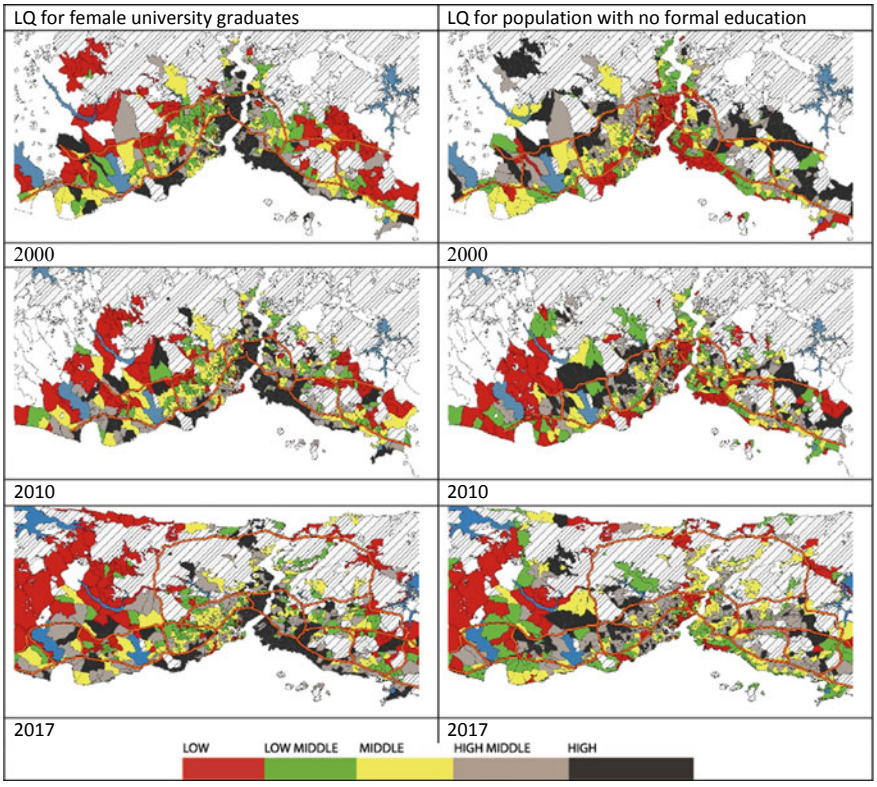

Fig. 15.3 LQ maps for university graduates and population with no formal education. *Source* TurkStat, Address-Based Population Registration System

there are some very important differences that need further attention. I turn to this issue below when I discuss the segregation along the lines of socioeconomic status, based on a grouping of neighbourhoods.

Table 15.1 shows the dissimilarity indices (DI) for selected education groups in Istanbul for 2000, 2010 and 2017. The table reveals some crucially important features of segregation. Of the groups considered, the ones that are most unevenly distributed across the city are university graduates. The largest segregation is between university graduates and people with no formal education (0.49 in 2000, rising to 0.52 in 2010 and then dropping to 0.44 in 2017), the main reason for which is the sharp decline in the percentage of people with no formal education. As can be seen from the table, groups with a low level of education tend to live close to each other in space, but they live separated from those with a high level of education. What is also striking is that the indices for upper-status groups are higher in all cases than those for lower status groups, an indication of the stronger tendency on the part of the higher educated to concentrate in areas where their percentage is already high. Another tendency that the DI figures reveal is the fact that segregation along the lines of education seems to have slightly dropped in the 17 years from 2000 to 2017 on both continents, probably an indication that the neighbourhoods that are being gentrified get more mixed, a tendency which is observed on both European and Asian sides of the city.

This conclusion must, however, be treated with caution. Although the dissimilarity index is argued to be compositionally invariant (i.e. not affected by the overall composition of the population), Taylor et al. (2000) and Gorard and Taylor (2002) have reported cases where DI cannot be considered fully composition invariant; there are cases when the index is altered by changing composition of a population over the years considered. We should note the fact that during the period under consideration, the educational categories studied here recorded some great changes with, for instance, the share of university graduates rising from 8% in 2000 to 19% in 2017 and that of people with no formal education falling from 35 to 11% in the same period.

There are also sufficient grounds to claim that DI performs very poorly in making temporal comparisons. It is very sensitive to changes in the number and sizes of areas compared (Simpson 2007). We know that the number of neighbourhoods rose from 550 to 780, from 2000 to 2017, with the expansion of the city towards the unoccupied and low-density areas. This rise in the number of neighbourhoods is not only due to the expansion of the city towards the periphery but also to further division of existing ones into smaller units; some made for gerrymandering in elections. Therefore, the initial impression that one can get from falling DI might be somewhat misleading since there is enough evidence that changing borders and the increasing number of neighbourhoods do affect the measurement of segregation. In any case, however, there is a considerable spatial division in Istanbul along the lines of educational status. And we must also note that this segregation is not a new phenomenon peculiar to the 2000s, but something Istanbul obviously inherited from earlier periods (for segregation in 1990 see Işık and Güvenç 2002; and for 2000 see Işık and Pınarcıoğlu 2008, 2009). There is, however, an important point that DI cannot reveal—the clear shift in the spatial pattern of segregation.

Table 15.1 Dissimilarity indices for Istanbul, 2000, 2010 and 2017

	Education categories								
	Compulsory education only			University graduates			Group index		
	2000	2010	2017	2000	2010	2017	2000	2010	2017
No formal education	0.047	0.093	0.110	0.487	0.514	0.442	0.102	0.192	0.223
Compulsory education only	–	–	–	0.486	0.489	0.413	0.095	0.141	0.155
University graduates				–	–	–	0.394	0.354	0.324

15.5.1 Classification and Mapping of Neighbourhoods

Given that neighbourhood level data is scarce for Istanbul, three variables are used to classify neighbourhoods to gain a better understanding of how spatial segregation patterns have changed between 2000 and 2017. (1) The percentage of those with a university degree in the total adult population (population older than 25 years of age) of each neighbourhood; (2) child–woman ratio (CWR) calculated as the number of children under age 5 per 1000 women of ages between 15 and 49; and (3) the percentage of women with a university degree in the female population of 30 years and over in each neighbourhood.

Using these three variables, neighbourhoods were sorted for each variable from the lowest to the highest value and then divided into quintiles. Each quintile was then assigned a score from 1 to 5, depending on its ranking. In the case of university graduates (both total and female), the lowest quintile was given a score of 1 and the highest quintile a score of 5, since both are positively correlated with income. In the case of CWR, the scoring was reversed (1 to the highest quintile and 5 to the lowest quintile) as CWR is negatively correlated with income. Finally, the individual scores were added up without assigning any weight to reach an overall score between 3 and 15, representing the socioeconomic status of each neighbourhood. Depending on their scores, neighbourhoods were then divided into 5 categories named low, low-middle, middle, middle-high and high-status neighbourhoods. The results are shown in Fig. 15.4 for 2000, 2010 and 2017.

15.5.2 From 2000 to 2017: Exodus of the Poor

The segregation map for 2000 represents a typical pattern of segregation that could be found not only in Istanbul but also in most other Turkish cities. The basic characteristics of this segregation pattern can be summarised in a few words: concentration of affluence in and around the prestigious areas of the city (in the case of Istanbul, along the sea coast) and clustering of the poor at the fringe that is of no interest to the better-off classes. It must be noted that in the case of Istanbul, these areas are mostly unauthorised squatter housing areas built in the 1960s and 1970s. Another important aspect of this segregation pattern is the existence of middle-income groups acting as a buffer between low- and high-income groups. The lower and upper ends of the social ladder do not seem to touch each other in residential neighbourhoods. In few instances where they seem to have a direct contact, there is almost always a physical barrier: D-100 highway on both the Asian and European side is a clear separator between the rich and the poor (Işık and Güvenç 2002). There are very few examples of the rich and the poor living in neighbouring areas. Poor areas next to rich areas can be found on both sides of the Bosporus, but they are more visible on the Asian side of Istanbul. They are the remnants of squatters built at times when these areas

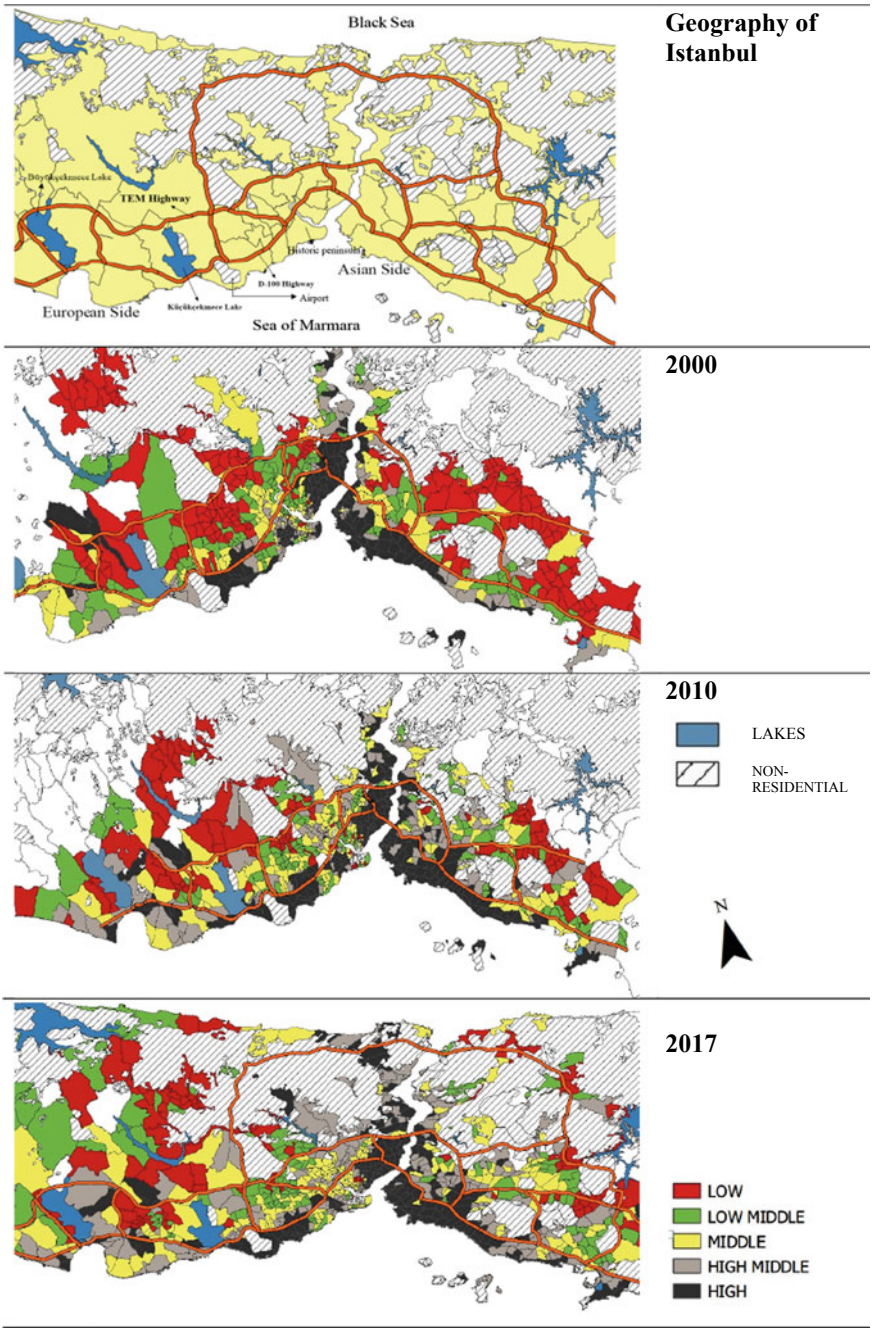

Fig. 15.4 Socioeconomic classification of neighbourhoods

were of little value to the wealthy, but their relative position in the city has changed over time due to transformation in the late 1990s.

The 2000 segregation map shows the first signs of what we may call the flight of the upper classes from their traditional residential neighbourhoods at the coastline. This flight of the upper classes started in the 1990s but was until then of sporadic and limited nature. The growing tendency on the part of high-income groups to settle at the urban fringe, particularly in areas known as 'gated communities' (Geniş 2007; Tanülkü 2012, 2013) is still invisible in the 2000 map because neighbourhoods on the fringe are too large for the impact of such scattered communities to be observable. Such flight of high-income groups is only visible if it is large enough to make up a significant portion of a neighbourhood. The most notable example of such movements is a new settlement known as Bahçeşehir (Garden City) on the far European edge of the city (see the westernmost part of 2000 map). As a harbinger of what was to come in the 2000s, this settlement was built in the late 1980s with generous credit support from now-abolished state-owned real estate banks and became a symbolic example of the flight of the middle and upper classes from the built-up areas of the city.

A pattern where the wealthy appropriated the privileged parts of the city, the poor lived exclusively in clusters at the outskirts and the middle classes acted as a buffer between the two was almost a trademark of most Turkish cities in the 1990s and early 2000s (cf. Ataç 2017). But this pattern was subject to a brutal and abrupt change at an unforeseen speed in the 2000s, with some disastrous results for the urban poor and ruining everything we thought we knew about Turkish cities. A glimpse of the changes that took place in the 2000s can be caught even with a cursory comparison of the maps for 2000 and 2010. Although the basic pattern of the rich along the sea coast and the poor at the outskirts still remains, there are important trends that shed light to the defeat of the poor, the zeitgeist of the period. Here we can see the first and undeniable traces of what we may refer to as the (a) displacement of the urban poor from most of their previous locations and their exodus to even more remote parts of the city; (b) consolidation of the urban elites in, around and along with the privileged areas by cleansing the remnants of the poor that had settled there in earlier periods; (c) large-scale gentrification of some inner-city areas with some conflicting results; and (d) occupation by the poor or lower classes of some inner-city areas abandoned by the wealthy, the so-called degradation of some parts of the city.

It is not surprising to see that some of the largest transformation projects took place under the generous support of the state in areas with high accessibility between the TEM and D-100 highways on both sides of the metropolis. Parts of these areas had been subject to unauthorised housing development in the 1970s and 1980s. They were the typical examples of pre-2000 type of unauthorised urban development—built on occupied state land through ad hoc networks working along the lines of ethnicity, religious affiliation and fellow-townsmanship, meaning that they had some degree of heterogeneity within themselves before the onset of large-scale projects of 2002. Though they had lost their initial characteristics and turned into more heterogeneous settlements by time in terms of their inhabitants, they were without exception on pieces of land that were far more valuable than their initial

value. This 'non-correspondence' between their relative position within the city—hence their soaring land values—and the characteristics of their inhabitants paved the way for a large-scale and devastating intervention on the part of the state and local authorities. Ayazma transformation project for about 20.000 inhabitants on the European side (see Lovering and Türkmen 2011) and Maltepe-Başıbüyük projects for about 15.000 inhabitants on the Asian side (Kuyucu and Ünsal 2010; Karaman 2013b) are among the best documented and best-known examples of such projects. In all these projects, former residents were offered housing units at the outskirts and thus forced to live in newly built residential areas on the far edges of the city. These were, with no doubt, cleansing projects whereby the poor were pushed further away from the city.

A similar process of sterilisation is also visible in areas close to the prestigious areas inhabited by the upper classes, particularly on sites overlooking the Bosporus on both continents. A comparison of 2000 and 2010 maps shows how the upper classes expanded geographically and how pockets of the poor were eradicated along with the areas between the two Bosporus bridges. These areas, too, had been subject to extensive squatter development in earlier periods. The transformation projects in the Beykoz district on the Asian side and the infamous Armutlu project are among the many examples of such projects (Ergun 2004). It must be noted that the cleansing of hills overlooking the Bosporus served more to the upper classes as opposed to the ones described above, such as Ayazma, where middle and upper-middle-income groups made the most use of.

In the historic parts of the city, several renewal projects took place and two processes were at work there; large-scale projects launched by the state and projects of a minor scale initiated by the nascent urban elite. As an example of the latter, we can refer to the Cihangir area (Lovering and Türkmen 2011), a once degraded site, opposite to the historic peninsula in an area known as Pera occupied in the nineteenth and early twentieth century by non-Muslim minorities. This area became the focus of culture-led regeneration (Günay and Dökmeci 2012). The gentrification of the Cihangir area was a slow and self-paced process, while the ones instigated by the state were brutal and devoid of any room for the residents to get their share of rising values. Of these renewal projects, that in Sulukule, famous for being the first neighbourhood in the world to be permanently settled by the Romani people, became the stage of a widespread protest and was even mentioned in EU's 2006 annual progress report as an example of the displacement of Roma population (CEC 2006). All these protests were in vain, and the neighbourhood was evacuated by police force, and Sulukule residents found themselves exiled to a distant part of the metropolis where they had not seen before (Uysal 2012; Schoon 2014).

Amidst this chaos, parts of the historic peninsula, once the home of middle and upper-income groups, were reclaimed by low-income groups (Dinçer 2011). The part played by Syrian refugees fleeing from the civil war must be stressed in this context. According to official figures, Turkey is home to 3.6 million Syrian refugees living mostly in big cities with many unsettling impacts not just for Istanbul but for many other cities. Of these refugees, more than 15% (560,000) live in Istanbul, usually in areas where rents and living costs are low and accessibility is high (Kılıç et al. 2019).

Those parts of the historic peninsula for which the upper classes had no interest for were thus appropriated by a mixture of low-income groups coalescing with Syrian refugees.

All these huge projects of transformation at the periphery and gentrification projects of various scales left behind a patchwork metropolis in some parts of the city. Especially in the peri-urban areas where land is scarce and competition is high, the transformation of the fringe was sporadic and remained incomplete, producing a patchy pattern in some parts of the metropolis resembling the one emphasised by Florida (2017) as an important component of the new urban crisis. An examination of the 2017 segregation map in Fig. 15.4 would reveal that the tendencies that started in the early years of the first decade of the 2000s produced a significantly different pattern. Although the parts of the city close to the most valuable asset—namely, to the sea coast—are still colonised by the wealthy, the new Istanbul at the end of the second decade of the 2000s can be best described by the almost total absence of the poor in inner-city areas close to or easily accessible from the city centre. The poor have now been driven away to the edges of the city, with little contact to the rest of Istanbulites. The heavy-handed attitude of the state and local governments in most of the transformation projects and their determination to break any resistance using even police force when they felt necessary must be regarded as an indication of insatiable desire to redistribute urban rents, which in previous periods had been a lifesaver for newcomers and the urban poor. It is to this issue of redistribution of urban rents and consequences flowing out of it that I turn in the concluding remarks.

15.6 Concluding Remarks

Turkey was and still is a country of high inequality. Although the level of inequality did not change significantly on the surface in the last few decades, the underlying class equations and the mechanisms whereby society coped with these inequalities did. Up until the 2000s, the urban poor found the means to appropriate soaring property values in prospering metropoles and make use of these opportunities as leverage for social climbing. It is this informal redistribution mechanism in both urban labour and property markets that guaranteed that all social tensions related to high levels of inequality were kept at bay and masses joining the ranks of the urban poor maintained their hopes for reaching the upper echelons of social divisions. In this game of inequality, the state acted as an accomplice, turning a blind eye to the existence of markets in the undefined shady zone between the legal and illegal, the formal and informal. The geography of inequality changed as well, with the rich concentrating along the sea coast as they did in previous periods, plus air-tight pockets in gated communities on the edges and creating spaces for themselves in parts of the centre. The final pattern is a patchwork metropolis as opposed to the previous one characterised by clear lines of demarcation in space between social groups.

The resulting pattern of segregation that we see for the year 2017 is the outcome of several intertwined processes that had their origin in the late 1990s and culminated in the 2000s:

(a) State-led eradication of former squatter areas especially in peripheral parts of the city where accessibility and thus property values are high;
(b) Selective gentrification of inner-city areas, some under the auspices of the state, others self-initiated and infiltration of the nascent urban elite into former middle-class areas; and,
(c) In any case, apathy and even brutality on the part of the state toward the losers, that is the former residents of project areas; and thus, the cleansing parts of the periphery and the inner city from the urban poor, a process I referred to as the exodus of the urban poor to the remote parts of the metropolis where they can have little contact with the city.

The extent to which this change in segregation pattern can be attributed to income inequality is a question for which I have no ready-made answer as high inequality has been an integral aspect of Turkish society for a long time. It is, however, certain that a metropolis where the poor have been driven out of sight, a process by which the ability of the poor to use space as means of power has been castrated, is a new phenomenon even for Turkey. This is something we all have to think about.

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Chapter 16
Segregation in London: A City of Choices or Structures?

David Manley

Abstract This chapter provides a comprehensive overview of the socio-economic segregation in London. The cosmopolitan nature of the city means there is an interwoven complexity that prevents the separation of social, cultural and economic residential trajectories of the population. As a result, the chapter explores socio-economic segregation within the context of the changing nature of the (sub)urban contexts. In particular, the chapter documents not only the occupational segregation but also introduces the often-used dimension of ethnicity and pairs it with the less commonly explored age and tenure dimensions through which the social structure of the city is inscribed. This enables a broader understanding of the rapid changes that have been wrought on the micro-scale can be understood in the context of a city that has, in terms of the overall composition, changed little.

Keywords Segregation · London · Housing · Ethnicity · Occupation

16.1 Introduction

Originally founded by the Romans as Londinium, the city has prospered over almost two millennia growing from its initial roots as a trading port on the River Thames to national capital and international finance hub. In terms of global reach, London is on par with New York (GaWC 2020). Over this period, the functions of the city, the relative population composition and the social, economic and ethnic population distributions have changed, but London remains a city of contrasts. With almost 9 million people living in the Urban Core, it is the most populous of any European Capital, a population that grows substantially when including the wider commuter belt areas of over 14 million people (Eurostat 2018). It is also one of the most important cities globally in terms of finance, business and industry as well as a major tourist destination on the international stage, and exerts considerable influence nationally as the seat of Government for the United Kingdom. As one of the original Global

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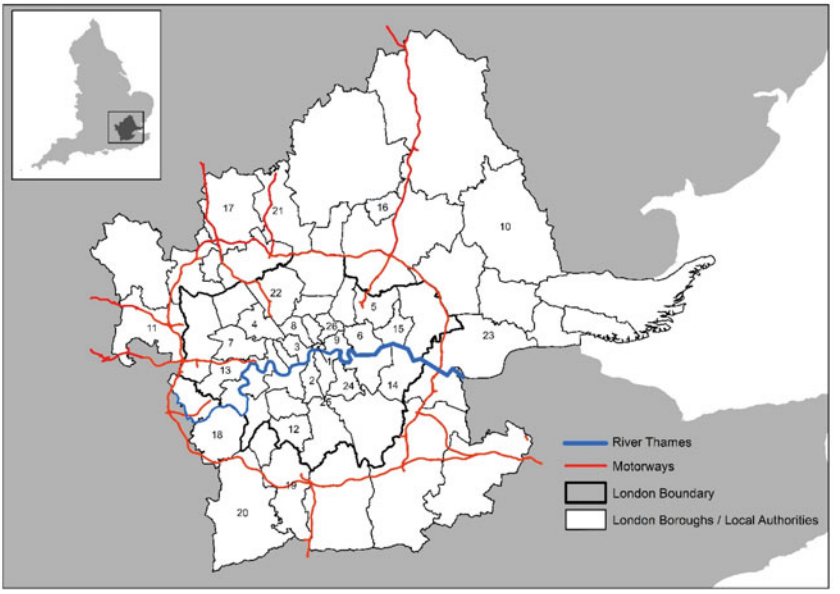

1 City of London; 2 Lambeth; 3 Kensington and Chelsea; 4 Brent; 5 Redbridge; 6 Newham; 7 Ealing; 8 Camden; 9 Tower Hamlets; 10 Chelmsford; 11 South Buckinghamshire; 12 Sutton; 13 Hounslow; 14 Bexley; 15 Barking and Dagenham; 16 Harlow; 17 St Albans; 18 Elmbridge; 19 Reigate and Banstead; 20 Mole Valley; 21 Welwyn; 22 Barnet; 23 Thurrock 24 Lewisham; 25 Southwark; 26 Hackney. (Note only those Boroughs and Local Authorities referred to in the chapter text are identified)

Fig. 16.1 The Boroughs of London and surrounding Local Authorities that make up the OECD area

Cities (Sassen 1991) it is set apart from the rest of the UK on almost all measures: it has greater ethnic diversity, greater cultural breadth, multiple but interlinked and highly varied housing markets, and with 32 Boroughs it represents multiple cities within a city. This chapter presents an overview of multiple dimensions of segregation in London, starting by focusing on the occupational groups and then exploring the socio-economic composition of the population within the wider The Organisation for Economic Co-operation and Development (OECD) region. This region extends far beyond the 32 Boroughs traditionally considered to be 'London' administratively or culturally to crucially include the metropolitan hinterland (see Fig. 16.1 for a mapped description).

16.1.1 Ethnicity

The diversity of the population in London has been built over many waves of internal migration and international immigration. In terms of international immigration, until

the end of the Second World War, entry into the UK was largely dominated by residents from countries in what became the Commonwealth. After the British Nationality Act in 1948, the right to enter and work in the UK was granted to over 800 million residents in the former countries included in the British Empire. The resulting flows were, of course, much smaller than this, but there was still a substantial number of economically motivated migrants entering the UK, and especially London, to take up positions in occupations with a deficit of labour supply—such as transportation and the newly formed national health service. Within the Boroughs of London, the experience of migration has been highly varied. For instance, Lambeth and Kensington and Chelsea were Boroughs where the Black Caribbean population first settled in the city, and Brixton is still regarded as the Caribbean Capital of Britain. Other Boroughs such as Hackney, Brent, Lewisham and Southwark also played important roles in the initial years for these groups. By contrast, people belonging to the Bangladeshi communities in London have tended to concentrate in the Borough of Tower Hamlets. Within the vast diversity of groups, the other two largest are the Pakistani (around Redbridge and Newham) and the Indians (Ealing and Brent). There is, then, there is the potential for substantial ethnic segregation at the macro (Borough) scale.

16.1.2 Economic

Economically, the residential history of London is just as varied as it is for ethnicity. Meen and colleagues (2012) highlighted the potential for the social and economic profile of neighbourhoods to steadfastly remain static within the wider urban system, even in the presence of some substantial (e.g. regeneration or gentrification) shocks in the longer term. London's social mosaic was initially mapped out by Booth (1903) using street by street observation to give classifications across the whole of the city. It is notable in his classification that areas such as the present-day Kensington and Chelsea were already identified as belonging to the 'upper-middle and upper classes, wealthy' group, just as any modern-day classification would conclude. Similarly, the neighbourhoods in the Belsize Park[1] area (Camden) were similarly identified and continue today to be areas of wealth and affluence. By contrast, neighbourhoods located in the Borough of Tower Hamlets, especially those located in was known as 'Stepney' were classified in the 'lowest class', 'very poor' and 'poor', neighbourhoods. Tellingly, these correspond closely with those neighbourhoods identified as being the poorest in London using modern deprivation measures such as the Index of Multiple Deprivation (Smith et al. 2015). Although these are only a couple of brief exemplars, they allude to the wider trend which despite London being a seat of substantial gentrification (from the initial work by Ruth Glass (1964) to the more recent Super Gentrification literature of Bulter and Lees 2006; Butler et al. 2013) the structure of many neighbourhoods within London has been locked into the long term

[1]The name Bellsize is derived from the French 'bel assis' which translates into English as 'well situated'.

reproduction of spatial inequality. Investigating the change in spatial characteristics of occupation and focusing particularly on the places of residence of the working class and middle-class, Manley and Johnston (2014) revealed that substantial change was a rare phenomenon over a relatively long (10 year) period.

16.1.3 Housing

In recent years London has attracted substantial investment from globally wealthy investors and has become an international site of investment for the superrich major housing developments, especially in interventions in the central areas (see Atkinson 2016). This process has fuelled the continuation of much longer-term trends within the city where the residential infrastructure of the city is often highly sought after. Many current property developments are targeted at the private market, often for owner occupation or private rent. Where mixed tenure has been explored, the implementations have been sometimes controversial (see the development of gated play spaces, Guardian 2019a) or highly exclusionary, such as the poor door[2] access to mixed tenure developments (see for instance Osborne 2014).

However, the British housing system was not always like this. The UK is traditionally viewed as a Liberal Welfare State with early moves into state provision in the first part of the 1900s under the Liberal Government of Asquith. This state provision of housing was substantially bolstered in the post-war period (1942 onwards) with the introduction of the National Health Service. In terms of the development of the city, the welfare state was critical in the organisation, access to and redevelopment of slum areas across the UK. In particular, London was the setting for many of the early 'council houses' (herein referred to as social housing) under the instruction of the Estates Department of the then London County Council (LCC). The creation over much of the 1900s of large estates across the city provided the backdrop for a largely mixed population at the city scale where all Boroughs provided some form of social housing. Since inception, it has been possible for tenants to purchase the property they rent from the council provider, but until the late 1970s, it was rare for tenants to exercise their Right to buy (RTB). However, in 1980 the Housing Act passed by the then Conservative government of Margret Thatcher formalised the policy and in the decades that followed, over 4 million properties were sold across the UK, leading to a substantial reduction in the availability of rental stock. Within London, where to date, almost of 290,000 properties have been sold (DCLG 2019), the consequences of RTB played out differentially in each borough. In some parts of the city, former social housing stock is in private ownership and worth well over £1 million while equivalent houses elsewhere are still valued at a 10th of that price. Regardless

[2]The term 'poor door' refers to the practice of putting separate entrances on multi-dwelling developments so that those residents in the cheaper (often denoted as affordable or rented) properties are distanced from residents in the more expensive apartments by literally entering the building through different entrances.

of location, the RTB was a major element in the residualisation of social housing, resulting in a reduced stock available to a smaller section of society. It was then also a process that leads to social housing being increasingly viewed as a tenue of last resort. The ultimate expression of this residualisation was seen in the early hours of 14 June 2017 when the Grenfell Tower caught fire, and 72 lives were lost in the ensuing blaze. Grenfell Tower, owned by Kensington and Chelsea London Borough Council with the Kensington and Chelsea Tenant Management Organisation acting as Landlord disaster, highlights the complexity of the two-tier housing system that the RTB reinforced. Those tenants living in the apartments which remained owned by the council would be managed as traditional social housing tenants with inspections and the ultimate housing responsibility falling to the local authority, or the representatives they appointed. By contrast, those flats bought under RTB but existing in the same tower block would not be under scrutiny to the same degree. While the leaseholder remains the same, the RTB either as a dwelling for the owners or as a private market rental, the upkeep and maintenance is a private issue.

16.1.4 Chapter Outline

In the sections that follow, an in-depth assessment of segregation by occupation is presented using multiple measures. This is followed by a discussion about segregation focusing on the characteristics of the city explored above—ethnicity, and housing type—along with age as a further important demographic characteristic. Data are drawn from the 2001 and 2011 UK Census, the largest source of data for the UK population. UK Census data is not available at an individual level, so in order to explore segregation, it is necessary to use aggregated areal units: in this chapter, the Lower Super Output Area (LSOA) is used, representing 'neighbourhoods' which have on average around 1400 people. By considering multiple characteristics, we can explore the extent of different types of segregation in the metropolitan area and develop a wider understanding of the social geography of the city.

16.2 Inequality and Occupational Segregation

The Gini Index for the United Kingdom since 1961 demonstrates a clear increase in inequality. In 1961 the UK had a Gini coefficient of 0.25, which increased slightly through the 1970s and 1980s. After 1980 the Gini increased to 0.35 by 1991 increasing again in the middle of the 2000s to about 0.36. By 2011 the figure had begun to fall and there is evidence, post-2008, that the trend is in decline; however, whilst this might be regarded positively and suggest a decline in inequality, the reduction should be interpreted with the Global Financial Crisis in mind. Gini reduction can occur through a number of processes that result in the gap between the richest and poorest declining. It might be that the real incomes of the poorest increase, thus

providing those most in need with greater financial security. However, it could also be that the movement is the result of the richest seeing a decline in their incomes and wealth while the poorest do not see any material gain in their circumstances. In the moments after the financial crisis, there is evidence that it was the latter of these processes that drove the decline, not the former, evidence supported by the slight but clear increases in the Index value in recent years as the UK has left the recession of the 2008 crisis behind. Looking forward towards a post-Covid-19 city, it is likely that there will be substantial changes in the Gini coefficient again far beyond that of the 2008 recession.

The Gini is a useful measure of inequality, but it only tells a small part of the wider story and the details within the measure matter, as does the geography of wealth distribution. In the UK, wealth is concentrated in the Southern part of the country, with much of the financial activity around London. Moreover, even with a stable or declining headline figure, the differences between the richest and poorest are stark: the income of highest earners is estimated to be 6.8 times that of the lowest earners while the overall wealth of the richest members of British society is estimated at 316 times that of the poorest (according to ONS Wealth and Assets Survey July 2014 to June 2016). It is, then, against this backdrop of declining macro inequality but with an expectation of a more complex micro picture that we explore the OECD London area in more depth.

Figure 16.2 decomposes the population into occupational categories into three groups as Top Middle and Bottom (Fig. 16.2a) or using the nine categories from the NS-SEC (Fig. 16.2b). The overall trend in the wider London OECD region has been one of professionalization. Although the Bottom group has not declined (recording 14% in both periods), the Top group has grown, increasing from 32 to 38%. Using the more detailed NS-SEC groups, it is clear that this growth has occurred in the Professional group at the expense of the Managerial class, which has shrunk slightly, as well as decreasing the size of the Middle group. The composition of the NS-SEC groups which make up the Middle group are largely similar in size over the 10-year period, the notable exception being the Administrative class, which has declined by a third, and which accounts for the majority of the Middle decline.

Fig. 16.2 Occupational structure of London 2001 and 2011 for the **a** top middle and bottom, and **b** NS-SEC groups

Table 16.1 Index of dissimilarity (multiplied by 100) for occupational groups in OECD London, 2001 (lower part of the table) and 2011 (upper part of the chart). Bold denotes the greater ID pair value, italics indicate identical ID value

	MAN	PRO	APR	ADM	SKI	SER	SAL	MAC	ELE	TOP	MID	BOT
MAN		**15**	**14**	**23**	**30**	**32**	**33**	**38**	**40**			
PRO	13		10	22	32	**29**	30	38	**37**			
APR	12	**12**		**20**	**30**	**28**	**29**	**37**	**36**			
ADM	19	**24**	18		**17**	**18**	**18**	**22**	**25**			
SKI	28	**34**	28	15		**20**	**20**	**15**	**23**			
SER	23	28	21	13	15		**15**	**21**	**16**			
SAL	26	**31**	24	13	14	13		**20**	**16**			
MAC	34	**40**	33	21	14	19	16		**20**			
ELE	32	36	29	20	17	15	14	14				
TOP											*18*	**36**
MID										*18*		**20**
BOT										34	18	

MAN Managers; PRO Professionals; APR Associate professionals; ADM Administrative Jobs; SKI Skilled workers; SER Service; SAL Sales; MAC Plant Machine Workers; ELE Elementary Workers

Of course, the occupational composition charts do not consider the neighbourhood distribution of the occupational groups. To address this, the index of dissimilarity (Table 16.1) is used to reveal some clear occupational segregation patterns. Whilst the overall conclusion is that segregation has increased[3] between 2001 and 2011, this is not the case for all occupational pairs. For example, comparing the Professional category against the Associated Professionals, those in Administrative Jobs, the Skilled Jobs group, the Sales workers and the Machine Workers segregation has declined. However, these represent the exceptions to the general increase. The greatest increases in occupational segregation are observed between groups at either end of the table, for example, between the Managerial group and both the Sales and Elementary occupations. Focusing on the disaggregated occupational groups in the table, it is clear that the increases all involve either the Managerial, Service or the Elementary groups suggesting that there is a distinct trend for those in the lowest (Elementary) or the highest group (the Managers) to increasingly live apart from the other occupational groups in residential space. The other group noted, Service workers, is one that is very diverse in composition with some members being similar in characteristics to the higher groups and others to members of the lower groups. As such, this is not an unreasonable, or unexpected, conclusion to reach in the context of the changes in the residential structure of neighbourhoods an idea we revisit later on: the changes in housing provision and the increasing house prices in central city areas lead us to conclude that the Manager's segregation is likely the result of a process

[3]Note, increase refers only to a numerical change in the value of the index and is therefore being used descriptively rather than denoting a process of change as revealed by a statistical significance test, see Manley et al. (2019) for more discussion.

of residential choices being expressed in their home locations, while for those in Elementary occupations is more likely to be the result of being residualised housing or neighbourhoods that are less attractive to those with greater spending power or forced out of the areas they previously lived in as a result of gentrification processes. In the right-hand part of Table 16.1, ID values for the aggregated groups are presented. They confirm that the greatest segregation is between the Top and Bottom groups in both time periods, and that there has been an increase in segregation between 2001 and 2011. The segregation between the Bottom and Middle group, and Middle and Top is largely static over time. This supports the idea of greater spatial inequality.

16.3 Location Quotient Maps

The location quotient maps report the concentration for the Top Group (Fig. 16.3) and the Bottom Group (Fig. 16.4). For the Top Group the LQ measure reports expansion and a spreading out of the distribution across the city. Kensington and Chelsea are the key concentration areas of the Top groups in the central city in both 2001 and 2011, as is the far northern reach of the OECD metropolitan area. On the eastern side, there is a smaller pocket of concentration in the Chelmsford area (referencing area 10 on Fig. 16.1), which disappears during the decade between the Censuses (the transformation is from the highest category in 2001 to the lightest in 2011). By contrast, there is a relative lack of individuals in the Top group running along the central area, which maps on the Thames and as then moves eastwards, through more traditionally working-class areas. In terms of the expansion, there are clearly areas which have seen either an increase in concentration or now represent concentrations of workers in the Top group. This is especially true for the northern reaches of the OECD area, but there is also evidence of the same outcome in the south. Without a decrease in the Top group elsewhere, this suggests an increase in the absolute number of workers in these occupational positions. Using these trends, it is reasonable to conclude that over

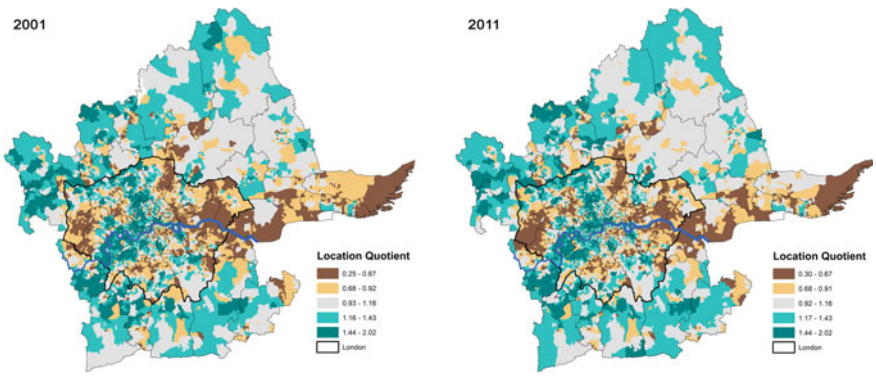

Fig. 16.3 Location quotient maps of the 'top' occupation groups

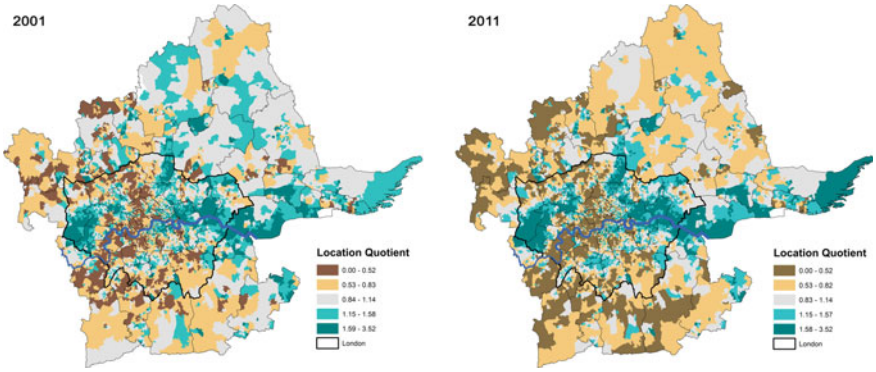

Fig. 16.4 Location quotient maps of the 'bottom' occupation groups

the 10-year period, more people have entered these neighbourhoods in top positions, expanding the Top group.

In Fig. 16.4, the LQ of the bottom group is reported. The separation of occupational groups is clear when these maps are compared to the previous set. To the western side of London, the concentration is to the north of the professional cluster, focusing on Spelthorne, Hillingdon and Hounslow, and on the far eastern side in Bexley and Barking and Dagenham. Between 2001 and 2011, there was little overall change in the occupational structure of the workforce in London, but there was a substantial increase in size of around 30% (see Manley and Johnston 2014). However, the way that the expansion in population has played out in the residential housing market has not been consistent between groups. Whereas the professional occupations have experienced a spreading out, occupying new neighbourhoods across the city, the people in bottom occupations have remained spatially constrained. In fact, rather than spreading their growth has been through intensification in those areas where they were already concentrated. Together these changes hint at a polarisation at the bottom end. The final point to note for the bottom group is the cluster in the northeast of the city focused strongly on Harlow. Here there is a strong and persistent cluster in both time periods, which is spatially distinct to the borough and exhibits a sharp decline as soon as you move beyond the immediate boundaries of Harlow.

16.4 Maps of Typologies

For the typology, as with other chapters, each major group (Top, Middle and, Bottom) were split into four categories (using the share of each group as: 0–29%; 30–49%; 50–59%, or; over 60%). For this chapter, neighbourhoods, where one group represented over 60% are identified as being dominated by that group. The Polarized neighbourhoods are those where any of the groups fall between 50 and 59% and

Table 16.2 Summary of the neighbourhood typology in Fig. 16.5

	2001%	2011%
Polarized top	6.4	**14.1**
Polarized middle	67.6	45.6
Polarized bottom	–	0.1
Mixed	14.5	**35.0**
Middle dominate	11.3	1.0
Top dominate	0.3	**4.2**
Total number of LSOAs	6643	6729

the Mixed neighbourhoods are those with the combinations of the two lower categories for all three groups (in other words, there is no dominant group or polarisation occurring). Not all potential combinations of neighbourhood types and groupings are realised in the maps, although all are, theoretically, possible. A summary of group membership is provided in Table 16.2.

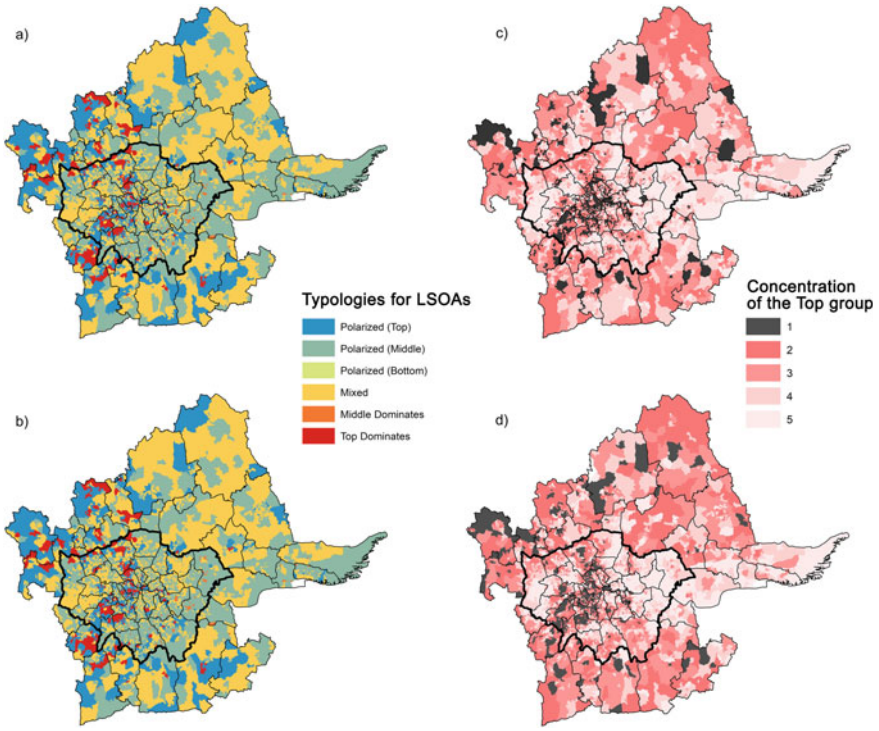

Fig. 16.5 The typologies for LSOAs in the London OECD area in **a** 2001 and **b** 2011 along with the concentration of the top socio-economic group in London during **c** 2001 and **d** 2011

In 2001 the Polarised Bottom Group did not exist, yet by 2011 it has appeared. However, the creation of a new group is not as substantial a change is it appears at first, because of all the LSOAs in London the Polarized Bottom (that is, a neighbourhood where the occupational groups of Manufacturing and Elementary dominate) applies only to a single neighbourhood located in Ealing (see back to Fig. 16.1). Thus, whilst the addition of a new grouping is, in reality, a relatively small change, the increase in Polarized Top neighbourhoods is not (growing from 6.4% of LSOAs to 14.1%, see Table 16.2). This is partially a reinforcing of the polarized top areas that were already present in Kensington and Chelsea in filling large parts of the North to North West of the City extending as far as the Local Authorities of St Albans and Chiltern (in the county of South Buckinghamshire). Where more areas are Polarized for the top group, an equivalent increase has occurred in the Top Dominates group such (from 0.3 to 4.2%). Many of the areas classified into this group about the Polarized Top areas largely south of the River Thames (including Elmbridge) which is also South of Heathrow Airport) and into the Local Authorities for Reigate and Banstead as well as Mole Valley (both of which are beyond the traditional boundary of London and in the county of Surrey). There are also pockets of Top Dominated neighbourhoods in the north of the Metropolitan area, including the commuter towns in the Chilterns, St Albans, as well as the more traditional London Boroughs of Welwyn and Barnet and the town of Hatfield (in Welwyn). This suggests at least two processes may be at play in the changing structure: for the commuter areas, there may be a movement into these areas either from the more centrally located areas of the City or choosing to locate here as an entry point to the rest of the Metropolitan area.

In terms of the multicultural and multifaceted city, the growth in mixed areas is substantial (from 14.5 to 35%). In the north-eastern side of London, running from Thurrock (25) on the Thames Estuary and Chelmsford in Essex (10) to Welwyn (24). In these areas, there are individuals working in occupations that are classified in all three of the groups (Top, Middle and Bottom groups) such that each group is presented. Whereas the mixing was largely a peripheral issue in 2001 with some central areas having no (or very few) mixed areas, it is the case now that, with the exception of the City of London Borough (which is a special case area anyway), there are no Boroughs without mixed areas. Many of the new Mixed areas were previously Polarised Middle areas (and to a much lesser extent Middle Dominated areas), suggesting that members of both the Top and Bottom are moving into areas in place of residents in the Middle—in other words, neighbourhoods are both upgrading and downgrading.

16.4.1 Location of the Top Occupational Group

The concentration of managers and professionals has remained relatively static over the 10-year period between 2001 and 2011. In 2001 and 2011, 20% of the top group population could be found in 10% of the neighbourhoods. Figure 16.5c, d demonstrates that the location of the 10% of places has also stayed static with top

quintile locations in the north of the OECD region beyond the bounds of the core of London, a clear concentration in the Central part of the city and a few areas in the southern reaches. By contrast, the least concentrated neighbourhoods for the Top group cut a clear slice through the middle area of the map extending from the west to the east, interrupted only by the central concertation. It is also notable that there are no LSOAs without at least a couple of Top residents at both Census points.

16.5 Contrasting Dimensions of Segregation

Occupational segregation represents an important dimension by which the divisions of the urban residential space can be explored and there are other equally as important dimensions that can be considered. To develop a more rounded picture of segregation in London, the Index of Dissimilarity is recalculated for ethnicity, age and tenure. Starting with ethnicity, to allow a similar comparison to the occupational groups, the ethnic diversity of the London Metropolitan area was coded into Majority (all White British) and Minority (all other ethnic groups) to provide a binary classification. The message that is apparent here is that there has been a small decline in segregation as measured by the Index of Dissimilarity over the 10-year period (from 0.46 to 0.44). By comparison to the occupational segregation above, both of these figures are higher, suggesting that ethnic segregation is greater than occupational in the wider London area.[4] This concurs with the literature for the rest of the UK, which in general suggests that there has been a decline in ethnic segregation and whilst the geographical extent of this study is different to the usual definition of London, it is unsurprising that it reflects the wider trend (see Catney 2016) for the UK in general and Harris (2012) for London in particular, although note the use of school pupil data in the latter which necessarily focuses on the younger age groups only, not the Population Census) (Table 16.3).

Of course, the dichotomisation of ethnicity into two categories provides an overview, but it does obscure much of the detail between groups: the minority groups are, as highlighted in the introduction, comprised of many different ethnicities. To provide greater depth, we decompose the majority versus minority comparison into the major ethnic subgroups used across the UK Census. Using these five groups that are largely comparable over time, the picture of segregation for the major ethnic groups is not as clear cut as it was when dichotomised. Nor is it as clear cut as it was for occupation. There has been both increase and decline over the decade; this data reports on, with no clear single message. For instance, the White/Mixed, White/Other and Mixed/Other pairings have higher D values in 2011 than in 2001. By contrast, the White/Asian, Mixed/Asian, Mixed/Black, Asian/Black, Asian/Other and Black/Other have lower values, while the White/Black shows no change. This suggests that overall the trend has been for ethnic deconcentration. Of the increases,

[4] Although as above, direct comparisons between ID values and across groups are to be made very cautiously see Manley et al. (2019).

Table 16.3 Index of dissimilarity (multiplied by 100) for major ethnic groups in 2001 (below the diagonal) and 2011 (above the diagonal)

	WHITE	MIXED	ASIAN	BLACK	OTHER	MAJORITY	MINORITY
WHITE		**22**	4	*43*	**37**		
MIXED	2		33	23	**27**		
ASIAN	**41**	**36**		4	32		
BLACK	*43*	**25**	**43**		32		
OTHER	29	26	**37**	**36**			
MAJORITY							44
MINORITY						**46**	

The white category includes the White European, White Irish and White other groups. The Asian includes Indian, Pakistani, Bangladeshi. The Black represents the Black Caribbean and Black African. Other is all other groups in the Census. For the dichotomised comparisons, the majority is only the White British. All other groups fall under the Minority heading

the greatest is in the 'Other' category (from 0.29 to 0.37), but caution should be exercised when interpreting this change simply because of the heterogeneous nature of the 'Other' grouping. The other changes in segregation are smaller, all in the second decimal place.

The next dimension of segregation that we present refers to age. Age has recently been the focus of increased attention in the segregation literature (see Sabter et al. 2017). The processes around ethnic and, to a certain extent, occupational are different to age. The previous dimensions, to a certain extent, focus on separation and discrimination as drivers. Within the residential landscape, there are further reasons why people may experience segregation by age. These include the presence of institutions that cater specifically to certain age groups (for the older individuals, these could be care homes, while for younger residents could include university halls of residence) and will therefore imprint segregation into the landscape. Away from the extremes of age, the older someone is, the more likely they are to have resources to purchase more exclusive housing or have already entered more exclusive neighbourhoods before they increased in price. It is worth noting that, also unlike the categories around ethnicity and occupation, which have clear social construction, age is something that all individuals experience over time and regardless of ethnicity, occupation, class or gender. Moreover, the age profile of an area can change without any residential mobility taking place—again, as people age, the group to whom an area is identified against will change and the demographic processes of birth and death further alter the composition. As such, it represents a different type of segregation—one with alternative process-driven causes—but one which is important nevertheless.

In terms of the degree of segregation (Table 16.4), it is worth highlighting that the levels of segregation as measured by the Index of Dissimilarity are lower than they were for ethnicity (Table 16.3) and many of the occupational groups (Table 16.1). Note that we do not group the age categories together into supergroups as was done for occupation or ethnicity because it does not make sense to reduce the detail here. The greatest segregation is between the youngest and oldest groups (0.26)

Table 16.4 Age segregation for 2001 (below the diagonal) and 2011 (above the diagonal)

	Age 18-24	Age 25-44	Age 45-64	Age 65 Over
Age 18-24		**15**	*2*	**26**
Age 25-44	13		**17**	**25**
Age 45-64	*2*	16		*12*
Age 65 Over	24	21	*12*	

Table 16.5 Tenure segregation for 2001 (below the diagonal) and 2011 (above the diagonal)

	Outright Own	Mortgage Own	Social Renting*	Private Renting
Outright Own		*15*	*55*	38
Mortgage Own	*15*		49	35
Social Renting	*55*	**5**		43
Private Renting	**41**	**38**	**47**	

*Social Renting includes both renting from a Housing Association and renting from Council

and the younger middle group (0.25). By contrast, the two middle groups and the youngest and middle groups are less segregated. This reinforces the idea suggested above that both the structures of institutional living—for both age groups—and the finance required to purchase (or rent) property is likely to push the extremes in age apart. However, as noted above as well, the continuous nature of ageing means that the segregation observed here may not be stationary through the life course. Finally, it is important to note that, unlike the previous measures where some groups have observed an increase while others have experienced a decrease in segregation for the age groups, there are no pairs that have experienced a decrease.

The overall message for housing tenure segregation (Table 16.5) is one of little change in terms of the intensity of segregation, which in many senses is not surprising (recall the work of Meen et al. 2012 discussed in the introduction). The development of housing is a long-term investment and so a substantial change in the tenure profile of neighbourhoods is not expected. However, there are, as was highlighted in the introduction, few ways through which tenure can change—for social renting,[5] it is through the right to buy moving from renting to owning. The change from owned to private renting is a simpler move, as is the reverse.

An issue that has become increasingly important in London, and many other global cities, has been the increase in households that are very wealthy. For the purposes of identifying these groups and to highlight the segregation of the wealthier groups, owner-occupation is sub-divided into owned with a mortgage (the most common

[5]In this discussion, we have combined two forms of social renting—renting from the council and renting from Housing Association—because although we acknowledge that they are different tenures the numbers in some of the Boroughs are very small and therefore would be difficult to estimate. Moreover, in the wider societal discourse, the distinction around the origin of the property is not often made and the catch all label social renting applied.

route to house purchase where the money is borrowed from a lender such as a bank or building society) and owned outright which in the context of much of the London market is an expression of high wealth. The segregation between the owning (mortgage) and the owning (outright) and social renting have remained static. There has been a slight fall in segregation between social renting and owning with a mortgage (the right to buy is likely to be an explanation here, with the right to buy tenants accessing their purchase via a mortgage, although some redevelopment and inclusion of mixed tenure developments may also provide an insight). The main feature of interest here, however, is the magnitude of the Index of Dissimilarity. Compared with the other dimensions of segregation we have considered (age, ethnicity and occupation), the pairwise comparison between social renting and other tenure forms are the highest of all the comparisons (up to 0.55).[6] What this suggests is that segregation in London is very much driven by the location of the housing that a household accesses: housing is built in clusters and those smaller clusters of tenure types often are co-located in broader neighbourhoods with similar housing. Although there has been a push towards creating a greater mixing of tenures (see, for instance, Bridge et al. 2011), the fixity of housing—it takes large financial investments and time—spread over substantially large areas of the city to fundamentally alter the urban spatial structure. As a result, the underlying housing stock does not change very much from year to year, or even over a ten-year period, and so the neighbourhoods reproduce themselves. In terms of the changes in segregation, the biggest has been for private renters. Here there has been a decrease for all pairwise combinations. As the period 2001 to 2011 saw an increase in the prevalence of private renting, this is not a surprising outcome.

16.6 Conclusions

Segregation is and always has been a complex and multi-faceted issue, and with increasing diversity and concern around the mixing of populations (on many dimensions), it is not an issue that is going to be solved anytime soon. What is clear from this chapter is that there are many dimensions along which segregation can be measured. Some, such as ethnicity, refer to (historical) discriminatory practices and have exclusionary outcomes which have been linked to further societal problems

[6] Although tenure is the largest it is important to note that the measures of segregation are not net of each other. Therefore, the tenure segregation outcomes do not take into account the distribution of age, ethnicity or occupational all of which are likely to be conflated with access to and the distribution of individuals in the tenures (see Manley et al. 2019) for a discussion about the issue of conflation and net measures of segregation). Regardless of this critique, however, this is an instructive exploration of the multiple dimensions and as housing tenure is the one issue that is considered in this chapter that has a spatial fixity to it—you can only living in social renting housing if there is a socially rented property available in the neighbourhood, with similar restrictions for the private renters and owners as well—it is reasonable to consider that tenure distribution is the greatest determinant of segregation in the city.

and unrest (see Home Office 2001). Other dimensions like occupational segregation whilst still reflecting separation and potential social tensions also represent spatial expressions of wider social inequalities and difference as well as the outcomes of social power expressions: those with higher occupational status and greater wealth are able to access much more of the capital than those in the lower occupational categories. Real housing choice is a luxury and choice requires the ability to pay.

Age segregation, by contrast, presents a different conceptualisation of social processes. Individuals, and their households, require and desire different facilities and amenities over the life course: what works well for people in their early adulthood (18–24) does not necessarily reflect the needs of those in the middle of the traditional family rearing ages (25–44) or those who are moving into the later stages of their working life (45–64) and retirement (65+). Unlike ethnic groupings, and to a lesser extent, the occupational groups, people will experience all the categories through the ageing process. The question, which we cannot address here, then becomes one of whether or not cohorts are segregating and ageing in situ thus reinforcing segregation over time, or are neighbourhoods providing shelter for people at various points through their life course, and people then pick up and move on as they age? There is evidence that the transmissions of wealth between generations may exacerbate intra-generation segregation. It has been reported that up to 25% of first-time buyers in the UK are accessing property thanks to the bank of Mum and Dad (Guardian 2019b). Those with housing wealth will be further enabled to choose where to live compared to those without it (see Galster and Wessel 2019). However, although there is some evidence in the literature (see, for instance, Willetts 2010; McKee 2019), this is not a debate that has, yet, been fully explored in the wider literature.

Ultimately, this leaves tenure segregation. Whilst the previous three dimensions all related to characteristics of people, the final dimension refers to a characteristic of the property. As a result, it is a different type of segregation and one which refers to the spatial structure of the city. Some groups are excluded from some tenures: higher earners cannot access social renting. Those with low incomes will not be able to buy outright, or possibly even buy with the mortgage. Often the younger households will be in private renting because they lack the means for a deposit to access owner-occupation. However, we know that different groups within the previous dimensions—often ethnic minority groups, often individuals in lower occupational groups—are overrepresented in some of the tenures. As a result, we propose that the housing structure of the city serves as a key driver of the spatial expression of inequality—segregation—and to reduce this inequality requires long term investment and oversight in terms of planning, the production of housing, and the types of housing and its locations.

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Chapter 17
Income Inequality and Segregation in the Paris Metro Area (1990–2015)

Haley McAvay and Gregory Verdugo

Abstract In the last decades, the Paris metro area has experienced important structural changes linked to rising income inequality and a rapidly growing immigrant population. Using census data from 1990, 1999 to 2015, this chapter explores these transformations and how they have shaped trends in residential segregation. We find that the occupational structure of the area shifted upwards in the recent decade with a substantial increase in the share of the top occupational groups. This trend, however, did not primarily concern the immigrant population, which nonetheless experienced a growth in the middle class. These trends were further accompanied by an increase in income inequality driven by rising wages among the top 1% earners. Despite these changes, dissimilarity indexes between socioeconomic groups and between natives and immigrants have remained quite stable over the period. However, interaction indexes suggest that neighbourhoods are becoming more homogenous over time, both in terms of socioeconomic and ethnic diversity. Finally, the findings shed light on the correlation between socioeconomic and immigrant segregation. Socioeconomic disadvantage and the presence of immigrants within neighbourhoods, especially of non-European origin, are tightly correlated, and that correlation became stronger over time.

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17.1 Introduction

In the last decade, the population of the Paris metro area grew rapidly, and with more than 12 million inhabitants in 2015, it is one of the largest urban centres in Europe. As a major economic and political capital, the composition of its population is more polarised than the French or European average, with a smaller proportion of the middle classes and strong income inequality (Labrador 2013). Moreover, like other major cities in Western Europe, the Paris area has seen a rise in immigration in recent decades, particularly from non-European countries.

Despite these broad structural changes, relatively little evidence is available on how these transformations affected residential segregation in the Paris metro area. Since the 1980s, substantial urban renewal and social mix policies have been implemented in France with the aim of combating segregation. Policymaking has primarily targeted the poor peripheral urban areas known as the *banlieues*, where many immigrants from France's former colonies settled in public housing projects. Hit by deindustrialisation and economic hardship, these areas have become synonymous with high unemployment, poor-quality schools, crime and are even symbolic of the failure of immigrant integration. Recent assessments of French urban policy document that urban renewal and social mix initiatives have been largely unsuccessful and have even had the unintended consequence of reinforcing segregation (Epstein 2011; Fol 2013). Meanwhile, an increasing number of studies suggest negative effects of living in disadvantaged and segregated neighbourhoods on employment (Gobillon et al. 2011; Petit et al. 2016).

This chapter uses French census data from 1990, 1999 and 2015 to investigate changes in occupational structure, inequality and residential segregation in the Paris metro area. We add to prior literature on segregation in Paris by using the most recent available data on the entire metropolitan area, comparing three census dates using small spatial scales comparable to census tracts (*IRIS*),[1] and by articulating socioeconomic and immigrant segregation. The chapter has three broad objectives: (1) to document structural changes in the urban population linked to occupation, income inequality and immigration; (2) to analyse the residential distribution of socioeconomic groups and (3) to describe trends in socioeconomic and immigrant segregation over time and the ways in which they are correlated.

[1] We use the entire *Ile de France* region and census tracts of about 2,500 inhabitants, whereas the major prior study on socioeconomic segregation focused on the city of Paris only using larger tracts (Préteceille 2006) due to data availability constraints.

17.2 Background

Since the 1980s, residential segregation has been a predominant target of policy-making and has received pervasive media attention in France (Lelévrier and Melic 2018). Yet, it is only recently that systematic empirical research based on representative data has shed light on spatial inequalities. Unlike the U.S. or other European contexts, which have long been concerned with the unequal spatial distribution of minorities, in France, the earliest studies tackled segregation from the angle of social class using occupational groups (Tabard 1993; Maurin 2004; Préceteille 2006). Préteceille (2006) offers one of the first studies of socioeconomic segregation in the Paris region, measuring changes in dissimilarity indexes between occupational groups in neighbourhoods between 1990 and 1999. He finds that the strongest indices are observed for upper-status occupations and are increasing over time, whereas intermediary groups are becoming less segregated. He further points out that residents of Paris still predominately live in middle-class and mixed neighbourhoods. More recent studies have weighed in on this debate using tax and administrative employee data, allowing analysis by income groups rather than occupational categories. Godechot (2013) focuses on the spatial concentration of the wealthiest households (top 1% and 0.1% of earners) and documents that the level of segregation for top earners is the strongest in Paris compared to other French cities and is on the rise. Most recently, using tax data at the communal level, Ribardière (2019) also points to an increase in residential segregation by income in the Paris area between 1999 and 2015.

Overall, despite methodological differences between these studies, the evidence indicates increasing socioeconomic segregation, owing to the strong spatial isolation of upper-status groups in particular. Below we discuss three potential mechanisms underpinning socioeconomic segregation in the Paris area: the segregation of immigrants, urban policy and public housing, and rising income inequality.

17.2.1 The Role of Immigrant Residential Segregation

While residential segregation in France is primarily viewed as an issue of class, that is, relating to the unequal distribution of socioeconomic groups, urban disadvantage and immigration have been historically tightly intertwined in the French context.[2] During the 1980s, post-colonial immigrants found accommodation primarily in the large public housing projects embedded in the suburbs of large urban areas (*banlieues*)

[2]This framing of segregation as predominately a problem of class can be at least partly understood in light of the Republican colorblind model and the Marxist tradition in the French social sciences. France considers distinctions on the basis of race/ethnicity to be illegitimate and therefore does not collect ethnic/racial statistics, creating significant barriers to measuring racial residential segregation or other inequalities. At the same time, the predominance of Marxism within French sociology hindered enquiry into the ethnoracial dimensions of stratification beyond social class mechanisms (Safi 2013).

near industrial sites where jobs were available. In the wake of deindustrialisation and rising unemployment, the *banlieues* became explicitly synonymous with socioeconomic disadvantage and implicitly associated with racial minorities. These neighbourhoods drew public attention following the highly mediatised urban riots during the 1980s and early 2000s involving minorities and contributed to the construction of segregation as a social problem.

It is not until the mid-2000s that research began to quantify the extent of residential segregation between immigrants and French natives (Préteceille 2009; Safi 2009; Verdugo 2011; Pan Ké Shon and Verdugo 2015). These studies analyse segregation at the municipality level from consecutive censuses. Their results show high segregation in Paris between natives and immigrants from North Africa, Sub-Saharan Africa and Turkey, which increased moderately between 1968 and 1999. Verdugo (2011) was the first to study the long-term evolution of immigrant segregation at the level of the census tract. He documented higher levels of segregation for non-European immigrants, which were rising largely due to the increased concentration of immigrants living in public housing. Although less is known about segregation beyond the first generation, due to restrictions in census data, a few studies indicate that spatial inequalities are largely transmitted to the second generation, particularly among non-Europeans (McAvay 2018a, b; McAvay and Safi 2018). Immigrant segregation appears to be in part maintained by discrimination on the Parisian housing market (Bonnet et al. 2016; Bunel et al. 2017) as well as native flight dynamics out of immigrant areas (Rathelot and Safi 2014; McAvay 2018a, b), particularly in areas near large public housing projects (Verdugo and Toma 2018).

These findings from France align with lessons from the U.S. about racial residential segregation. Massey and Denton (1993) emphasise how discrimination and race-based residential preferences create a segmented housing market that channel minorities into poor areas. They further make the argument that racial segregation and racial inequalities may more broadly operate as a mechanism of socioeconomic segregation and the concentration of poverty. If racial minorities have lower income on average, the spatial separation of racial groups would automatically result in segregation along class lines, separating high-income racial groups from low-income racial groups (Massey and Denton 1993; Reardon and Bischoff 2011). Quillian and Lagrange (2016) show that racial segregation and income segregation are correlated to a similar degree in France and the U.S., while McAvay and Safi (2018) show an overlap between ethnoracial and socioeconomic segregation at the individual level. Hence, it is possible that the rise in non-European immigrants and their spatial separation from natives may contribute to socioeconomic segregation in the French context.

17.2.2 The Role of Urban Policy and Public Housing

French urban policy emerges formally in the 1980s with the aim of reducing social inequalities, targeting specifically the so-called *quartiers sensibles* with large shares

of public housing. The main locus of state intervention in urban areas is the public housing sector, which provides low-rent government-owned or -subsidised units (*habitation à loyer modéré*, or HLM). Built in the post-war period to improve living conditions and resettle slum residents, public housing projects are now associated with socioeconomic disadvantage and the concentration of minorities in the *banlieues* (Lelévrier 2010). With the creation of 'priority zones,[3]' France implemented its first spatial affirmative action (Epstein 2011; Fol 2013). The most ambitious national-level urban policy plan was introduced in 2003, the *Loi Borloo*, with the aim of creating a social mix in priority zones through urban renewal and redistributive policies. The policies aimed to achieve a social mix by first demolishing public housing to create new real estate opportunities on the private market in these areas, with the aim of attracting the middle class; and second, by building new public housing units in areas where it is under-represented, in order to relocate poor households to more mixed spaces. While these policies are explicitly about class, many argue that they are implicitly concerned with the concentration of minorities (Epstein 2011).

More than a decade later, the social mix sought by the 2003 reform is largely considered a failure. Research even suggests that urban renewal and social mix policies had unintended consequences that contributed to reinforcing segregation. Studying these effects in the Paris area, Lelévrier (2010) shows that these policies triggered upper-class mobility out of the targeted areas, while poor households were relocated in disadvantaged areas, primarily in other sensitive urban zones. Thus, in contradiction with their stated aim, these policies actually resulted in a reconcentration of poverty by channelling similar SES households to similar areas. Further, despite the substantial resources invested in the targeted areas, Epstein (2011) emphasises the failure of spatial affirmative action as unemployment is still two times higher in sensitive urban zones compared to the national average.

Other unintended consequences of urban policy have unfolded in the public housing sector, revealing its ambiguous role in maintaining segregation. The urban policy has used public housing as a tool for maintaining social mix. The 2000 Urban Solidarity and Renewal law (SRU) made it mandatory for all cities to have at least 20% social housing. This would allow poor populations to live in more affluent municipalities and prevent them from being forced out of gentrifying areas with rising housing prices (Ribardière 2019). Yet evidence shows that the sector is strongly segregated along class lines. As income eligibility requirements are broad enough to include middle-class households, the public housing sector is not reserved for the poor (Whitehead and Scanlon 2007). However, the poorest residents tend to live in low-quality housing in poor areas, while high and middle-income households have access to higher-quality buildings in more attractive, central locations (Whitehead and Scanlon 2007; Lelévrier and Melic 2018). Public housing has also had ambiguous effects on the segregation of immigrants. A number of French urban studies have shown that social mix policies used in attributing public housing have resulted in informal racial profiling, by which the housing demand of non-European origin

[3] Specifically, the creation of priority educational zones ('ZEP') in 1981, followed by sensitive urban zones ('ZUS') in 1996.

immigrants is channelled towards lower quality units in deprived areas (Kirszbaum and Simon 2001; Sala Pala 2013; Bourgeois 2013). Cases of institutional discrimination have been brought in front of the French courts against public housing authorities in the name of social mix policies.

17.2.3 The Role of Rising Income Inequality

Like other Western societies, France has experienced rising income inequality since the end of the twentieth century. Research has sought to assess how growth in inequality impacts residential segregation. Evidence from the U.S. shows that rising income inequality spurred socioeconomic segregation between 1970 and 2000 (Watson 2009; Reardon and Bischoff 2011). Reardon and Bischoff (2011) specifically demonstrate that one of the main mechanisms underlying this link is the exacerbated concentration of affluent households, whereas the concentration of poverty is unaffected by rising inequality. A similar hypothesis has been tested in France regarding the role of financialisation of the economy in spatial inequalities. Using a wide-scale administrative dataset, Godechot (2013) shows that the increase of finance jobs and high wages in the sector has intensified the segregation of top incomes in Paris. Godechot (2013) attributes this rise in spatial segregation among the wealthiest to the development of financial districts in the Western areas of Paris as well as residential avoidance strategies among the upper classes.

17.3 Data and Methods

We use individual-level census data from 1990, 1999 and 2015 to document changes in occupational structure, immigration and residential segregation over the period. As the census does not collect household income, we also draw on administrative employee files linked to the Permanent Demographic Sample[4] (EDP-DADS) to measure trends in income inequality in Paris and in France.

The Paris Metro Area, displayed in Fig. 17.1, is defined according to the boundaries of the *Ile-de-France* region.[5] *Ile-de-France* is the most populous of all French regions, with a population of over 12 million residents. The region encompasses

[4] *L'échantillon démographique permanent* in French. EDP is a large scale panel that has been conducted by the French National Institute of Statistics since 1968 on the basis of census declarations and civil registries.

[5] An alternative would have been to use the urban area (*aire urbaine*) of Paris estimated by the French statistical institute and which is based on daily commuting patterns. Because it is revised periodically and has changed over the period, we preferred using the region that has stable boundaries. In practice, using either definition would have little effect on the results as the region includes 97% of the population of the urban area in 2013 and 99.9% of the population of the region is included in the urban area.

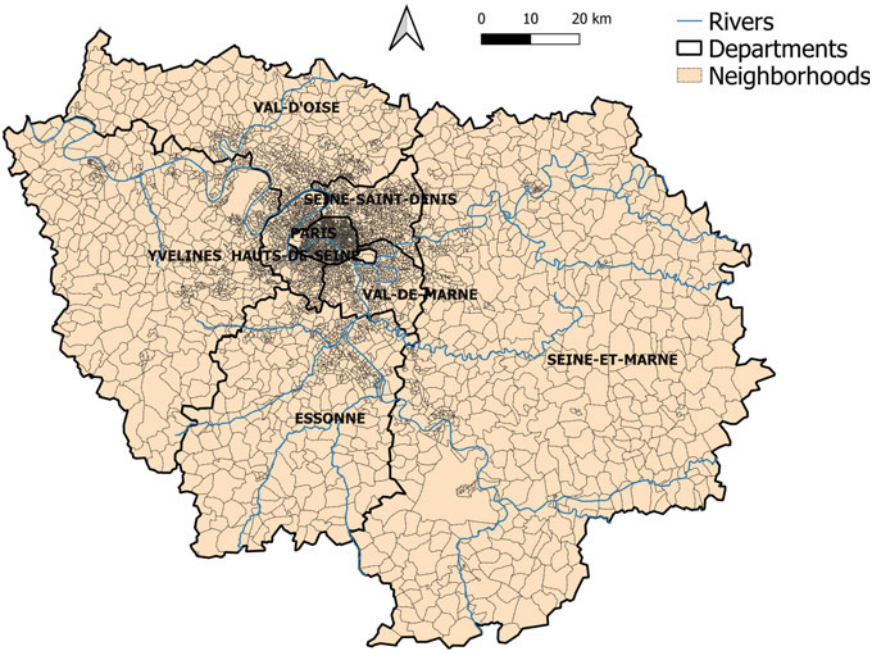

Fig. 17.1 Geography of the Paris metro area

1,276 municipalities and 8 departments: the city of Paris (about 2 million people), Essonne, Hauts-de-Seine, Seine-Saint-Denis, Seine-et-Marne, Val-de-Marne, Val-d'Oise, and Yvelines. The area is divided between the city of Paris at its core and the surrounding suburbs: the inner outskirts called the *petite couronne* and the outer suburbs known as the *grande couronne*. These zones have approximately the same number of inhabitants, but they differ widely in terms of housing prices, which are much higher in the municipality of Paris, and the type of housing, as only the *grande couronne* is composed of a significant share of single household units. While the share of social housing varies widely within each zone, it also tends to be lower in the outskirts. On the other hand, the Seine-Saint-Denis department in the northeast bordering the city of Paris is well-known for concentrating high shares of immigrants, public housing projects and the poorest population of the Paris metro area.

The neighbourhood scale used is IRIS ("aggregated units for statistical information"). IRIS are infra-municipality units of about 2,500 inhabitants for all municipalities of more than 10,000 inhabitants. IRIS was not implemented until 1999, prior to which a smaller division, the *îlot* was used. For the sake of comparability, INSEE provides a correspondence table to match the 1990 *îlots* with the 1999 IRIS code so that IRIS can be used at all dates.

We measure occupation using the French socioprofessional classification (*catégorie socio-professionelle*) of individuals reported in the census. We recode these categories into three socioeconomic status groups: top, middle, and bottom. The top

group includes managers and professionals. The middle group includes associate professionals, clerks, service workers, and craft workers. The bottom group includes machine operators and other skilled workers and unskilled workers.[6]

Immigrants are categorised using the double criteria of birth nationality and country of birth and are defined as persons born abroad without French citizenship at birth. We use the country of birth of immigrants to create a broad 'non-European immigrant' category. French natives are persons who are born French citizens, regardless of country of birth. Because they are French-born citizens, descendants of immigrants cannot be identified in the census and are thus counted as French natives.

We use maps to visualise changes in the distribution of various socioeconomic groups in the Paris metro region. In addition, we use dissimilarity and interaction indexes to measure socioeconomic and immigrant segregation (Reardon and O'Sullivan 2004). In all analyses, the sample is restricted to the employed[7] population of the Paris Metro area living in ordinary non-institutional households. Income inequality measures using EDP-DADS are calculated for full-time male employees aged 25–55.[8]

17.4 Results

17.4.1 Changes in Occupational Structure and Inequality

Three important changes have occurred in the composition of the Paris Metro area population since 1990: a sharp increase in top occupational groups, a growing number of immigrants, and rising income inequality. Figure 17.2 shows the change in the occupational structure of the area over time. While the middle class has remained relatively stable, the top occupational group climbed from 20 to 29% of the population while the bottom group declined by 8 pp. Compared to the national average, in 2015, the Paris region stands out with markedly more top occupational groups (29 vs 17% nationally) and fewer lower status groups (22 vs 14% nationally). Overall, this evidence of an upward socioeconomic shift with an increased share of top and top-middle occupational groups is consistent with the process of professionalisation described for the previous decades by Préteceille (1995) for Paris and by Hamnett

[6] In French, the categories are as follows: top (*chefs d'entreprise, professions libérales, cadres*); middle (*professions intermédiaires, techniciens, contremaîtres, agents de maîtrise, employées, personnels des services, artisans, commerçants et assimilés*); bottom (*ouvriers qualifiés, ouvriers non qualifiés*).

[7] This excludes inactive, retired and unemployed persons. Agricultural workers are further excluded given the small N for this category.

[8] We focus on male employees in order to avoid the comparisons of the evolution of income inequality affected by the increase in the labor force participation of women, which was substantial over the period.

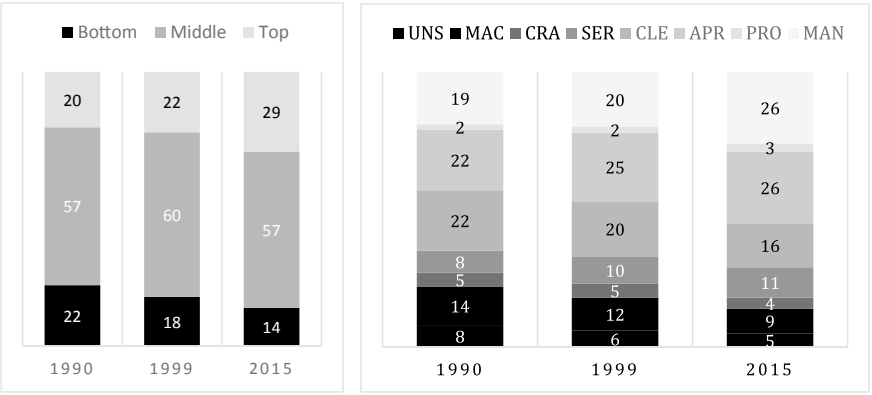

Fig. 17.2 Distribution of occupational groups (1990,1999, 2015). *Source* French Census (1990, 1999, 2015)

(1994, 2001) for London. As we do not find increases both at the top and bottom of the distribution, our results are inconsistent with the thesis of social polarisation (Sassen 1991).

The Paris metro area has also experienced an increase in the immigrant population. Between 1990 and 2015, the share of immigrants grew by 5 pp., reaching 23% in 2015, while the share of non-European immigrants increased from 9% in 1990 to 17% in 2015, which was more than twice the national average. However, changes in the occupational structure of the immigrant population differ strongly from the overall population. Immigrants, unlike natives, did not experience a strong increase at the top of the occupational distribution. Rather, the middle group grew from 42 to 59% between 1990 and 2015 while the bottom group declined. This trend seems to be driven primarily by the entry of immigrants into the service sector, which increased by 7% between 1990 and 2015.

Income inequality dynamics have also evolved in relation to these compositional changes. According to the GINI index, levels of inequality appear to be quite stable at 0.36, consistent with prior findings (Verdugo 2014). However, wage percentile ratios indicate rising inequality. In 2015, the top 1% earned 11 times the wages of the first decile, which is an increase of one point since 1990 and 4 points higher than the national average. Changes in income inequality thus appear to reflect rising wages among top earners.

Finally, it is of note that the increasing presence of the upper classes in the Paris metro area resonates with changes in housing tenure. Homeownership rates in the area, though lower than the national average, grew by 4 pp. reaching 47% in 2015, while renting on the private market dropped to 31%. Social housing occupancy remained relatively stable at 22%.

17.4.2 *Residential Patterns of Occupational Groups in the Paris Metro Area*

We now turn to explore the spatial distribution of occupational groups in Figs. 17.3, 17.4 and 17.5. All maps show a concentration of the top occupational groups in the western neighbourhoods of the city of Paris as well as the western suburban departments of Hauts-de-Seine and Yvelines. In contrast, the upper classes are largely under-represented in the northern neighbourhoods of Paris and the northern and eastern departments of Seine-Saint-Denis and Val de Marne, areas where a strong presence of bottom occupational groups is found (Fig. 17.3). Yet despite this evidence of spatial polarisation between the top and bottom groups, the Paris metro area is still largely composed of middle or mixed neighbourhoods, as illustrated by Fig. 17.4. Further, neighbourhoods in the Paris metro area are characterised more by the concentration of affluence than the concentration of disadvantage. While there are indeed places where the bottom occupational groups are overrepresented (Fig. 17.3), there are almost no neighbourhoods where the share of this group exceeds 60% (Fig. 17.4).

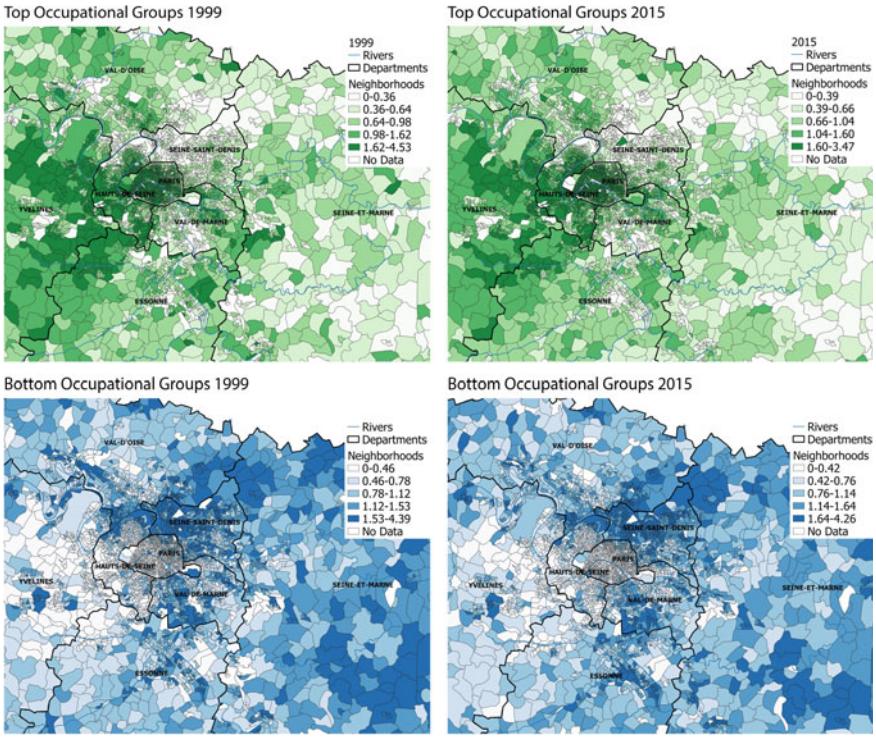

Fig. 17.3 Location quotient maps for the top and bottom occupational groups. *Source* French Census (1999, 2015)

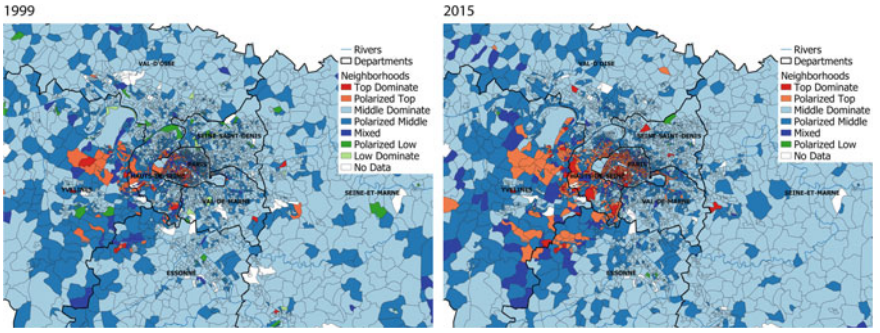

Fig. 17.4 Classification of neighbourhoods by socio-economic composition. *Source* French Census (1999, 2015). *Note* the socio-economic classification coding scheme here is identical to that used in the London chapter

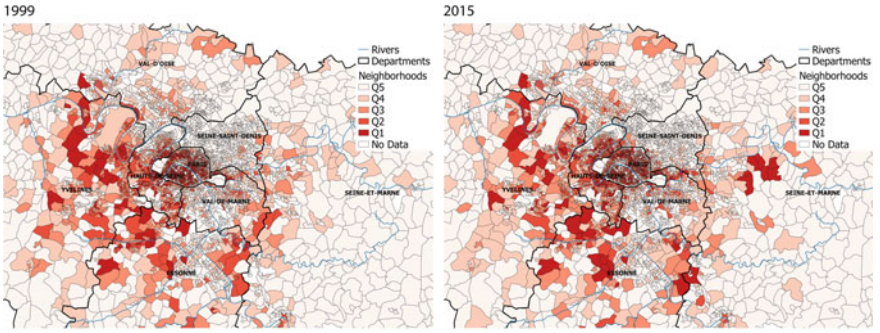

Fig. 17.5 Location of the top occupational groups. *Source* French Census (1999, 2015)

On the other hand, as shown in Fig. 17.4, neighbourhoods where the top dominate are more frequent.

Further, comparing the maps overtime points to a clear intensification of the spatial divide between the top and bottom groups between 1999 and 2015. As Fig. 17.4 best illustrates, the number of top and polarised top neighbourhoods in Paris and its western suburbs increased substantially over time. This process of gentrification is clearly visible in the city of Paris, which in 2015 was mostly composed of upper-class neighbourhoods, with the exception of the northern and some western parts of the city. Top occupational groups have also expanded their presence in the Eastern department of Seine et Marne and the southern department of Essonne, which, although relatively middle class, have more upper-class neighbourhoods in 2015 compared to 1999 (Fig. 17.5). The increase of top occupational groups in the Paris metro area was thus accompanied by spatial transformations linked to gentrification and a greater concentration of affluence.

17.4.3 Occupational and Immigrant Segregation

These structural and spatial trends suggest that socioeconomic segregation may be on the rise in the Paris metro area. Dissimilarity indexes for occupational groups are presented in Tables 17.1 and 17.2. First, no matter the year, the highest levels of segregation are observed between the top and bottom occupational groups. Moreover, the index for these groups increased slightly over the period from 0.47 to 0.49. Thus, in 2015, about half of the top occupational groups would have to change neighbourhoods for the population distribution to match that of the broader metro area. This level of segregation between the top and bottom groups is higher than the national average of 0.45. Further, looking at the more detailed occupational categories, the highest indexes are found between managers and professionals versus unskilled workers, machine operators but also middle-status groups such as clerks. Indexes for the top versus middle and middle versus bottom groups are, in contrast, lower and relatively stable over time. The index between the top and middle grew from 0.31 to 0.32 between 1990 and 1999, while the index between the middle and bottom declined from 0.22 to 0.21 between 1999 and 2015.

We further calculated interaction indexes to measure exposure or the degree to which occupational groups share the same residential spaces. While the dissimilarity indexes are relatively stable, changes in the interaction indexes point to the increasing isolation of the top occupational groups over time. In 1990, for an individual working in a bottom occupation, the average share of high-status individuals within the same neighbourhood was 37%; in 2015, it fell to 23%. Exposure also dropped by 8 pp. between the top and middle groups. Hence, as suggested earlier by the maps, changes

Table 17.1 Dissimilarity indexes (multiplied by 100) for occupational groups

1990	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS	UNE
MAN		25	27	38	36	28	47	53	39
PRO	29		42	51	48	39	59	63	50
APR	26	44		16	21	20	26	35	24
CLE	37	53	16		17	26	17	26	19
SER	33	47	22	20		24	18	24	13
CRA	30	42	24	30	27		30	37	27
MAC	45	59	26	17	21	33		16	18
UNS	51	63	35	28	27	39	19		20
UNE	38	52	25	21	17	30	19	22	

1999	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS	UNE
MAN									
PRO	23								
APR	26	40							
CLE	40	52	18						
SER	37	48	20	15					
CRA	28	37	19	26	24				
MAC	47	58	26	15	16	30			
UNS	52	61	32	21	21	35	15		
UNE	36	46	20	17	11	25	18	22	

Source French Census (1990, 1999, 2015)

Table 17.2 Dissimilarity Indexes (multiplied by 100) between Top, Middle and Bottom groups

	1990	1999	2015
TOP - MID	31	32	32
TOP - BOT	47	49	49
MID - BOT	22	22	21

Source French Census (1990, 1999, 2015)

in socioeconomic segregation are linked to an intensified concentration of the most affluent groups within specific neighbourhoods.

Turning to immigrant segregation, levels of segregation between immigrants and French natives are lower overall than occupational segregation and quite stable over-time at 0.26. Between non-European immigrants and natives, the index is much higher and more comparable to the separation of top versus bottom occupational groups, at 0.37 in 1990. Yet, the data suggest that non-Europeans are becoming less segregated from natives over time, as dissimilarity indexes for this group fell by 5 pp. over the period. This trend may be spurred by the shift upward from bottom to middle occupations among immigrants discussed earlier. Again, however, the interaction indexes nuance this picture. Indexes for natives versus immigrants and non-Europeans are high, indicating a relatively strong degree of contact within neighbourhoods, due to the large share of natives. However, the probability of interaction also declines significantly over time, by 6 p.p. for the exposure of immigrants to natives and 8 p.p. for non-Europeans versus natives. In 2015, interaction indexes are 0.73 and 0.71 for Non-Europeans and immigrants, respectively. Thus, the immigrant population appears to be residing more and more in areas with fewer natives.

Our final analysis aims to assess the extent to which socioeconomic and immigrant segregation are correlated in the Paris metro area. Do lower-class, disadvantaged neighbourhoods have higher concentrations of immigrants, and if so, has this correlation weakened or intensified over time? Panel A in Table 17.3 shows cross-sectional correlations between the share of occupational groups, unemployment rates

Table 17.3 Correlations between occupational groups, unemployment and immigration within neighborhoods

	A. Cross-sectional correlations			
	Immigrant Share		Non-European Immigrant Share	
	1999	2015	1999	2015
Share of Bottom SES	0.46*	0.50*	0.47*	0.55*
Share of Middle SES	-0.18*	0.14*	-0.10*	0.22*
Share Top SES	-0.24*	-0.36*	-0.29*	-0.43*
Unemployment Rate	0.70*	0.73*	0.72*	0.78*

	B. Correlations of changes in Census-tract Composition	
	Delta Immigrant Share 1999–2015	Delta Non-European Immigrant Share 1999–2015
Delta Bottom	0.29*	0.21*
Delta Middle	0.01	0.08*
Delta Top	-0.25*	-0.27*
Delta Unemployment	0.38*	0.36*

Source French Census (1999, 2015). Table shows Pearson correlation coefficients* $p < 0.05$

and immigrant shares of neighbourhoods in the area. In both 1999 and 2015, greater shares of immigrants are strongly positively correlated with the share of bottom occupational groups and high unemployment rates in neighbourhoods. On the other hand, the presence of immigrants—especially of non-European origin—is negatively linked with the share of top occupational groups. Interestingly, however, while the share of immigrants in neighbourhoods was negatively correlated with the presence of middle groups in 1999, this correlation turned positive—if still weak—in 2015.

All in all, the correlation between immigrant-dense and low-SES neighbourhoods become markedly stronger between 1999 and 2015. This is confirmed in panel B in which we report the correlations between the *changes* in shares of immigrants, low and high-status groups and unemployment rates in neighbourhoods between 1999 and 2015. Clearly, neighbourhoods that experienced an influx of immigrants or non-European immigrants saw a significant reduction in the shares of high-status groups, an increase in unemployment and a rise in the share of low-status occupations. While not causal, these patterns suggest that immigrant neighbourhoods tend to increasingly concentrate disadvantage along with a "flight" of the upper classes from these spaces.

17.5 Conclusion

This chapter explored changes in occupational structure, income inequality and immigration in the Paris metro area between 1990 and 2015 and ways in which these changes shaped the spatial divide between socioeconomic groups and immigrants and natives. We find that a shift to the top of the occupational distribution occurred in recent decades with a substantial increase in the share of top occupations and a drop in low-status groups. Income inequality also grew over the period, driven by rising wages among the top 1% earners.

At first glance, residential segregation between occupational groups appeared to change only marginally in conjunction with these evolutions. Dissimilarity indexes remained quite stable, with only a small increase observed between the bottom and top occupational groups. Segregation further appeared to decrease slightly between middle and bottom occupations. However, the dissimilarity indexes mask increasing spatial homogeneity over the period, as interaction indexes reveal that the upper classes have become substantially less likely to share the same neighbourhoods with other groups. In line with this lower degree of contact between SES groups, the maps showed an expansion of high-status neighbourhoods in the Western suburbs of Paris and the city centre. These trends align with evidence of gentrification and the growing spatial isolation of the upper classes highlighted in previous studies (Préteceille 2006; Godechot 2013; Ribardière 2019), and lend support to the hypothesis that income inequality, likely related to the expanding financial sector (Godechot 2013), has contributed to the intensification of socioeconomic residential segregation in the Paris area.

We further investigated changes in the residential segregation of immigrants and its relation to socioeconomic segregation. The findings show that segregation is

highest between Non-Europeans and natives, much stronger than levels of segregation for immigrants overall and for most occupational groups. Further, although dissimilarity indexes remained stable or dropped somewhat between immigrants and natives, interaction indexes again revealed decreasing contact between these groups within neighbourhoods over time. Moreover, while immigrants have entered the middle occupational groups over the period, the correlation in neighbourhoods between low socioeconomic status, high unemployment and the presence of immigrants is strong and growing. These trends may reflect the effects of discrimination or native flight processes—especially among the upper classes—which consolidate disadvantage within neighbourhoods that have high shares of immigrants. Overall, socioeconomic and immigrant segregation are tightly correlated, and increasingly so over time.

A limitation of our analysis is that we do not observe second-generation immigrants. Descendants of immigrants who are not living with their parents are not identified as such in the census and are thus counted as French natives. It is possible that the stability and even decline in the dissimilarity indexes between Non-European immigrants and natives masks an increase in the share of second-generation immigrants in the neighbourhood. This would coincide with prior research that shows similar levels of residential segregation and disadvantage for second generations compared to their parents (McAvay 2018a, b; McAvay and Safi 2018). While plausible, this claim should be nuanced by the fact that second generations of non-European origin living independently from their parents accounted for about 3% of the French population in 2015 (Brutel 2017).

All in all, it is notable that, as prior research has highlighted, the intensification of spatial inequalities documented here is at odds with recent French urban policy initiatives that have explicitly sought to curtail socioeconomic segregation, particularly by renewing disadvantaged urban areas to attract middle and upper-class households (Lelévrier 2010; Epstein 2011; Fol 2013). As the Paris area becomes more gentrified and wages are rising among the wealthiest households, the upper classes are better able to implement strategies to avoid poor or ethnoracially diverse areas, while prohibitive housing prices and discrimination keep poor households and immigrants out of upper-class neighbourhoods. It also seems likely that the conjunction of socioeconomic disadvantage and the presence of immigrants within neighbourhoods will reinforce white flight and avoidance processes as these areas become stigmatised both due to their class and ethnic composition. At the same time, the reduced social and residential mobility prospects of people living in poor areas, particularly minorities, compounds socio-spatial inequalities. Rather than investing in costly transformations of targeted urban neighbourhoods, more effective redistributive policymaking might aim at favouring social mobility opportunities among minorities and disadvantaged groups.

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Part VI
North America

Chapter 18
Growing Income Inequality and Socioeconomic Segregation in the Chicago Region

Janet L. Smith, Zafer Sonmez, and Nicholas Zettel

Abstract Income inequality in the United States has been growing since the 1980s and is particularly noticeable in large urban areas like the Chicago metro region. While not as high as New York or Los Angeles, the Gini Coefficient for the Chicago metro area (.48) was the same as the United States in 2015 but rising at a faster rate, suggesting it will surpass the US national level in 2020. This chapter examines the Chicago region's growing income inequality since 1980 using US Census data collected in 1990, 2000, 2010, and 2015, focusing on where people live based on occupation as well as income. When mapped out, the data shows a city and region that is becoming more segregated by occupation and income as it becomes both richer and poorer. A result is a shrinking number of middle-class and mixed neighbourhoods. The resulting patterns of socioeconomic spatial segregation also align with patterns of racial/ethnic segregation attributed to historical housing development and market segmentation, as well as recent efforts to advance Chicago as a global city through tourism and real estate development.

Keywords Chicago region · Socio-economic segregation · Spatial segregation · Occupational structure

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18.1 Introduction

In the United States, changes in the relative size and wages of different occupational groups (i.e., occupational structure) are central to understanding socioeconomic segregation (Mouw and Kalleberg 2010). By socioeconomic segregation, we mean 'residential segregation of population groups based on occupation and income' (Tammaru et al. 2016). It is empirically shown that there is a strong relationship between occupations, socioeconomic status, and resulting income distribution in American cities. Mouw and Kalleberg note that 'Between-occupation changes explain 66% of the increase in inequality from 1992/1994 to 2007/2008, and the explanatory power of occupations (the proportion of inequality explained by occupation codes) has risen from 0.382 in 1983 to 0.433 in 2008 (2010: 427). Similarly, Glaeser et al. (2009) show that occupations are a better indicator than conventional measures of human capital (i.e., the share of adults with college degrees and the share of adults who are high school graduates) in explaining income inequality. The same study also notes that 'not only do contemporaneous skill levels predict inequality, but inequality of skills in 1980 predicts an increase in income inequality since then' (2009: 630). This research supports using occupations as a proxy for determining residents' socioeconomic status.

In this chapter, we examine socioeconomic segregation in the Chicago region through the lens of occupations as well as income. The region is an interesting case given Chicago's industrial history and its evolution to become a post-industrial global city, growing as a 'command and control' centre for finance and banking as well as the commodities market (Abu-Lughod 2000). However, it has not been a straight path to social polarization as Sassen (1991) would predict, and likely because, as Hamnett (1994) might suggest: Chicago's economic trendlines did not align with Los Angeles and New York in the 1970s and 1980s. In contrast, the region experienced a more prolonged decline in manufacturing, primarily because of the diversity within the industry. Further, while it is consistently in the top ten in the United States for receiving immigrants, the net gain in population has not offset outmigration and shrinking family size (Pletz 2019). Finally, a relatively large African American population in the City is often competing with immigrants for lower-paid jobs.

Still, Chicago has worked hard to make itself a global city by building upon its assets. This includes its location, which is a major crossroad for the movement of goods to and from national and international destinations through different modes of freight transportation (rail, truck, air and water). Large scale public works helped transform Chicago's downtown, its river and lakefront, and its public housing (Bennett 2012). At the same time, the city 'incentivized' private investment through tax-increment financing and other tax breaks. This includes the addition of more than 40,000 new units of higher-end housing since 2010 (about 3% of the total housing stock), with more than half in the city centre and nearby neighbourhoods (Realpage.com 2018). While these efforts have attracted higher-income people to live in the region, tourism has attracted nearly 58 million visitors in 2018 (Rackl 2019). To

Fig. 18.1 Chicago metropolitan region

accommodate these newcomers, there has been a significant expansion of the retail, entertainment, accommodation and personal services sectors, which generally pay lower wages and offer limited benefits.

18.2 The Chicago Region

The Chicago metro region is comprised of the 14-county Chicago-Naperville-Elgin Metropolitan Statistical Area (MSA) that includes three states (Fig. 18.1).[1] Approximately 9.5 million people live in the MSA, with more than 90% in nine northeastern counties in the state of Illinois and the remainder in the states of Indiana and

[1]Metropolitan statistical areas consist of the county or counties (or equivalent entities) associated with at least one urbanized area of at least 50,000 people, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties. A micropolitan statistical area consists of the county or counties associated with at least one urban cluster of at least 10,000 but less than 50,000 people, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties. The Chicago MSA contains 2,215 census tracts, which are bounded areas used by the US Census Bureau to collect data and to allow statistical comparisons over time. Based on the population size of between 1,200 and 8,000 people (the optimum size is 4,000 people), census tracts are often equated with neighbourhoods.

Wisconsin; four counties in northwestern Indiana and one county in southeastern Wisconsin.[2] The Chicago region is the third most populous MSA in the United States after Los Angeles and New York, and it is the tenth-largest among the OECD metro-regions. It is approximately 7,196 square miles (18,638 km^2) with a population density of about 1,325 people per square mile. While now considered one nearly continuous urbanized area, the region began as a collection of settlements, which at the time were mostly farm centres or industrial towns (Keating 2005). Today, the region has very little land that is classified as rural and most of the industrial towns are now suburbs of the City of Chicago, which is the largest settlement in the region with 2.7 million people. The next largest is the suburb of Aurora, which has about 200,000 people.

18.2.1 The Economy

The Chicago region is a major employment centre with about 4.7 million people employed in the region in 2015, which was a 9.3% increase from 2000. As with many older urban areas, there has been a shift in the location of work as new employment centres have formed outside the city centre in suburban locations. However, the City of Chicago remains the home to many corporate headquarters and has been aggressively recruiting new firms with attention to technology. The region's top 10 employment clusters based on employment size are: Business Services (383,000), Distribution and Electronic Commerce (250,000), Education and Knowledge Creation (135,000), Financial Services (90,000), Transportation and Logistics (85,000), Hospitality and Tourism (79,000), Marketing, Design and Publishing (78,000), Insurance Services (53,000), Food Processing and Manufacturing (36,000), and Production Technology and Heavy Machinery (35,000).[3]

About 63% of the population is of working age (18–64 years old; the median age is 37.4 years). A significant concern for the region and generally in the United States is that the average age of workers in manufacturing is much higher (around 55 years old). While employment in this segment is declining, there still is a demand for workers, but fewer younger people are filling job openings in this industry. Workforce development efforts are focused on closing the growing skills gap needed to fill manufacturing jobs and other tech-related sectors. While unemployment is relatively low at around 5% for the region, it varies by race/ethnicity, with unemployment among working-age African Americans about three times higher than Whites and two times higher than Latinos (CMAP 2018). In addition, about 20% of working-age people do not participate in the labour force at all. This includes people who have

[2]The source of socio-economic data in this section, unless noted otherwise, is the US Census Bureau (2017) American Community Survey 1-year estimates for the Chicago-Naperville-Elgin, IL-IN-WI Metro Area.

[3]These data are from The U.S. Cluster Mapping Project https://www.clustermapping.us/.

been unemployed for more than two years, people with disabilities and others who may be at-home caregivers.

A draw for employers to the Chicago region is a relatively well-educated workforce. About 89% of all adults who are 25 or older have a high school degree or higher, which is about the same as the US rate; however, for those holding a bachelor's degree or higher (38%), the region is above the US average (32%).

18.2.2 The Welfare System

The United States is a mix of centralized and decentralized welfare policies and programs administered through state and local governments. Most public support programs for households are means-tested regardless of source, while federal funds aimed at community improvement and economic development are based on entitlement formulas determined by the level of poverty and other conditions indicative of need (e.g. housing quality) in a city or county. Income support is based on household needs and income level. Only about 2% of the households in the Chicago region receive some form of public assistance or welfare and an additional 4% get supplemental income due to having a disability. In addition, about 9% of households receive monthly public assistance for food (i.e. food stamps). Generally, income support does not move most people out of poverty, which means they usually live in lower-income communities where they can find affordable housing.

18.2.3 Demographics

With an average of 2.7 persons per household, there are 3,488,312 households in the region with 30% living in the City of Chicago. Of this total, 60% are couples (with and without children), which is about the same as the US ratio. The remaining portion is split into households of non-related people (e.g., roommates, unmarried couples), and single adults with or without children. The racial makeup of the region is 53% Non-Latino White (White), 22% Latino (any race), 16% Non-Latino African Americans, and 7% Asian. The remaining population is either Native American or Pacific Islander or people who identified as more than one race. In comparison to the United States, the region is more diverse, with higher rates of Latino, African Americans and Asians, and slightly lower rates of Non-Latino Whites. This diversity overall in the region is expected to continue as the Asian and Latino population is projected to grow.

Residentially, however, the region is highly segregated by race and ethnicity, and especially divided by large concentrations of Whites that live in the region's suburban neighbourhoods as Fig. 18.2 illustrates. The greatest rate of segregation is between Whites and Blacks with a Dissimilarity Index of 0.753 followed by 0.524 for Latinos and Non-Latinos (Governing Magazine 2018). While this is an improvement from

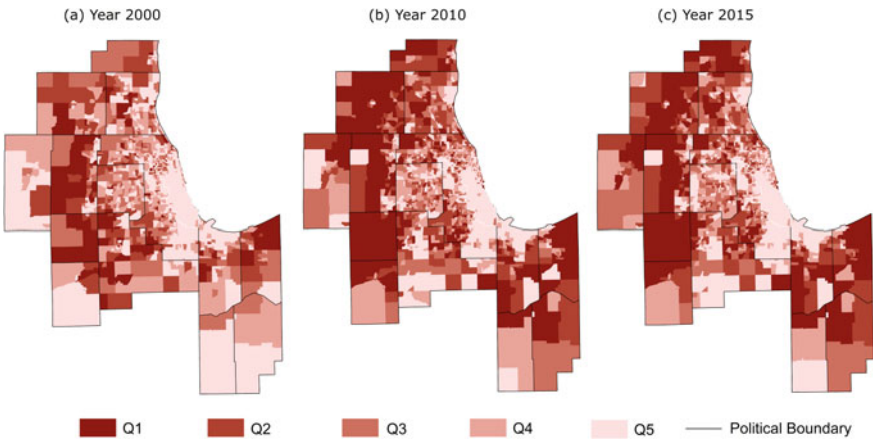


Fig. 18.2 Spatial distribution of Non-Latino White population, 2000, 2010, 2015

previous decades, the current data suggests there has been no change since 2010 in the Black-White score. One reason may be the increase in the White population in the City of Chicago that is concentrating on the north side and in the city centre. Most are in the 25- to 34-year-old age group and often single, without children. At the same time, there has been a decline in the Black population, mostly families with children on the south and west sides of the city. When combined, it appears that young White people are *replacing but not necessarily displacing* African American families from Chicago. This is important to keep in mind when looking at changes in socioeconomic patterns.

18.2.4 The Housing System

Housing in the United States is primarily privately owned property, purchased with a mortgage from a financial institution (the typical length of the loan is 30 years). Currently, nearly 64% of households in the Chicago region are homeowners, with most living in single-family homes (detached and attached). Ownership is generally higher in suburban and exurban areas (75–80%) and lower in the City of Chicago (45%). The median value of a single-family home in the region is about $240,000, which while slightly higher than the United States, is still below pre-recession values for the region. In contrast, median rents are at their highest at nearly $1,100 a month, which is about the same as a median mortgage payment. As a result, more than half of the renters in the region are 'burdened' because of their low incomes (i.e., paying more than 30% of income for housing costs) and most are very low income. In comparison, only 34% of owners are burdened, and most of them earn higher incomes.

The region does have public housing and other forms of subsidized housing via rental assistance programs and funding for development; however, it only benefits about 17% of renters. Public housing has also contributed to economic and racial segregation since most of it was built in the City of Chicago in the 1950s and 1960s in predominantly African American communities. While housing choice vouchers have given families the opportunity to use their rental assistance anywhere in the region, most voucher holders live in lower-income areas where there is more affordable rental housing available.

As the following analysis illustrates, there are clear patterns of socioeconomic concentration and segregation. While tied historically to uneven development, most is attributed to long-standing lending and real estate practices coupled with discrimination based on race and ethnicity (MPC 2017). Despite it being illegal since the 1960s in the United States to discriminate based on race or ethnicity in both the housing and labour market, changing the racial, spatial patterns has been slow, especially in suburban areas where Whites have historically had higher income levels, better access to capital and more personal wealth than non-Whites. This divide is evident in the rates of ownership and home values by the three major population groups in the region: Blacks are at 41% ownership with a median housing value of $140,000, Latinos have a 53% ownership rate and median home value of $160,000, and Whites have a 76% ownership rate and median home value of $225,000 (Institute for Research on Race and Public Policy 2018).[4]

18.3 Analysis and Results

18.3.1 Income Inequality

Income inequality has increased considerably in the Chicago region since 1980 and at a faster rate than in the United States (see Table 18.1).[5] The region's Gini coefficient increased nearly 36% from 0.35 in 1980 to 0.48 in 2015, while it increased only 19% in the country. This trend is important considering that in 1980, Chicago's Gini coefficient was well below the United States, and how it has grown at a much faster rate in the last 15 years (13.3% compared to 3.7%).

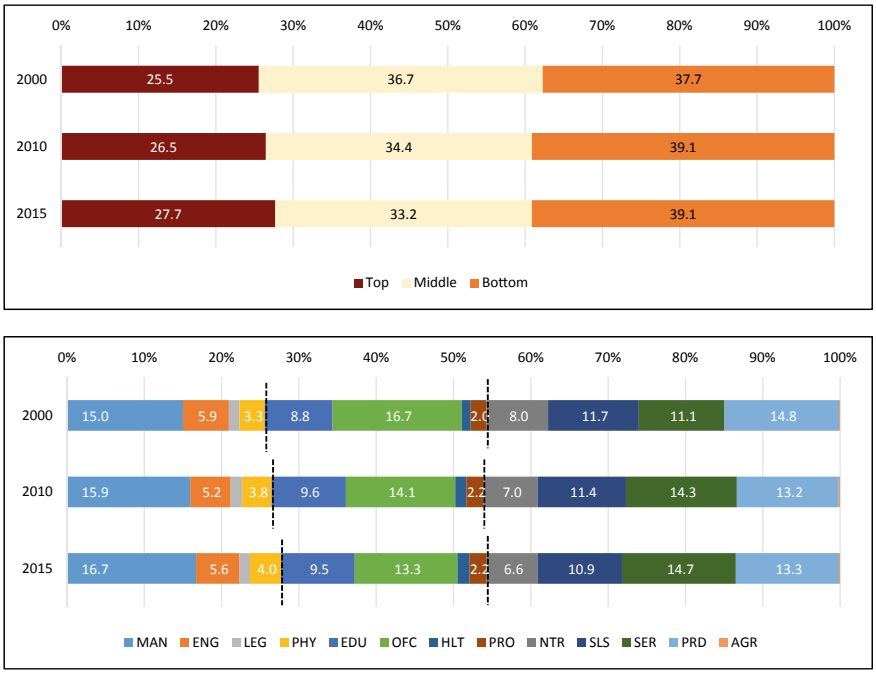
This pattern is consistent with the global city literature, which posits that cities such as Chicago, which serve as command and control centres in the world economy and help sustain a polarized labour force in terms of skill and wage levels (Sassen 1991; Zhong et al. 2007). Faster growing inequality in Chicago also suggests that

[4]This report used data from the US Census, American Community Survey, 2010–2014.

[5]The Gini index was constructed with data from the Integrated Public-Use Micro-Samples (IPUMS) for the 1980, 1990, and 2000 US Censuses and 2013–2017 American Community Survey. We use household income, which means that single households and households with children are evaluated the same. Using household income instead of per capita income is consistent with most studies conducted in the US (Glaeser et al. 2009; Florida and Mellander 2016).

Table 18.1 Gini coefficient for Chicago region and United States, 1980, 1990, 2000, 2010, 2015

	1980	1990	2000	2010	2015	1980–1990 (%)	1990–2000 (%)	2000–2010 (%)	2010–2015 (%)
Chicago region	0.35	0.40	0.42	0.47	0.48	12.2	7.4	9.8	3.2
United States	0.40	0.42	0.46	0.47	0.48	6.2	7.9	1.7	1.9



Note: Please see Appendix for occupational description.

Fig. 18.3 Distribution of occupational groups 2000, 2010 and 2015. *Note* Please see Appendix for occupational description

drivers of income inequality such as disparities in educational attainment and returns to human capital, and changes in occupational structure, are more pronounced at the regional level than at the national level. Projections for employment by occupation groups in 2026 support this trend continuing and the middle occupational groups continuing to shrink faster in Illinois than the nation.[6]

18.3.2 Occupational Structure

The following data suggests that the period preceding the 2008 recession and the recovery after affected growth in occupations unevenly. Figure 18.3 shows the middle groups shrinking before and after the recession, decreasing 3.5% points between 2000 and 2015, while the top and bottom groups grew by more than 2 and 1% points, respectively. Looking more closely at the distribution of occupations within

[6]Based on data from the Illinois Department of Economic Security, Illinois will change its distribution of occupations by 2026 as follows: Top (+0.6), Middle (−1.1), Bottom (+0.5), while the US will change: Top (+0.8), Middle (−0.7), Bottom (−0.1). The Chicago region population is approximately 70% of the state.

these three categories, we see that the middle group has not decreased proportionately across occupations and nor have the top and bottom groups increased proportionately between 2000 and 2015.

18.3.3 Dissimilarity Index

Looking at the segregation of top and bottom occupation groups, the Chicago region's Dissimilarity Index appears to also be rising, increasing from 0.31 in 2000 to 0.32 in 2010 to 0.33 in 2015. This trend suggests a high degree of residential segregation based on occupations, where nearly a third of the employed population with top occupations (or bottom occupations) would have to move from one neighborhood to another in order to produce a completely even distribution of the two occupational groups in the region.[7] There are several potential explanations for the change in the DI during this time period. An important factor to consider is the recession caused by the financial and housing market crash in 2008, which contributed to a significant increase in unemployment by 2010 (10.6%, up from 4.3% in 2000) that has nearly returned to post-recession rates by 2015 (5.9%) (FRED 2019). The increase in the DI scores since 2000 suggests that new employees that joined the region's labour force in the top and bottom categories disproportionally lived in—or chose to move to—neighbourhoods with an already high concentration of these respective groups, therefore exacerbating rather than reducing existing occupational spatial segregation.

Tables 18.2 and 18.3 provide evidence of the degree to which residents with different occupations live in the same neighborhood by computing DI for every occupation pair. Dissimilarity Index values between occupations provide a more detailed measure of evenness in residential distribution based on occupations in the region. Several patterns emerge. First, DI values are relatively stable between 2000 and 2015, indicating that the overall residential pattern based on occupations has not changed significantly in the last 15 years. Second, DI values between top occupations (e.g. MAN and ENG) or middle occupations (e.g. PRD and SER) are relatively small, suggesting that residents with similar socioeconomic status tend to live in the same neighbourhoods. Third, the highest DI values are observed between top and bottom occupations.[8] This suggests that residents in top and bottom occupations

[7] In order to check the robustness of the results to differences in how top and bottom occupations are defined, we constructed two alternatives DIs using different definitions, first restricting the top occupational category to the top three paying occupations while holding the bottom constant, and then we kept the top occupational category the same and expanded the bottom category to include a middle occupation (i.e. Office and administrative support occupations). The results are not significantly different from those presented in the text.

[8] Dissimilarity between Agriculture (AGR) and top occupations (MAN, ENG, LEG, PHY) is the highest, but we do not want to emphasize this pattern as AGR exhibits high DI value with all occupations in general. Also, AGR occupations account for a very small share of the regional total (around 0.1%) in any given year, and located in isolated, rural parts of the region.

Table 18.2 Dissimilarity indexes (multiplied by 100) by occupation, 2000 and 2010

	MAN	ENG	LEG	PHY	EDU	OFC	HLT	PRO	NTR	SLS	SER	PRD	AGR	UNE	TOP	MID	BOT
MAN		22	39	24	22	29	44	46	40	20	38	43	86	39			
ENG	18		45	30	26	32	46	49	44	26	40	46	87	42			
LEG	35	41		42	43	53	60	61	61	46	57	63	89	58			
PHY	21	27	37		28	34	44	48	43	27	41	46	86	43			
EDU	20	24	37	23		26	41	41	38	23	32	39	85	33			
OFC	26	29	49	29	23		36	35	25	21	22	25	84	23			
HLT	37	38	54	35	32	27		45	39	39	40	41	84	39			
PRO	42	45	57	42	36	28	35		40	40	38	40	85	35			
NTR	37	40	57	38	35	21	32	34		32	27	24	80	30			
SLS	16	22	41	22	19	18	31	36	27		28	33	85	30			
SER	36	38	53	38	29	19	31	31	23	26		21	83	21			
PRD	42	44	60	43	37	23	34	34	20	31	17		81	25			
AGR	79	78	85	78	78	75	76	78	68	76	72	69		85			
UNE	49	52	62	51	43	35	43	39	42	42	31	35	78				
TOP																**26**	**32**
MID															**25**		**15**
BOT															**31**	**13**	

Note The lower quadrant presents DI values for 2000 while the upper quadrant presents DI values for 2010

Table 18.3 Dissimilarity indexes (multiplied by 100) by occupation, 2010 and 2015

	MAN	ENG	LEG	PHY	EDU	OFC	HLT	PRO	NTR	SLS	SER	PRD	AGR	UNE	TOP	MID	BOT
MAN		20	37	22	20	28	40	44	41	20	37	43	85	51			
ENG	22		43	27	24	31	42	47	44	26	39	46	85	53			
LEG	39	45		42	41	52	59	61	62	46	57	63	90	63			
PHY	24	30	42		26	32	41	46	43	27	41	46	86	54			
EDU	22	26	43	28		25	38	39	38	21	31	39	84	45			
OFC	29	32	53	34	26		32	33	25	19	21	25	81	39			
HLT	44	46	60	44	41	36		43	37	36	36	39	81	50			
PRO	46	49	61	48	41	35	45		40	38	36	39	84	45			
NTR	40	44	61	43	38	25	39	40		31	26	23	78	46			
SLS	20	26	46	27	23	21	39	40	32		26	32	83	43			
SER	38	40	57	41	32	22	40	38	27	28		19	81	34			
PRD	43	46	63	46	39	25	41	40	24	33	21		79	39			
AGR	86	87	89	86	85	84	84	85	80	85	83	81		85			
UNE	39	42	58	43	33	23	39	35	30	30	21	25	85				
TOP																**27**	**33**
MID															**26**		**15**
BOT															**32**	**15**	

Note The lower quadrant presents DI values for 2010, while the upper quadrant presents DI values for 2015

are more segregated from each other than each is with residents in middle occupations. However, it is notable that education (EDU) and sales (SLS) occupations exhibit relatively small DIs with three top occupations (MAN, ENG, PHY). In fact, EDU and SLS exhibit DI values as small as the ones observed among top occupations, suggesting that a significant number of teachers and sales associates are living in the same neighbourhoods as managers, engineers, and physicians. Finally, very low DI values between unemployed and service occupations suggest that either the unemployment rate is high for people in service occupations or that unemployed people, in general, tend to live in same neighbourhoods as people working in service occupations.

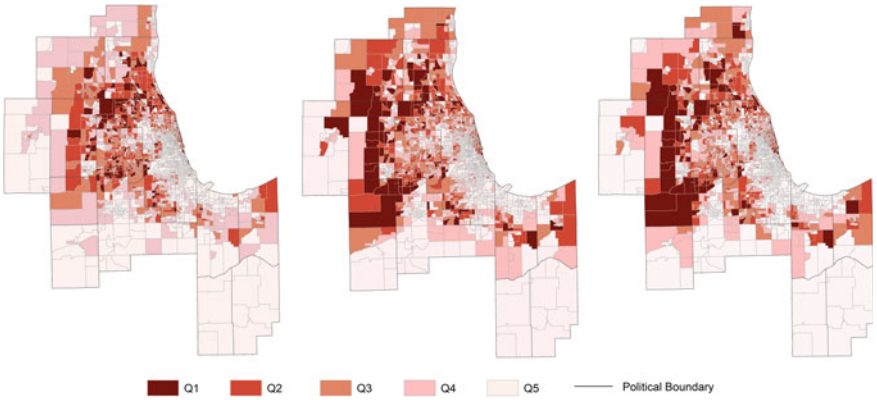


Fig. 18.4 Location of the top occupational group, 2000, 2010, 2015

18.3.4 Location of Top Occupational Groups

Our top occupational category consists of management occupations ($104,570); legal occupations ($92,290); computer and mathematical occupations ($85,820); architecture and engineering occupations ($78,790); health diagnosing and treating practitioners and other technical occupations ($69,240); business and financial operations occupations, ($71,420); and life, physical, and social science occupations ($63,870). Consistent with previous studies, the bottom occupational category includes healthcare support occupations ($29,440); food preparation and serving-related occupations ($22,220); building and grounds cleaning and maintenance occupations ($29,140); personal care and service occupations ($23,800); sales and related occupations ($29,500); farming, fishing, and forestry occupations ($28,130); production occupations ($34,390); transportation and material moving occupations ($31,760).

According to the US Bureau of Labor Statistics (BLS), the annual median wage in the Chicago MSA was $41,210 in 2018.[9] The top occupational category, on average, earns nearly twice as much as the regional average. In comparison, the lowest-paid occupations in the region earn on average 30% less than the regional median annual wage. As Fig. 18.4 illustrates, there is a clear pattern of spatial distribution and concentration by quintiles in the top occupational group. The top quintile (Q1) is largely concentrated in the northern part of Chicago along the Lake Michigan and the western and northwestern part of the region. Since 2000, the concentration of the top groups has increased in the northern part of Chicago and in its centre. At the same time, some neighbourhoods in the southwest side, which had been a concentration of Q2 and Q3 groups, are now Q4 and Q5. With the exception of a few rural neighbourhoods, suburban neighbourhoods remained a mix of Q1 and Q2.

[9]Wages and salaries are before tax and do not include nonproduction bonuses or employer costs of nonwage benefits, such as health insurance or employer contributions to retirement plans.

18.3.5 Location Quotients (LQs)

LQs allow us to examine the concentration of the top and bottom occupation categories in relative terms as they make neighbourhoods comparable (see Fig. 18.5). Overall, the percentile distribution and min/max of values align with the pattern found for the region by the dissimilarity index. First, the LQs for the top socioeconomic group are consistently larger than its equivalents for the bottom socioeconomic group, indicating that overall, the residential concentration for managers and professionals is more extreme than it is for unskilled workers. This spatial pattern is evident at the 99, 95 and 90 percentile levels. Second, higher mean and median values for the bottom socioeconomic group (1.04 and 1.0 respectively) than for the top socioeconomic group (both less than 1.00) suggests that there are more neighbourhoods in the Chicago region with a high concentration of unskilled workers than neighbourhoods with a high concentration of managers and professionals. Third, LQs for both groups are relatively stable across the time periods, suggesting that most neighbourhoods have sustained their character in terms of their occupation composition.

A closer look at the figures shows that growth in the Chicago region's DI since 2000 is likely driven by the neighbourhood choice of residents with top occupations, which has expanded in Chicago on the north side of the city and in some northern and western suburbs. This conclusion is based on finding that residents with top

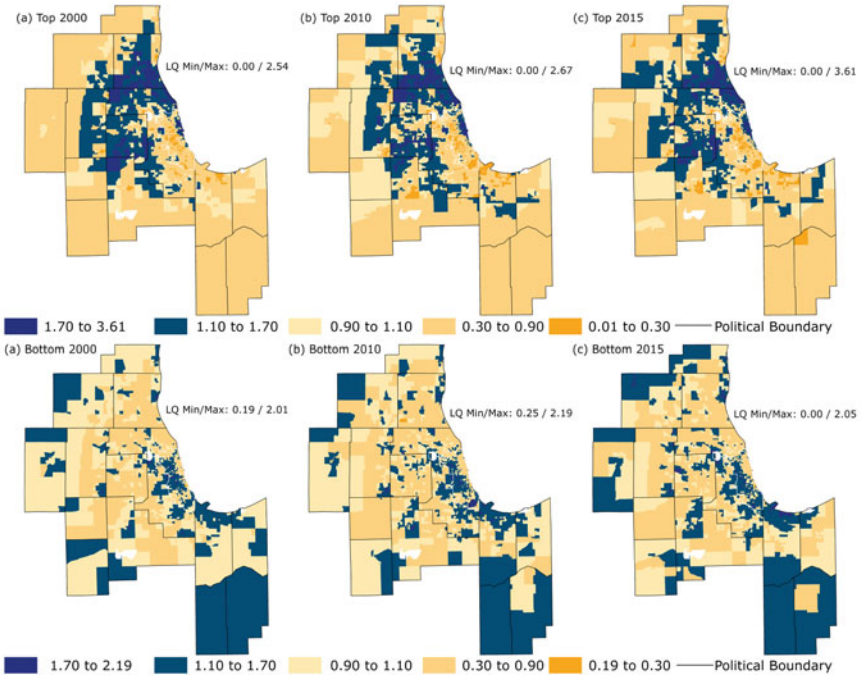


Fig. 18.5 Location quotient maps for the top and bottom occupational groups, 2000, 2010, 2015

occupations disproportionally added to those neighbourhoods with an already high concentration of top occupations (LQ > 1 for top occupations). Neighbourhoods with LQs larger than 1.00 in both 2000 and 2010 for the top occupational group gained a disproportionate share of the net increase in the top occupations (80% of total). At the same time, neighbourhoods with LQs less than 1.00 in both 2000 and 2010 for top occupations gained only 3% of the net increase in the top occupations. These numbers confirm our hypothesis that neighbourhoods with a high concentration of the top occupational group gained disproportionally more people in the top occupations than neighbourhoods with a low concentration of this group, thereby pushing the DI up.

Since the change in DI is driven by two components (residential changes of top and bottom occupational groups), we also must examine what happened to those residents in the bottom occupations during the same period. The large increase in bottom occupations (relative to the regional average) could be indicative of the regional economy, creating more low-paid/skilled jobs during the recession period. It is also possible that some of the existing residents in 2000 working in middle occupations lost their jobs during this period and transitioned to low-paid jobs, thus being re-classified in the bottom occupational group. For this type of change to push up the DI, at least one of two processes must have happened. First, residents working in low occupations would have to be disproportionally added to those neighbourhoods with an already high concentration of bottom occupations (LQ > 1.00 for bottom occupations). Second, residents with bottom occupations in low concentration neighbourhoods (LQ < 1.00 for bottom occupations) would have to lose their jobs at a faster rate than the regional average or relocate to high concentration neighbourhoods or leave the region.

While data limitations prevent us from providing a definitive answer to the latter process, it is possible to determine the net gains of neighbourhoods in the bottom occupational group (the former process). A closer look at the change in the location of residents with bottom occupations from 2000 to 2010 shows that 59,384 people, or 41% of the total net new people employed in the bottom occupations, were added to those neighbourhoods that have LQs larger than 1.00 in both 2000 and 2010. As the maps illustrate, these neighbourhoods are both in the City of Chicago and in the suburbs. Neighbourhoods with LQs less than 1.00 in both years gained approximately the same number of bottom occupations from 2000 to 2010 (61,422 or 42% of the total). These figures suggest that the location choice of residents with bottom occupations played a relatively small role in pushing DI in upward direction.

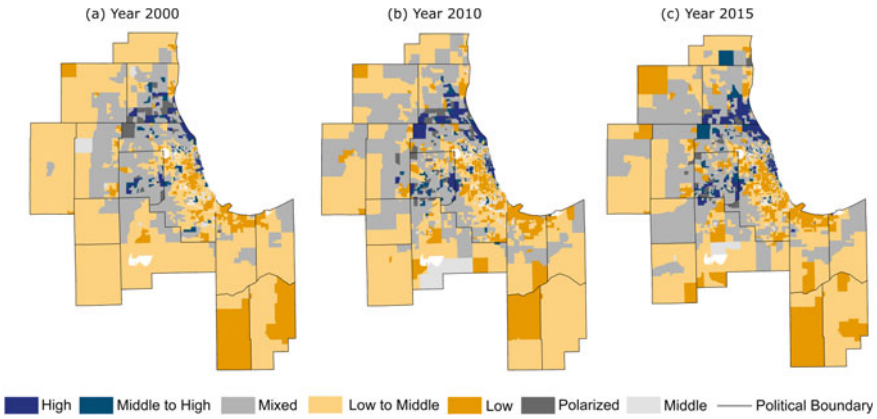


Fig. 18.6 Classification of neighbourhoods by socioeconomic composition, 2000, 2010, 2015

18.3.6 Residential Segregation Based on Socioeconomic Status

Using the aggregated occupational categories, we computed the percentage of the employed labour force in each census tract that falls into the top, middle, and bottom groups. Then, based on the local representation of those groups at different thresholds, we assigned neighbourhoods into a socioeconomic status (SES) typology (Marcinczak et al. 2015) and mapped them to show change over time (see Fig. 18.6).

Overall, three SES neighbourhood types account for more than 80% of all neighbourhoods in the Chicago region between 2000 and 2015: Mixed, Low to Middle, and Low. There is some variation in the share of each type during this period. For example, while Low-to-Middle neighbourhoods are the largest share in 2000 (37.5%) and 2010 (29.3%), Mixed neighbourhoods are the largest share in 2015 (29.5%). One pattern is consistent. The share of Middle and Low-to-Middle neighbourhoods is decreasing while the share of High, Low and Polarized neighbourhoods is increasing. The largest absolute increase from 2000 to 2015 was Low neighbourhoods with 181 neighbourhoods added in 15 years, increasing the share of this SES group from 18.7% in 2000 to 26.8% in 2015 (43.4% increase). Similarly, the share of High neighbourhoods increased significantly as well (81% increase), growing from 97 to 176 neighbourhoods. And while there were only 33 Polarized neighbourhoods in 2000, there are 72 of them in 2015 (nearly 118% increase).

18.4 Conclusion

These results suggest two trends in the Chicago region. First, an occupational shift is 'shrinking the middle' while also increasing the number of people in the bottom and top occupational groups. This is consistent with the global city literature on the social polarization of the workforce. Second, holding the occupation structure constant, residents with similar occupations at the top and bottom appear to be sorting themselves into neighbourhoods with people in similar occupations; for example, as discussed in the LQ section, residents with top occupations overwhelmingly choose to live in neighbourhoods with already high LQs for the top occupational group. The classification of neighbourhoods by socioeconomic composition reflects these trends, showing that the share of middle neighbourhoods is decreasing while the share of top and bottom neighbourhoods is increasing. This implies that social polarization has led to residential polarization between the top and bottom occupational groups. While we did not include race and ethnicity in the DI analysis, the spatial patterns suggest that the long history of racial segregation may be contributing to those residential patterns as well.

Looking ahead, given the large increase in the region's Gini score since 2000, the Chicago region appears to be on a trajectory toward greater income inequality in 2020 than the United States on average. We also expect that factors that have sustained racial and ethnic segregation (e.g. housing discrimination, unequal access to capital) will continue to contribute to this trend, but also that inequality will reinforce racial and ethnic segregation since most of the White population are currently in the top occupations while most African American and Latino people are in bottom occupations. Still, there are many variables that can affect these patterns of segregation and inequality in the future. This includes investment and development decisions in the region by both the private and public sector, which are somewhat hard to predict under current national economic policies (i.e. fluctuating tariffs and global trade wars, especially between United States and China). Furthermore, local policies can also shape the future, including efforts by the Chicago Metropolitan Agency for Planning to address segregation (CMAP 2018) and Chicago's new mayor elected in Spring of 2019, who ran on a platform of inclusion and equity, which may change where development occurs and who benefits in decades to come.

Appendix

See Tables 18.4, 18.5, 18.6, 18.7 and 18.8.

Table 18.4 Occupations included in the dissimilarity index

LABEL	Occupation	Group
MAN	Management, business, and financial occupations	Top
ENG	Computer, engineering, and science occupations	Top
LEG	Legal occupations	Top
PHY	Health diagnosing and treating practitioners and other technical occupations	Top
EDU	Education, community service, arts, and media occupations	Middle
OFC	Office and administrative support occupations	Middle
HLT	Health technologists and technicians	Middle
PRO	Protective service occupations	Middle
NTR	Natural resources, construction, and maintenance occupations	Bottom
SLS	Sales and-related occupations	Bottom
SER	Service occupations	Bottom
PRD	Production, transportation, and material moving occupations	Bottom
AGR	Farming, fishing, and forestry occupations	Bottom

Note The same set of occupations and groupings (top-middle-bottom) is used for DI, LQ, SES analyses. 2000 Census has an occupation class called "Farmers and farm managers" which did not exist in 2010 and 2015 datasets. To be able to present consistent DIs across years, this occupation is not included in the calculation of DI

Table 18.5 Socioprofessional grouping of occupations

Occupation	Group
Management occupations	Top
Business and financial operations occupations	Top
Computer and mathematical occupations	Top
Architecture and engineering occupations	Top
Life, physical, and social science occupations	Top
Legal occupations	Top
Health diagnosing and treating practitioners and other technical occupations	Top
Community and social services occupations	Middle
Education, training, and library occupations	Middle
Arts, design, entertainment, sports, and media occupations	Middle
Health technologists and technicians	Middle
Protective service occupations:	Middle
Office and administrative support occupations	Middle
Construction and extraction occupations	Middle
Installation, maintenance, and repair occupations	Middle
Healthcare support occupations	Bottom
Food preparation and serving-related occupations	Bottom
Building and grounds cleaning and maintenance occupations	Bottom
Personal care and service occupations	Bottom
Sales and related occupations	Bottom
Farming, fishing, and forestry occupations	Bottom
Production occupations	Bottom
Transportation occupations	Bottom
Material moving occupations	Bottom

Table 18.6 Cumulative percentile distribution of LQs for the top and bottom socioeconomic groups

	2000		2010		2015	
	Top SES	Bottom SES	Top SES	Bottom SES	Top SES	Bottom SES
MAX	2.54	2.01	2.67	2.19	3.61	2.05
99%	2.25	1.85	2.26	1.86	2.22	1.82
95%	1.90	1.60	1.91	1.67	1.92	1.65
90%	1.69	1.47	1.71	1.51	1.70	1.53
75%	1.27	1.23	1.30	1.26	1.29	1.29
MEAN	0.93	1.03	0.93	1.04	0.93	1.04
MEDIAN	0.85	1.00	0.84	0.99	0.85	1.00
25%	0.53	0.80	0.50	0.79	0.51	0.77
10%	0.34	0.68	0.30	0.63	0.30	0.61
5%	0.24	0.60	0.19	0.55	0.21	0.53
1%	0.14	0.44	0.05	0.40	0.11	0.39
MIN	0.00	0.19	0.00	0.25	0.00	0.00

Table 18.7 Classification of neighbourhoods by the share of socioprofessional groups

SES Coding	SES Category	Share of socioprofessional groups		
		High	Middle	Low
SES1	High SES Neighbourhoods	50% ≤	≤ 25%	≤ 25%
		50% ≤	≤ 25%	25–49%
		50% ≤	25–49%	≤ 25%
SES2	Middle to High SES Neighbourhoods	25–49%	25–49%	≤ 25%
		25–49%	50% ≤	≤ 25%
SES3	Mixed SES Neighbourhoods	25–49%	25–49%	25–49%
SES4	Low to middle SES Neighbourhoods	≤ 25%	25–49%	25–49%
SES5	Low SES Neighbourhoods	≤ 25%	25–49%	50% ≤
		≤ 25%	≤ 25%	50% ≤
SES6	Polarized SES Neighbourhoods	25–49%	≤ 25%	25–49%
		25–49%	≤ 25%	50% ≤
SES7	Middle SES Neighbourhoods	≤ 25%	50% ≤	≤ 25%
		≤ 25%	50% ≤	25–49%

Table 18.8 Neighbourhood types according to socioeconomic status composition, 2000–2015

	2000		2010		2015		Change in Share (2000–2010)		Change in Share (2000–2015)	
	#	%	#	%	#	%	#	%	#	%
SES1	97	4.4	135	6.1	176	7.9	38.0	39.2	79	81.4
SES2	100	4.5	116	5.2	103	4.7	16.0	16.0	3	3.0
SES3	657	29.7	601	27.1	655	29.6	-56.0	-8.5	-2	-0.3
SES4	831	37.5	648	29.3	553	25.0	-183.0	-22.0	-278	-33.5
SES5	414	18.7	542	24.5	595	26.9	128.0	30.9	181	43.7
SES6	33	1.5	75	3.4	72	3.3	42.0	127.3	39	118.2
SES7	71	3.2	85	3.8	49	2.2	14.0	19.7	-22	-31.0
NA	12	0.5	13	0.6	12	0.7	1.0	8.3	3	25.0
Total	***2,215***	***100.0***	***2,215***	***100.0***	***2,215***	100.0	0.0	0.0	0	0.0

Note: NA refers to neighbourhoods with zero population

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Chapter 19
Income Inequality and Economic Segregation in Los Angeles from 1980 to 2010

John R. Hipp and Jae Hong Kim

Abstract Rising income inequality is a critical problem in both the global North and South. In the United States, the Gini coefficient measuring nationwide income inequality rose from 0.403 in 1980 to 0.480 in 2014 (US Census), and residential segregation by income has increasingly occurred in many metropolitan regions and is particularly reflected in the spatial separation of the wealthiest households. This chapter focuses on the change in the level of income inequality in the Los Angeles region since 1980 and how it is related to changes in residential segregation between economic groups over that same time period. We use data from the US Census collected in 1980, 1990, 2000, and 2010. We measure residential segregation between economic groups based on occupational structure, and measure 'neighbourhoods' using Census tracts: these are units defined by the US Census and typically average about 4,000 residents. The overall level of inequality in the region is measured at each decade point using the Gini coefficient for household income. Maps demonstrate where different socioeconomic status groups have tended to locate and how economic segregation has changed in Los Angeles over this time period. We also assess the extent to which changes in inequality are related to changes in economic segregation over the last four and a half decades.

Keywords Neighbourhoods · Economic segregation · Long-term trends

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19.1 Introduction

An upward trajectory of economic inequality has been quite apparent around the world, although what has caused this trend would vary widely across countries, and so does the response chosen to address it. In the United States, the Gini coefficient measuring income inequality had begun to rise rapidly since the 1980s and increased every decade, despite yearly ups and downs.[1] Nationwide, this (uncomfortable) reality has received extensive media coverage, often highlighting what percentage of the aggregated income growth has been taken by the top 1% and how the income (or wealth) concentration has been accelerated in recent decades. Much attention has also been paid in academic and policy circles to ways to curb this trend of 'the fading American Dream' (Chetty et al. 2017) and promote intergenerational economic mobility.

The rising economic inequality is not an aspatial phenomenon. There is substantial variation across regions, and it has been reported that '[t]he rise in inequality experienced in the United States over the past four-plus decades is not just a story of those on Wall Street, in Hollywood, or in the Silicon Valley reaping outsized rewards, … [and that] rising inequality and increases in top 1 percent incomes affect every part of the U.S.' (Sommeiller and Price 2018: p. 16). Furthermore, some recent studies have suggested that the rising inequality can take the form of a higher level of residential segregation between economic groups (economic segregation from hereafter) within a region, especially the separation of wealthier household groups from the remainder, which would further reinforce the increasing trend of inequality (see, e.g., Reardon and Bischoff 2011; Scarpa 2016). Such a reciprocal interaction between inequality and segregation would be particularly problematic when resource allocation and land-use decisions are not made in favour of disadvantaged groups or communities. In such circumstances, the vicious cycle can persist and create a significant disparity in access to jobs or other essential amenities/opportunities.

Yet, our understanding of these critical mechanisms is far from complete. As mentioned above, increasing inequality is an indisputable reality in the United States (or even worldwide). However, a question is whether this apparent macro change has played out differently across various metropolitan areas in the US. Little is known about the various ways in which economic groups are residentially segregated in contemporary cities or larger metropolitan areas along with rising inequality. Moreover, there has been a dearth of comparative work that would enable us to identify commonalities or capture (subtle) differences between cities or regions around the world.

This chapter, combined with other contributions in the book, attempts to fill this gap. More specifically, here consideration is given to Los Angeles (and its vicinity), which is unique in many ways but presents some important representative qualities of post-industrial large metropolises. Materials presented in this chapter were produced

[1] For more detailed information, see US Census Historical Income Tables: Income Inequality, available at https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-inequality.html.

using an occupational classification scheme to make the analysis comparable to other case studies in the volume. The present occupation-oriented analysis was also expected to provide some fresh insights into the complex process that underlies the study region's segregation dynamics that would not be fully captured by traditional income-oriented approaches.

19.2 Background

The Los Angeles region provides an interesting case to study the spatial dynamics of inequality and segregation, given that studies have frequently pointed to its spatial layout as differing from the traditional monocentric development. Instead, it has been described as a polycentric region where an increasing number of employment subcenters have emerged (Kane et al. 2018). This region is the quintessential example of what is referred to as a member of the Sunbelt part of the country, and as such, exemplifies much of the post-World War II development in the United States in that it is a car culture built around roadways and highways, along with a relative lack of public transportation.

These characteristics of the Los Angeles region have been constructed through multiple waves of population and employment decentralisation over the history of its growth. While the City of Los Angeles grew most rapidly in the late nineteenth century through the 1930s, the entire metropolitan region has continued to expand dramatically. An early form of the suburban expansion occurred partly in the form of upper and middle-class flight from the core city, as observed in many other US metropolises, resulting in massive development in Orange County during the mid-twentieth century (Note: Orange County's population increased more than ten times from 130 thousand to 1.42 million between 1940 and 1970. Currently, it is the sixth-most populous county in the nation with a population of over 3 million). In the late-twentieth century, the growth was headed toward inland areas, specifically Riverside and San Bernardino counties, where new housing units were provided at much more affordable rates, although job opportunities were relatively scarce there. More recently, there has been increasing evidence of inner-city gentrification and associated poverty suburbanisation (Tong and Kim 2019), but new development in remote locations has continued (Hipp et al. 2014). We display key features of the region in Fig. 19.1.

Much of the new development has taken place in the form of single-family housing construction. While the housing stock has diversified in the region, low-density residential development remains common, particularly in remote locations. The percentage of owner-occupied housing units, however, has not increased substantially over the last three decades. Despite the growing decentralisation of households, the overall percentage has remained around 54%, while the level of homeownership varies across counties, ranging from 47% (Los Angeles County) to 68% (Riverside County) in 2010.

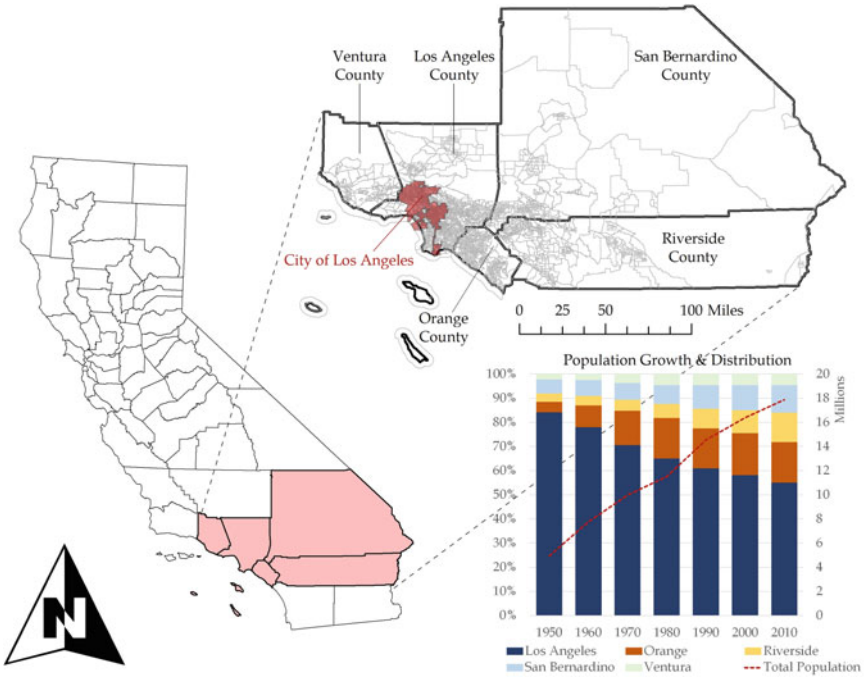

Fig. 19.1 Study region

Along with the expansion, there has been a proliferation of newly incorporated cities in the region, making it politically fragmented, since the 1950s. Most notably, in the state of California, '[t]he Lakewood Plan made incorporation cheaper and easier by allowing cities to contract for services with county governments. The Bradley Burns Act created fiscal incentives for incorporation by permitting California cities to capture a portion of the state sales tax. Local Agency Formation Commissions (LAFCOs) established the first statewide standards for incorporation. Finally, Proposition 13 incentivised municipal incorporation by allowing communities to capture sales tax and other revenue without fear of higher property taxes. Together, these reforms created fiscal incentives for incorporation that were hard for many communities to resist' (Hogen-Esch 2011: p. 7).

The newly incorporated places have surrounded existing localities, limiting their ability to expand geographically and achieve a critical mass for fiscal efficiency and other goals (Kim et al. 2018). Furthermore, this fragmented structure of governance has profound implications for the working of the metropolitan region, shaping the behaviour of both public and private sectors (Kim and Jurey 2013). Political fragmentation has been viewed as a cause of sprawl (Byun and Esparza 2005; Carruthers 2003; Ulfarsson and Carruthers 2006), although no single factor can fully explain the Los Angeles region's complex spatial structure. Fragmented local growth controls have

pushed development out and made it particularly difficult to construct higher-density affordable housing units where the demand has arisen (Levine 1999).

In this light, it is not surprising that common interest developments (CIDs), including gated communities and condominiums, are prevalent in the Los Angeles metropolitan region. According to Sanchez et al. (2005), providing useful estimates based on the 2001 American Housing Survey data, a considerable percentage of households in the region reported that they lived in walled (18.2%) or access-controlled (11.7%) communities. Such types of housing developments are even more popular in new development projects, producing increased social segregation (Le Goix 2005). Fragmented local governments have been in favour of CIDs, which would allow them to 'acquire new property tax payers without having to extend to them the full panoply of municipal services, … [and] some municipal governments have begun to virtually require that new housing construction consist of CIDs' (McKenzie 2003: p. 207).

These structural characteristics have also created various forms of isolation, even though there have been growing efforts to promote mixing in multiple dimensions (Hipp et al. 2017b). While the conventional spatial mismatch hypothesis does not fit well in the case of Los Angeles (Blumenberg and Manville 2004), a recent study has shown that job accessibility of inner-city residents has declined significantly in the region (Hu 2015). Other forms of barriers have also existed, making it difficult to connect job opportunities to welfare recipients who are supposed to move from welfare to work in the post-1996 welfare reform era in the United States (Ong and Blumenberg 1998). It is not uncommon that workers commute across city or county borders in this large metropolitan area. The following empirical analysis shows how different groups of workers were spatially distributed and in what ways the spatial distributions have changed over time, based on their place of residence, as opposed to where their jobs were located.

Thus, although this is a single region, there are differences across the five counties in the region in various ways. These counties have different spatial patterns of amenities and jobs. The density of Los Angeles County can be seen in that its housing units have many more amenities within one mile of them (measuring various types of amenities such as retail, restaurants, parks, etc.) than the other counties; housing units in Orange County have the next most amenities nearby, with the other three counties having far fewer (Kane et al. 2017: 25). There is also more job density in Los Angeles county compared to the others: the downtown of Los Angeles city has long been a business hub (Kane et al. 2016), and the west side of Los Angeles also has a high jobs/housing relationship (Hipp et al. 2017a). In Orange County, the Irvine area serves as a high jobs/housing location, whereas the Inland Empire counties have less evidence of such jobs/housing locations (Hipp et al. 2017a).

19.3 Data and Methods

19.3.1 Data

Our study area is the Los Angeles area, which is defined as the five-county Southern California metropolitan region, including Los Angeles, Orange, Riverside, San Bernardino and Ventura counties. For this large metropolitan region, we used census tracts as the unit of analysis to construct a temporally comparable neighbourhood-level dataset. We harmonised the tracts to 2010 boundaries based on population-weighted apportioning as defined by the US Census Master Area Reference Files. We used US Census data for the earlier waves, and used the American Community Survey 5-year estimates for the most recent decade (we used the 2008–12 data given that it is centred on 2010) to construct our dataset of 3,892 tracts with at least 100 population in 2010.

To assess the socioeconomic status of the neighbourhoods in the region, in addition to the occupation measures, we created two other measures. One is a measure of the average household income of residents in the tract. The second is a measure of education level in the tract, and is captured by the percent of residents with at least a bachelor's degree.

19.3.2 Methods

A challenge is to define consistent categories of occupations over time. We used the ISO definitions for defining categories. We, therefore, classified nine categories of occupations, one of which—agriculture, forestry, and fishery workers—we excluded from analyses given the small proportion constituted by this group in this urban area. The categories are: (1) managers; (2) professionals; (3) technicians and associated professionals; (4) clerical support workers; (5) service and sales workers; (6) agriculture, forestry, and fishery workers; (7) craft and related trades workers; (8) plant and machine operators and assemblers; (9) elementary occupations. We describe how we classified the occupation codes defined by the US Census for each decade into each of these categories in Appendix Table A1 (available online).

We also constructed a measure of the degree of occupation mixing in neighbourhoods with a Herfindahl Index of the nine occupation codes just described. The measure is a sum of squares of the proportion of residents in a tract in each of the occupation categories, and then is subtracted from 1 to make it a measure of heterogeneity. The theoretical range is from 0 to 0.8742.

19.4 Results

19.4.1 General Trends in Occupation Groups Over Time

We begin by describing the socioeconomic status of the five counties in this region. Orange and Ventura Counties are the two wealthiest counties in the region with the highest average income and education levels, whereas Riverside and San Bernardino Counties are the two counties from the Inland Empire (IE)—which tends to be blue-collar—and consistently show the lowest average income and lowest levels of education. Los Angeles County, the largest county in the region, is between these two extremes based on socioeconomic status. Although Ventura County is closer to Los Angeles County for average education level, they are close to Orange County for average household income.

We next describe the change in household income inequality in the region overall, as well as across the five counties in the region, for our study period.[2] The general upward trend in the level of inequality in the region has closely tracked the trend for Los Angeles County, the largest county in the region. The Gini coefficient for household income in the region has gone from 0.415 in 1980 to 0.43 in 1990 to 0.455 in 2000 before slightly falling to 0.449 by 2010. Los Angeles County has paralleled this with systematically higher Gini values, and peaked at 0.474 in 2000. The two Inland Empire (IE) Counties of Riverside and San Bernardino have very similar income inequality levels in 2010, but took very different paths to that point. Whereas Riverside County had the second-highest level of income inequality in the region in 1980, inequality has only slightly increased over the time period in this County. In contrast, San Bernardino County has gone from relatively low-income inequality in 1980 (0.382) to steadily increasing such that they have nearly caught Riverside County by 2010 (0.421). Finally, the two more wealthy counties are Orange and Ventura, and although they started with the lowest levels of inequality in the region in 1980 (0.37 and 0.38), they have both experienced quite steady increases over the entire study period such that Orange County has slightly higher income inequality than the two IE counties by 2010.

Turning to the occupation structure of the region, Fig. 19.2 provides this information for the tracts in the region. We see that the percentage of professional employees in the region has increased dramatically since 1990. Whereas 12% of employees were in professional occupations in 1980, this increased slightly to 13% in 1990, and then jumped to 22% in 2000 and 28% in 2010. This trend is clearly reflected in Fig. 19.3, which shows seven distinct types of neighbourhoods using a classification

[2]We computed the Gini coefficient for the region, as well as for each of the five counties, based on binned income data. Thus, we summed up the number of persons in each of the income bins for a particular decade, and then used the RPME ado package for Stata created by Paul T. von Hippel and Daniel A. Powers. It adjusts for the binned nature of the data, and uses an assumed Pareto distribution to handle the top-coded bin. There were 17 income bins in 1980, 25 bins in 1990, and 16 bins in 2000 and 2010.

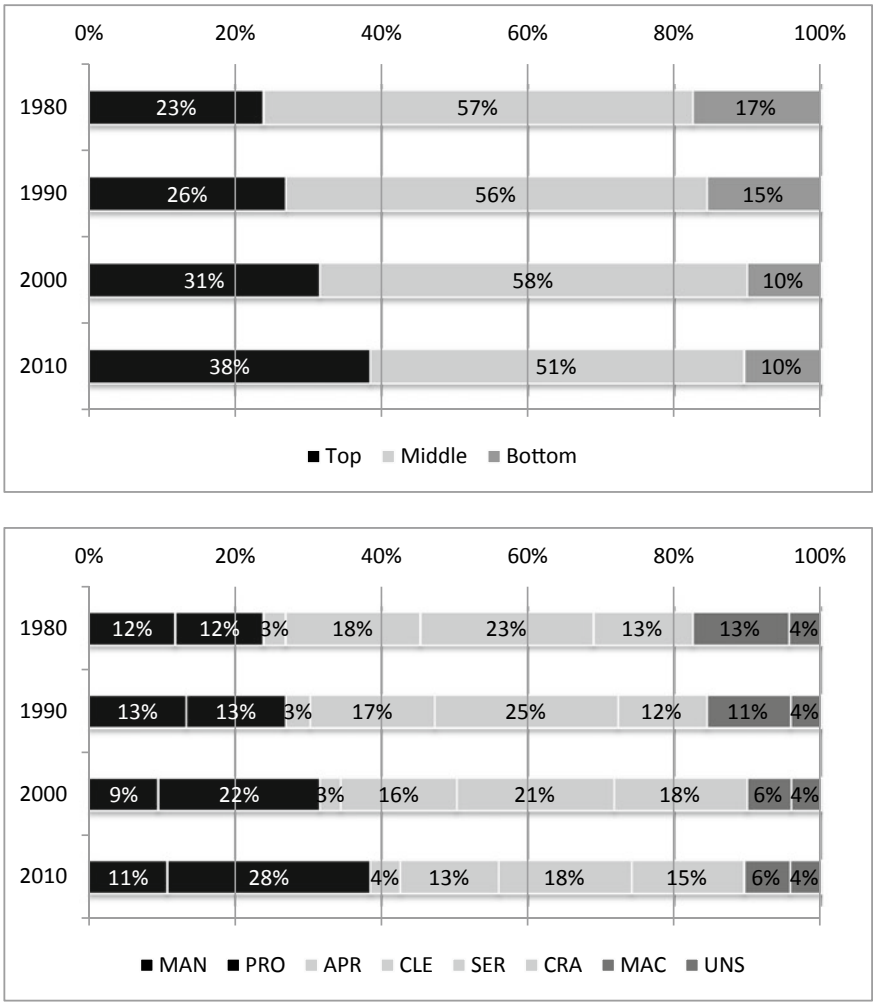

Fig. 19.2 Percentages of occupation classes in tracts in Southern California from 1980 to 2010

scheme provided by (Marcińczak et al. 2015).[3] As demonstrated in the map, High SES neighbourhoods have expanded over time along with the rise of professional occupations in the region. The number of High SES neighbourhoods (having over 50% of managers or professional occupations) increased from 121 in 1980 to 1150

[3]Given that the original classification scheme does not cover all possibilities, we have expanded the definitions of the following three categories: High SES neighborhoods, Low SES neighborhoods, and Middle SES neighborhoods. Specifically, if one of the three groups accounted for over 50% of the total workers living in a neighborhood, the neighborhood was classified into one of the three categories.

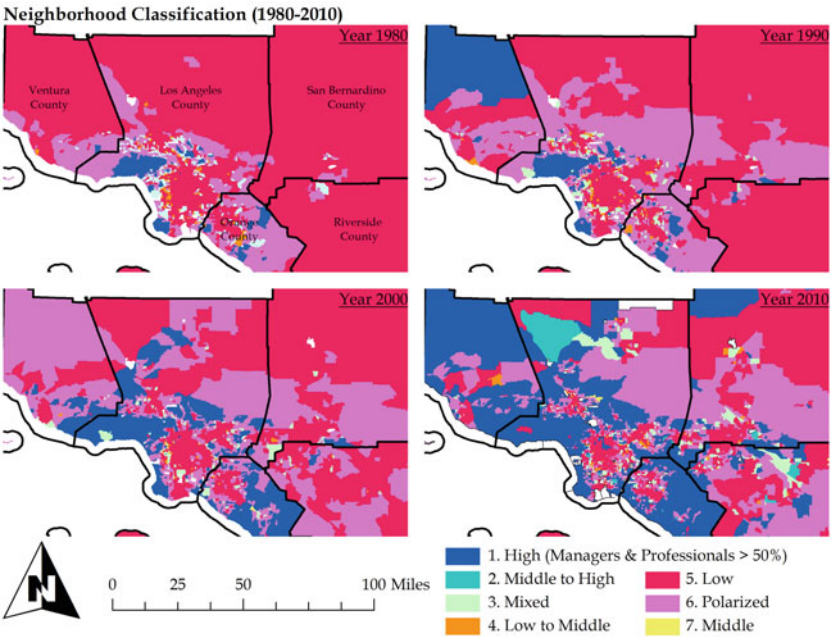

Fig. 19.3 Neighbourhood types in the Los Angeles region, 1980–2010

in 2010, although it has not surpassed that of the most dominant category in the region: Low SES neighbourhoods. In contrast, our study area turned out to have a much smaller number of Middle to high SES neighbourhoods and Middle SES neighbourhoods.

The percentage of workers classified as craft or related trades has shown a modest increase over this period, going from 13% in 1980 to 18% in 2000 before declining in recent years. The percentage of service and sales workers, clerical support workers, and plant and machine operators have all shown declines over the study period. It is also notable that the measure of occupational heterogeneity at the neighbourhood level has consistently declined over the study period, which is indirect evidence of increasing occupational segregation during this time period.

We also broke down the change in occupation structure across counties in the region over this study period. For several of the occupation categories, the counties followed similar trajectories. However, we highlight three particularly interesting patterns. First, whereas professional occupations have shown a general growth across all counties in the region, such jobs were relatively less present in the Inland Empire counties in 1980, and their growth has lagged behind that of the rest of the region since then. Whereas in 1980, about 10% of the jobs were constituted by professional occupations in the Inland Empire counties, the percentage was 14% in relatively wealthy Orange County. But by 2010, whereas the Inland Empire counties had increased to 23% professional occupations, in Orange County this had grown to 31%. Ventura and

Los Angeles Counties also exhibited greater growth in professional jobs compared to the IE counties. Second, there is also a notable change in the distribution of technicians, as the IE counties had the lowest percentage of such workers in 1980, but have experienced a steady relative increase at the same time that the proportion of such workers has stagnated in the other counties. By the 2000s, the IE counties had a much larger percentage of technicians compared to the other counties in the region. Third, although the relative presence of plant and machine operators has decreased across the region, the decrease was sharpest in Los Angeles County. Whereas in LA County, plant and machine operators constituted almost 15% of workers in 1980, this had been more than cut in half by the 2000s. The IE counties experienced a smaller decrease, and by the 2000s have a larger presence of plant and machine operators compared to LA County.

We also wished to assess the types of neighbourhoods that members of these different occupation groups live in. Note that this is different than focusing on the socioeconomic status of individual members of these occupations; rather, we are interested in characterising the socioeconomic status of the neighbourhoods that members of these occupation groups tend to live in. We did this by computing the correlation between the percentage of a tract that is composed of a particular occupation category and two key measures: the average household income in the tract, and the occupational heterogeneity in the tract. Table 19.1 displays the results, and the top panel shows the correlations with average household income. As expected, the strongest positive correlations with average household income in the tract occur for tracts with a higher proportion of manager or professional occupation workers. The third highest correlation in 1980 was with technicians and associated professionals, though this correlation weakened by 2010 and became similar to that for service and sales workers. Whereas in 1980, plant and machine operators lived in tracts with the lowest average household income, by 2010, this had shifted and craft and related trades workers lived in tracts with the lowest average household income.

In the bottom panel of Table 19.1, we show the correlation of the percent of various occupation groups in a tract with the occupational heterogeneity, which gives a sense of the extent to which members of various occupation groups live in neighbourhoods with a high degree of occupation mixing. In 1980, craft and related trades workers lived in neighbourhoods with the highest level of occupation mixing, and this level of mixing has remained relatively constant over the study period. On the other hand, whereas plant and machine operators in 1980 and 1990 tended to live in neighbourhoods with average levels of occupation mixing since 2000, they have lived in neighbourhoods with the highest levels of occupation mixing. At the other extreme, whereas service and sales workers lived in the most homogeneous occupation mixing neighbourhoods in 1980 and 1990, they have been in neighbourhoods with average levels of mixing since 2000. The level of mixing in the neighbourhoods of the highest occupation groups has consistently declined over the study period, especially for professional workers and especially since 2010.

Table 19.1 Correlation of percent in occupations with income and occupational heterogeneity

	Correlation with average household income			
	1980	1990	2000	2010
Managers	0.76	0.75	0.76	0.71
Professionals	0.68	0.71	0.67	0.62
Technicians and associate professionals	0.12	0.14	−0.29	−0.17
Clerical support workers	−0.18	−0.19	−0.28	−0.33
Service and sales workers	−0.02	−0.09	−0.05	−0.16
Craft and related trades workers	−0.39	−0.53	−0.58	−0.55
Plant and machine operators and assemblers	−0.56	−0.58	−0.55	−0.50
Elementary occupations	−0.50	−0.57	−0.46	−0.43
	Correlation with occupational heterogeneity			
	1980	1990	2000	2010
Managers	−0.08	−0.24	−0.28	−0.39
Professionals	−0.12	−0.23	−0.45	−0.67
Technicians and associate professionals	0.32	0.16	0.36	0.34
Clerical support workers	0.23	0.36	0.34	0.38
Service and sales workers	−0.25	−0.27	0.04	0.08
Craft and related trades workers	0.41	0.46	0.17	0.42
Plant and machine operators and assemblers	−0.11	0.08	0.39	0.47
Elementary occupations	−0.05	0.19	0.26	0.31

19.4.2 Residential Segregation Between Economic Groups

We next focus on the degree of segregation between economic groups, as measured by occupation categories. We assessed this by computing the index of dissimilarity between various groups in each of the decades of the study. The complete results are presented in Tables 19.2 and 19.3. We also visually present some results to illustrate the extent to which segregation between the most prestigious occupations (managers and professionals) and other occupation groups have changed over time. As shown in Fig. 19.4, these higher status occupations were most segregated from plant and machine operators in 1980 and 1990, but the level of segregation between these groups has not changed much over this time period.

On the other hand, the degree of segregation between these higher status occupation groups and elementary occupations has shown a steady increase over the study period, and since 2000 have shown the highest degree of segregation among the

Table 19.2 Dissimilarity Index (multiplied by 100) between the occupational groups

1980	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS
MAN		12	20	22	21	33	46	44
PRO	12		22	25	24	37	49	46
APR	21	21		17	19	26	39	37
CLE	21	24	16		13	19	31	29
SER	20	21	19	13		19	30	27
CRA	30	33	25	18	17		22	20
MAC	44	46	36	29	29	22		16
UNS	40	42	34	26	25	19	16	

1990	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS
MAN		19	41	34	30	47	54	59
PRO	13		37	29	26	44	50	56
APR	35	33		30	32	35	39	48
CLE	27	25	20		22	27	33	42
SER	23	22	21	13		29	36	41
CRA	44	44	27	25	26		27	34
MAC	47	47	28	28	30	17		39
UNS	52	51	36	36	35	25	29	

2000	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS
MAN		19	41	34	30	47	54	59
PRO	13		37	29	26	44	50	56
APR	35	33		30	32	35	39	48
CLE	27	25	20		22	27	33	42
SER	23	22	21	13		29	36	41
CRA	44	44	27	25	26		27	34
MAC	47	47	28	28	30	17		39
UNS	52	51	36	36	35	25	29	

2010	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS
MAN		19	41	34	30	47	54	59
PRO	13		37	29	26	44	50	56
APR	35	33		30	32	35	39	48
CLE	27	25	20		22	27	33	42
SER	23	22	21	13		29	36	41
CRA	44	44	27	25	26		27	34
MAC	47	47	28	28	30	17		39
UNS	52	51	36	36	35	25	29	

Table 19.3 Dissimilarity Index (multiplied by 100) between Top, Middle and Bottom groups

	1980	1990	2000	2010
TOP - MID	21	21	25	29
TOP - BOT	29	31	34	36
MID - BOT	15	16	15	20

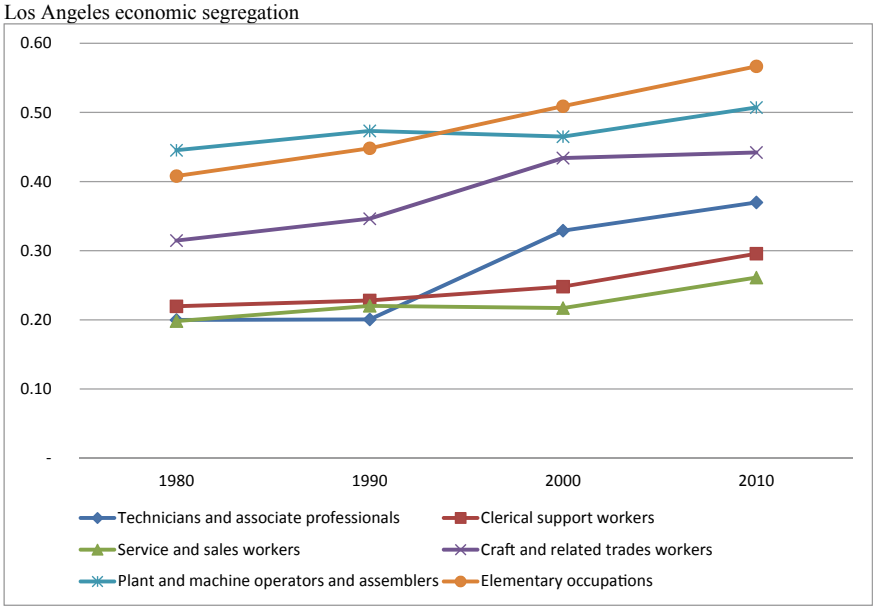

Fig. 19.4 Index of dissimilarity between managers/professionals and specific classes

groups shown in Fig. 19.1; the index of dissimilarity has increased from 0.41 to 0.57 over these 30 years. This finding is well illustrated in Fig. 19.5, juxtaposing the tract-level location quotients (LQ) of the higher status occupation groups and those of elementary occupations. Managers and professionals are concentrated in some affluent areas, including the northwestern parts of Los Angeles County and southern Orange County, where elementary occupations' LQ has remained extremely low. Figure 19.6 also highlights these locations in the region appearing largely stable over time, while some temporal changes are noticeable.

Other occupation groups have also shown an increasing trend of the dissimilarity index, suggesting that the overall level of occupational segregation has strengthened quite noticeably in the Los Angeles metropolitan region. For instance, whereas in 1980 and 1990 there were relatively low levels of segregation between these higher status occupations and technicians and associate professionals, this has jumped from 0.20 in 1980 to 0.37 in 2010. The lowest levels of segregation for these higher status occupations are with those in clerical support or sales and service occupations.

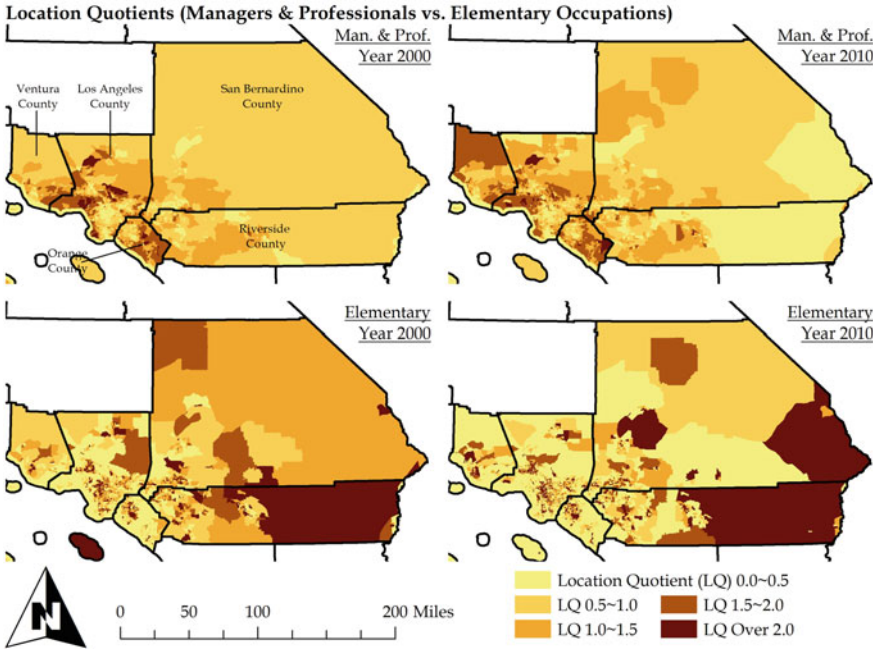

Fig. 19.5 Managers and professionals versus elementary occupations

We also explored the change over time in segregation between workers classified into high, middle, or low-status occupations. Following Marcinczak et al. (2015), we defined these as: high status is managers and professional occupations; middle status is technicians and associate professionals and clerical support workers; low status is service and sales workers, craft and related trades workers, plant and machine operators and assemblers, and elementary occupations. The segregation between the highest and lowest occupation workers has steadily increased over the study period, rising from 0.29 in 1980 to 0.36 in 2010 as seen in Table 19.3. The segregation between high and middle occupation workers has also risen since 1990, going from 0.21 in 1990 to 0.29 in 2010. The level of segregation between middle and lower-status occupations has not increased as dramatically, as the segregation between these groups remained flat between 1980 and 2000, and has only risen in the last decade from 0.15 to 0.20.

Finally, although we have seen a rise in occupational segregation in the region over this time period, there is less evidence of a rise in racial/ethnic segregation. We assessed this by computing the Theil index across tracts in each of the counties based on five racial/ethnic categories (Asian, Black, White, Latino, and other race). Whereas Los Angeles County has consistently experienced the highest racial/ethnic segregation in the region, the values have actually drifted downward over these thirty years (from 0.37 to 0.315). Riverside and San Bernardino counties have consistently had the lowest levels of racial/ethnic segregation over this period, with values around

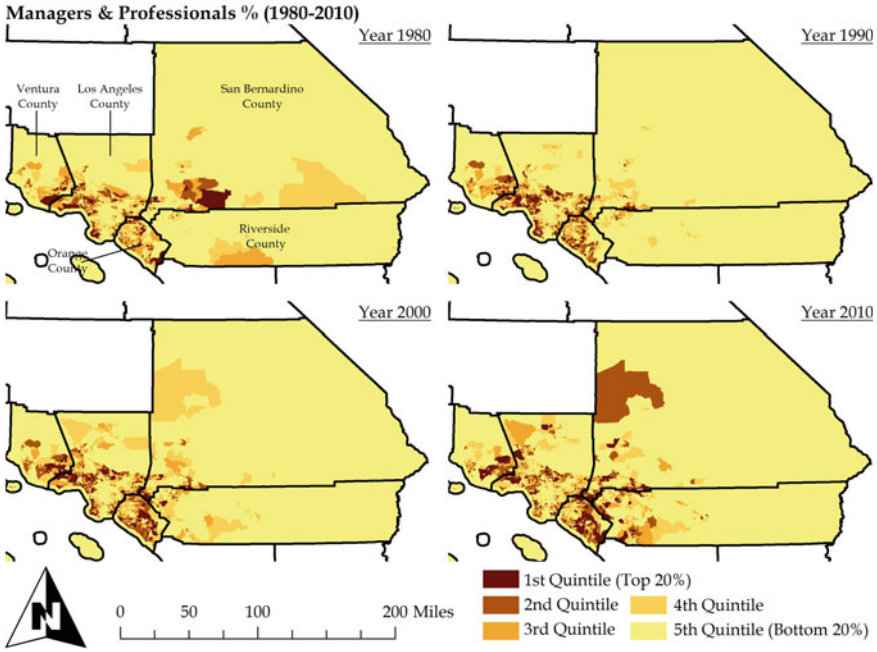

Fig. 19.6 Distribution of managers and professionals, 1980–2010

0.16. Ventura is slightly higher (0.22), although it has remained stable. Only Orange County has experienced a modest increase over the study period from 0.16 to 0.23. Thus, the increasing occupational segregation in the region appears to not be related to racial/ethnic segregation processes.

19.5 Conclusion

This study has focused on how levels of inequality in the Los Angeles area have changed from 1980 to 2010. Whereas we observed notable increases in inequality over the time period, as measured by the Gini coefficient based on household income levels, we also observed substantial changes in the region's occupation structure. The region has experienced a large increase in the proportion of professional workers over the study period. At the same time, there has been a large drop in the relative proportion of plant and machine operators. This pattern is consistent with the restructuring of jobs from blue collar towards white collar work, especially in this region.

Importantly, we also detected evidence of increasing residential segregation across the economic groups over time. Among others, we found that the highest status occupations (managers and professional workers) are becoming more spatially segregated from other occupations over the study period, while the rates of segregation increase

varied by group and decade. There was also evidence that these highest status occupation workers tend to live in areas with the most economical resources to which other groups have limited access.

Admittedly, the traditional dissimilarity index and other metrics employed in this study would not allow us to capture the full extent and details of the segregation dynamics underway in the Los Angeles metropolitan region. It is also known that the census tracts used here, as done in numerous other studies, have a limited ability to represent the true neighbourhood boundaries in reality. There is also concern that the lower sampling rate of the ACS in 2010 can bias segregation estimates; indeed, studies have shown such an effect when measuring economic segregation based on binned income data (Reardon et al. 2018). However, the fact that our occupation categories are less extensive than the income bins (and therefore not as subject to small counts) suggests that our results may be less impacted by this issue. Also, other limitations would not invalidate the strong evidence of increasing occupational segregation patterns and should not undermine the implications of the evidence that deserves further attention.

How these patterns might change as Los Angeles County—the central county in the region—continues to build out its light rail public transportation system, remains to be seen. In the short-term, these new light rail lines seem to engender gentrification processes in the adjacent neighbourhoods. In the long-term, the question arises whether this public investment can change some of the current patterns observed in this more sprawling, car-centric, development. One can be optimistic about the future, given that there have been numerous state-level efforts to promote affordable housing provision in various locations, including transit-rich areas, but we should not underestimate the obstacles that will have to be overcome in order to make a meaningful difference in the next decades.

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Chapter 20
Socioeconomic Segregation in Mexico City: Scale, Social Classes, and the Primate City

Paavo Monkkonen, M. Paloma Giottonini, and Andre Comandon

Abstract Mexico City is known as one of the largest cities in the world and thought by many to be one of the most unequal. Not surprisingly, it has received more attention than other Mexican urban areas. However, the city's internal social organization is often misunderstood. Mexico City stands out as a city where segregation is relatively low, and levels of inequality are actually lower than perceptions. Moreover, between 1990 and 2010, both segregation and inequality have declined. This chapter examines these changes. We report on changes in occupational structure and patterns of segregation by educational level. Educational level is different from income or occupation, but these three dimensions of socioeconomic conditions are closely linked. While the overall level of segregation between educational groups in the city has slightly decreased, residential patterns of educational groups have changed significantly. The number of neighborhoods with high concentrations of highly educated people increased significantly and expanded geographically. At the same time, the prevalence of neighborhoods with residents with low and middle educational attainment has diminished and neighborhoods that house people of all educational categories or high and middle categories are more numerous. This chapter illustrates the complexity of segregation patterns in such a large metropolitan area, as well as the challenges of determining why patterns have changed.

Keywords Segregation · Inequality · Education · Neighborhood · Mexico City

"Juntos pero no revueltos" [Together but not mixed]
Mexican proverb

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20.1 Introduction

Mexico City is one of the largest cities in the world and by far the largest in Mexico. One in six Mexicans live in the Mexico City Metropolitan Area (MCMA). It also has one of the longest histories of large-scale urbanization in the Americas, giving the sprawling metropolis multiple personalities. The patchwork of neighborhoods that have developed over centuries form the economic hub of the country, the center of the federal government, and a concentrated cultural repository. Cities that dominate their national urban system—primate cities like Mexico City—tend to be richer but also more unequal. Yet, the MCMA is not as unequal as one might expect. More surprisingly, given the popular understanding of the city, levels of social segregation are relatively low in the MCMA when measured using available data.

The perception of Mexico as an extremely unequal country is widespread. It does have a high rate of inequality compared to OECD countries, with a Gini coefficient[1] in 2016 of 0.43 being 25% higher than the OECD average. Yet it is less unequal than most other Latin American and many middle-income countries. For example, its Gini coefficient was lower than Brazil, Colombia, and South Africa, which all had GINI coefficients over 0.5 (OECD 2019b; World Bank 2019). Income inequality in Mexico increased in the 1990s before declining after 2000 to levels below those of 1990 (Cortés 2013). Though income inequality may be lower than expected, there are multiple aspects of social inequality in Mexican society, with dramatic differences in access to education, health services, housing, safety, and overall quality of life.

In this chapter, we assess income inequality and the levels and patterns of residential segregation in the MCMA. We focus on segregation by educational achievement because it is the only variable for which data are available. Education is also a proxy for socioeconomic status and a critical aspect of social inequality. One distinction is that unlike income, educational attainment of a person cannot go down. In Mexico, educational achievement has increased over time, while incomes have remained relatively stagnant. Nonetheless, they are strongly linked. Our central research question fits within the questions of socioeconomic segregation this book deals with. We ask how and to what extent levels of segregation by education and the residential patterns of educational groups have changed In the MCMA during the last two decades.

The answer to that question addresses a debate over the relationship between inequality and spatial segregation. Researchers in high-income countries have found a correlation between socioeconomic inequality and residential segregation (Reardon and Bischoff 2011), but evidence for this relationship in Mexico is mixed. This chapter details this connection by first describing the complex spatial and economic structures of the region. The next section provides an overview of inequality and its connection to segregation in the context of Mexico City. The fourth section presents the empirical results and illustrates the main patterns visually. The final two sections provide a discussion of the results and possible futures for the city.

[1] All GINI estimates presented in this chapter are calculated using after tax income.

20.2 Background: The Great Tenochtitlan

Mexico City has long been the site of one of the most populous cities in the world. When Hernan Cortés and his soldiers reached Tenochtitlán in 1519, they were amazed about its size, infrastructure, and cleanliness. Estimates of its population are around 250,000, larger than any other European city at that time, except for Paris or Istanbul (then Constantinople) at that time.

The growth of Mexico City and its metropolitan region has been a continuous process since the founding of Tenochtilán in the fourteenth century. However, the rural-to-urban migration of the second half of the twentieth century and the subsequent acceleration of suburbanization are the most consequential urbanization periods for the region. They led the MCMA to be one of the most populated and largest urban areas in the world. It currently has a population of about 22 million in a territory covering 7,866 km^2 (INEGI 2011), making it the largest urban area in Latin America.

The MCMA is composed of dozens of local jurisdictions spanning three states. At the core is Mexico City (formerly known as the Federal District and currently as CDMX), which is divided into 16 *Delegaciones* (similar to municipalities). Mexico City is the urban core of the region and for the remainder of the paper, we use MCMA to denote the region and Mexico City to refer to the core area. The remainder of the MCMA spills into two adjacent states—nearly 60 municipalities in the State of Mexico and one in the State of Hidalgo (SEDESOL et al. 2012). Figure 20.1 illustrates the location of the MCMA in the national context, as well as its political jurisdictions.

Fig. 20.1 Geography of Mexico City Metropolitan Area (MCMA)

The population of the metropolitan area used to be more concentrated in Mexico City itself, but after it urbanized most available land, Mexico City has had a lower growth rate than the adjacent municipalities of State of Mexico and Hidalgo. In 1990, over 50% of the population of the MCMA was in Mexico City (about eight million people), whereas in 2015 Mexico City's nine million residents are only 40% of the larger metropolitan region (INEGI 2015a, b). The government officially defined the current MCMA (also known as *Zona Metropolitana del Valle de Mexico*) in 2004 (SEDESOL et al. 2012). At this time, 36 additional municipalities were added, practically doubling the metropolitan region's territory.

Most of the population growth of the metropolitan area is the result of this territorial annexation and of the high population growth rates in the municipalities belonging to State of Mexico, rather than population growth within Mexico City. Nonetheless, the MCMA stands out for its slower rate of population growth as compared to the national average. Between 2000 and 2010, the MCMA had one of the slowest urban growth rates (0.9%) in the country. The national average was 1.4% and other metropolitan areas grew at 2.0%. However, given the size of the region, this lower rate still means large population changes in absolute numbers. Mexico City is also the densest urban area in the country with about 6,000 inhabitants per square kilometer (INEGI 2015a, b). Many peripheral areas have also become densely populated (see Figure in supplementary material online).

The urban primacy of the MCMA is unquestionable: it is the most populated and economically competitive city in Mexico. In 2009, the MCMA housed about 19% of the country's population, 25% of national gross domestic product (GDP), and 23% of jobs (Trejo Nieto 2016). Mexico City is not only an important global financial center, it is also widely recognized as the cultural capital of Latin America. Mexico City has the oldest university in the continent, two world heritage sites, and more museums than any other city in the world. This status, combined with the continued internal migration of people moving from rural-to-urban areas in search of better economic opportunity, has privileged low-skilled manufacturing and (informal) service jobs in the city's occupational makeup (García et al. 1978; Zenteno and Solís 2006). Thus, despite its slowing growth rate, the city continues to attract people from within Mexico and the rest of the world.

20.2.1 Occupational Characteristics of the Metropolitan Area

Compared to the other large metropolitan areas in Mexico, the MCMA has a more specialized occupational profile. It has a large share of jobs in the service sector—45% compared to 30% in the average city (Montejano et al. 2019). Its population has among the highest educational attainment and a high level of productivity per capita, though perhaps not as high as one might expect. The MCMA is home to the country's largest corporate headquarters but has such a large labor force that the average statistics overwhelm these high-level jobs.

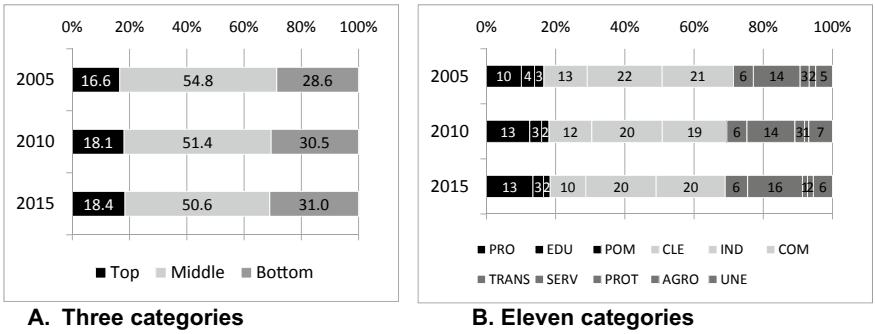

Fig. 20.2 Distribution of occupational groups in the MCMA and change over time. The Top category is comprised of Professionals, technicians, and art workers (PRO), Education workers (EDU) and Public officials and managers (POM). The Middle category includes Clerks (CLE), Industrial workers, craftsmen and assistants (IND), and Merchants (COM). The Bottom category consists of Transport operators (TRANS), Workers in personal services (SERV), Workers in protection and security surveillance (PROT), Agricultural workers (AGRO), and the Unemployed (UNE). *Source* INEGI (n.d.). *Notes* The occupation categories are derived from the standard North American Industry Classification System (NAICS) whose classifications are used in the Mexican National Occupation and Employment Survey (ENOE) conducted by INEGI. We used sample data for the fourth trimester of years 2005, 2010, and 2015 for the States of Mexico, Hidalgo, and Mexico City (which in censual terms functions as a state)

This productivity lag connects to the slow rate of change in the occupational composition of the MCMA. Figure 20.2 shows the distribution of occupational groups in 2005, 2010, and 2015. About 30% of the employees are in the bottom occupation groups and less than 20 percent are in the top category. As a node of attraction for both firms and workers, the MCMA hosts both a highly skilled labor force and a large group of low-skilled workers. However, the stable share of occupations reflects a stagnation in the specialization of the region—all sectors are expanding at similar rates. Greater productivity growth would be consistent with a shift toward a concentration in certain industries or at least an expansion of people in the top occupational category, which has not been the case in the MCMA.

The stability of the occupational profile stems from the rigid occupational stratification in Mexico. Intergenerational occupational mobility is lower in Mexico than in the rest of Latin America (Zenteno and Solís 2006), especially in the upper classes (Torche 2014). Occupational mobility is limited in spite of significant improvements in educational outcomes. It would seem that educational attainment in Mexico is not a determining factor in facilitating upward occupational mobility or preventing downward occupational mobility, i.e., higher levels of education do not ensure the entry or stay in the highest occupational groups (Zenteno and Solís 2006).

Additionally, educational reforms have mostly improved the intergenerational educational attainment at the lower levels (switch from primary to secondary) where there is a bigger increase in years of education compared to switch from secondary to tertiary education. Reforms have not improved positive effects in terms of employment. In other words, a move in average completion from grade three to grade nine has

a greater numerical impact when it comes to years-in-education than a move from grade nine to grade 12, but the latter has stronger positive effects on individuals' labor market outcomes. This greatly limits the impact of reforms when high-wage jobs require a college degree or graduate diploma.

The link between education and occupation is also visible across neighborhoods. Residents of Mexico City have higher education and are more likely to be in the top occupational category (23%) than residents of the States of Mexico and Hidalgo (only 13%). This concentration also translates to local clustering. The clustering of high-skilled jobs in and around the central business district of Mexico City is mismatched with the location of workers (Trejo Nieto 2016). Spatial mismatch of high-status jobs results partly because people with greater resources also have greater ability to commute longer distances.

20.2.2 The Mexican Housing System and Segregation

Housing occupies an uneasy position in relation to the welfare system (Malpass 2008). The state tends to intervene systematically in the housing sector, especially in middle-income countries. Like other Latin American countries, Mexico has embarked on an ambitious policy agenda to increase access to formal housing. The Mexican program has shaped cities perhaps even more than in its southern neighbors. Until recently, Mexican cities have had a spatial structure similar to that of the rest of Latin America. This structure has three elements: (1) low-income households mostly clustered to low-density peripheral areas, usually with limited or no urban services; (2) high-income households concentrated in certain areas of the city, usually starting near the historic center and move outward in one direction; and (3) a greater socioeconomic homogeneity in low-income neighborhoods (Griffin and Ford 1980; Sabatini 2003).

During recent decades, however, the peripheral areas of cities in Mexico, including the MCMA, have changed dramatically. Numerous large, homogeneous housing developments for the working class were built in cities across the country, driven by the reform and expansion of a federal housing fund (named INFONAVIT for its initials in Spanish) beginning in the early 1990s. The boom in financing transformed the way housing is produced and acquired (Monkkonen 2011). Prior to the year 2000, individuals built the majority of housing in an incremental, self-help manner on plots of land they purchased. Since then, federal mortgages enabled private developers to build large tracts of formal housing for purchase and now a majority of housing is built by developers and purchased with a mortgage. The federal mortgage fund is generated through a 5% payroll tax and has greater resources than other welfare sectors in Mexico. The share of public expenditure is still relatively low, at around 1% of GDP.

Housing provision through this fund has some significant shortcomings. First, workers in the informal sector, whose housing need is often most severe (OECD 2006), cannot access this government program which is available only to salaried

employees. Second, the housing offered is of a very small size, low quality and generally has a peripheral location often far from jobs. The changes to the government's housing fund without concurrent changes in municipal planning practice meant that developers also became de facto urban planners, with certain freedoms in deciding where, what, and how to build (Libertun de Duren 2018). New housing developments are homogenous, which means potential buyers are of a similar socioeconomic status. This has exacerbated residential segregation between socioeconomic groups (Monkkonen 2012a) and is connected to problems of housing vacancy (Monkkonen 2019).

20.3 Socioeconomic Segregation and Income Inequality in Mexico City

Recent work on segregation in Mexico shows that larger and higher cost cities are more segregated, though there are some regional differences across the country (Monkkonen 2012b, 2018). Cities in the northern region of Mexico have a larger presence of formal workers and high-income households, while the cities in the south have a much higher proportion of lower-income households and indigenous population. These two findings align with the general regional development trends in Mexico, i.e. the industrialization of northern cities and the persistent poverty in the south (Garza 1999; Trejo Nieto 2019). Nonetheless, the median city in the south is roughly 10% less segregated than the median city in the north.

The MCMA, located in the central region of Mexico, has the highest proportion of workers in the informal sector (54%) in the country. At the same time that it houses the most affluent households in the country, the federal government, and the nation's most prominent cultural institutions, the MCMA also has a high proportion of low-income households (38%), a share only surpassed by the Southern region (Monkkonen 2012b). The MCMA also has a disproportionate share of high-income households—using a separate dataset from 2015 (INEGI 2015a, b), we find roughly 18% of the households in Mexico City fall into the top decile of earners nationwide. This number is only 15% for the entire MCMA.

The MCMA is relatively unequal but not socially segregated. In 2014, compared to the country's states, Mexico City had the fifth highest GINI coefficient (0.48), and the states of Hidalgo and Mexico State had GINI coefficients of 0.48 and 0.44, respectively (OECD 2019a). Apart from income inequality and occupational profile, city size and urban growth are fundamental drivers of socioeconomic segregation (Monkkonen 2012a; Rubalcava and Schteingart 2000; Ariza and Solis 2009). As cities expand their territories, commuting distances and disparities in land values increase, which leads to more differentiated neighborhoods (Mills and Hamilton 1994).

The rapid population growth of the MCMA took place in the form of densification of the existing urban area as well as expansion into neighboring municipalities by both migrants moving from other states as well as from Mexico City to the metropolitan periphery. The horizontal expansion is consistent with patterns of spatial differentiation as new neighborhoods are developed.

20.4 Measuring the Relationship Between Income and Socioeconomic Composition

The decennial census of Mexico does not inquire about occupation. Data on occupation is, therefore, only partially available through the Mexican National Occupation and Employment Survey (ENOE). The statistical design of the ENOE produces precise estimates at the national level and by state, but not for municipalities and the smaller geographical units required for analyzing segregation. Therefore, we use educational groupings as a proxy for socioeconomic status. Education correlates with income and socioeconomic status (Caragliu et al. 2012), and residential segregation by income correlates with residential segregation by education (Monkkonen et al. 2018). We are, therefore, confident that our measures capture the main underlying spatial patterns of inequality. However, education differs from income or occupation in that education is not as much a product of market forces and does not determine the residential choice of people directly. Therefore, it does have a different relationship to spatial residential patterns.

Using education as the main variable changes the comparison of segregation patterns over time. For example, the education reform of 1993 established compulsory secondary education.[2] As such, children in school in the 1990s will automatically have on average higher educational achievement than people who finished school before the reform. Additionally, educational achievement is more permanent than income. Most people do not go back to school later in life, but their income can change every year, increasing or decreasing. This has different implications for changes in social mix.

Throughout this analysis, we use education attainment at the level of the basic geo-statistical area (known as AGEB for its initials in Spanish), which is equivalent to a census tract. We use data from the census of 1990, 2000 and 2010 carried out by the National Institute of Geography, Informatics and Statistics (INEGI). We use all urban AGEBs in the 76 municipalities of the MCMA in the year 2010.[3] That is, we apply the 2004 MCMA boundaries to the years 2000 and 1990. A large share of tracts outside Mexico city itself do not have data in 1990 because they had not been urbanized yet.

[2] In Mexico, secondary education refers to *secundaria*, which is equivalent to years 7, 8 and 9 of schooling.

[3] The MCMA has 5,605 AGEBs. They have mean and median population of 3,485 and 3,171.

Table 20.1 Indices of dissimilarity (DI) for the MCMA

	Low to middle	Middle to high	Low to high
1990	0.12	0.25	0.34
2000	0.14	0.32	0.45
2010	0.07	0.27	0.31

We categorize educational attainment in three levels: Low (complete or partial elementary education only, i.e. *primaria*, up to six years of schooling); Middle (complete or partial middle school education, i.e. *secundaria*, or seven to nine years of schooling); and High (complete or partial high school, college, or a higher degree, from 10 to more years of schooling).[4] In some cases, we discuss the differences between Mexico City and the MCMA because its 16 municipalities are more consolidated and its population characteristics are different. We calculate the dissimilarity index (DI) using the three pairings of educational categories (Low-Middle Middle-High, and Low-High) for each year. Following the study by Marcińczak et al. (2015), we interpret DI values below 20 as low, and DI values above 40 as high. Table 20.1 presents the results.

Two patterns stand out. First, in parallel with income inequality, the DI increased from 1990 to 2000 and then dropped, to levels lower than 1990 in 2010. The second striking result is that in no year and category is the segregation level higher than 0.4, except for the low to high segregation in 2000. The DI for the low to high category is always the highest, and the Low-to-Middle category is the lowest. This is consistent with theories of segregation that predict growth in residential separation with increasing social distance (e.g. Caldeira 2012).

In order to depict the concentration of these groups across the MCMA, we calculated the location quotient (LQ) using the High and Low educational categories. Figure 20.3 presents these maps. For the three points in time, Mexico City has an above average concentration of people with higher education, while the surrounding municipalities in Mexico State and Hidalgo State have a lower than average concentration. We find an above average concentration of groups with a lower educational attainment outside of Mexico City, and this concentration tends to increase as we move further away from the center.

We then classified neighborhoods in seven categories using the composition criteria laid out by Marcińczak et al. (2015). A significant share of tracts (over 40 percent in some years) remained unclassified using their exact criteria, which limited the comparative power of this calculation. Therefore, we modified the formula used by Marcińczak and his colleagues. Table 20.2 summarizes the categories after these changes.

Using the modified formula, we categorized all but a handful of tracts. Table 20.3 presents the percent of tracts in each of the categories. The majority of neighborhoods fall into the Low-to-Middle category until 2010 when the second largest category,

[4]Unfortunately, because of changes in the classification of education, we cannot distinguish beyond high school as a group consistently over the three decades.

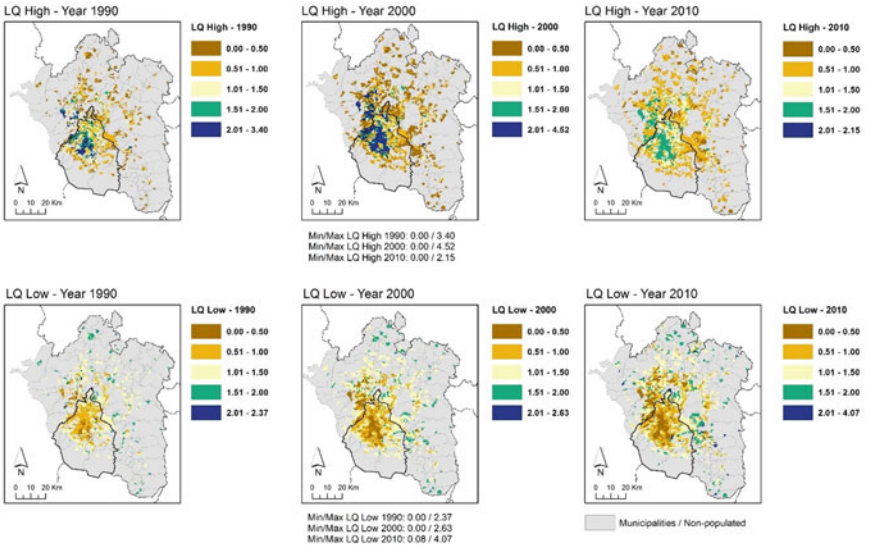

Fig. 20.3 Location quotient maps for the High and Low educational groups in the MCMA

Table 20.2 Criteria used for the classification of neighborhood types using to educational attainment

Type	Percentage of educated population by AGEB		
	High (%)	Middle (%)	Low (%)
High	>50	<30	<30
Middle to high	25–55	25–60	<25
Middle	<30	>50	<30
Low to middle	<25	25–60	25–55
Low	<30	<30	>50
Mixed	25–50	25–50	25–50
Polarized	25–60	<25	25–60

Table 20.3 Percent of tracts categorized by neighborhood type, 1990–2010

Type	1990	2000	2010
High	0.1	1.3	7.5
Middle to high	21.7	17.6	30.2
Middle	16.7	14.4	1.7
Low to middle	59.5	64.8	44.2
Low	0.1	1.2	0.5
Mixed	1.9	0.7	15.8
Polarized	0.1	0.0	0.1

Middle to High, converges. The small share of the Low category areas sheds light on the larger pattern of segregation. In many parts of the world the lowest socioeconomic group is the most isolated and, along with the highest category, drives overall levels of segregation. This is not the case of the MCMA. Very few areas of concentrated Low education neighborhoods exist.

Although the 1993 education reform, which established secondary education as compulsory, may have contributed to the absence of concentrated areas of low education, it is unlikely to be the main factor. The reform only affected children attending school in the years after 1993 thus had no effect on the adult population. A bigger influence could be the continued migration from rural areas. However, there is no clear evidence on the relationship between in-migration and segregation.

The share of High education neighborhoods was very small in the years 1990 and 2000, but increased to 8% by 2010. At the same time, the Middle education neighborhoods nearly disappeared. The concurrent changes in the paired category (Middle-High and Low-Middle) and Mixed category reflect a dramatic shift in the neigbourhoods' educational structure. The most common neighborhood groups are Low-to-Middle (decreasing) and Middle-to-High (increasing) neighborhoods.

We cannot identify the role of the residential mobility of different educational groups (e.g. people with high education entering High education neighborhoods) in segregation from our data. However, the role of residential mobility is likely to be modest in these neighborhood changes since the mobility of Mexican families is low, and family members tend to remain together until children are older. Rather, as each new generation is better educated compared to their parents, neighborhoods become educationally more mixed as a result of in situ intergenerational improvements in education.

We also found significant changes in the spatial distribution of neighborhood types given the educational composition of their residents. Figure 20.4 shows the distribution of each type of neighborhood in the MCMA. Mexico City consistently has more higher attainment neighborhoods than the rest of the metropolitan region. In 1990, the vast majority of High neighborhoods in the MCMA were in Mexico City, along with about 81% of the Middle-to-High neighborhoods, but only 32% of the Middle neighborhoods. In 2010, 84% of High neighborhoods and 55% of Middle-to-High neighborhoods were located in Mexico City.

Between 1990 and 2010, the number of Middle, Low-to-Middle and Mixed neighborhoods decreased significantly in Mexico City. The share of Middle neighborhoods decreased from 32 to 5%, the share of Mixed neighborhoods from 92 to 46%, and the share of Low-to-Middle neighborhoods from 52 to 29%. It also had all of the few polarized neighborhoods.

Mexico City has an over-representation at the higher end of the neighborhood distribution by education, but the trend points to an equalization with the rest of the region. The share of Middle-to-High and Middle neighborhoods decreased significantly in the urban core, while the north and northwestern areas directly adjacent to Mexico City saw an increment in Middle-to-High and Mixed neighborhoods in 2010.

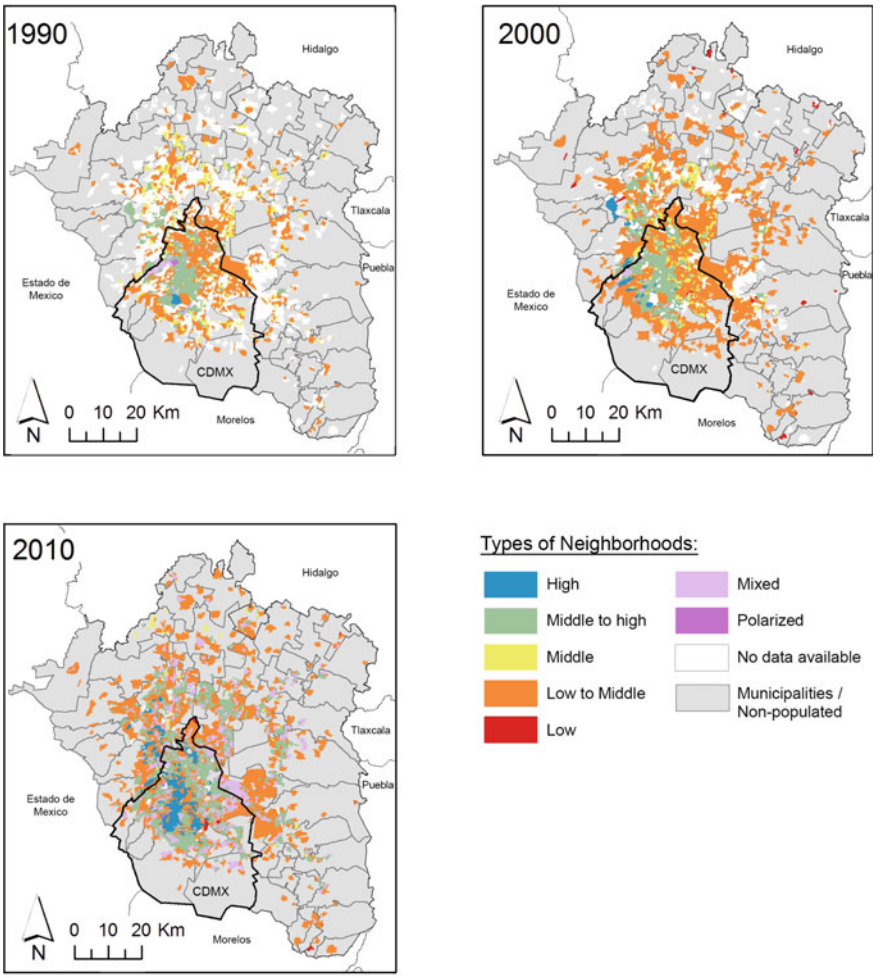

Fig. 20.4 Classification of neighborhoods by educational attainment in the MCMA

To determine whether the population with the highest educational attainment clustered in specific areas, we first sort neighborhoods by the absolute number of High category households, and then group neighborhoods into quintiles. Figure 20.5 shows neighborhoods based on the quintles they belonged to. The top quintile remains concentrated in the core of Mexico City through time, with a few newer clusters appearing in the North and Northwestern areas outside the Mexico City limits. This may be caused partly by the dispersion of the MCMA: in 1990 the urban core of Mexico City had about 55% of the AGEBs of the metropolitan area, while in 2010 it had only 43% of the AGEBs. Even so, the location of the top quintile (Q1) has changed significantly through time. In 1990, 41% of the Q1 neighborhoods were concentrated in Mexico City. By 2010 that share dropped to 28%.

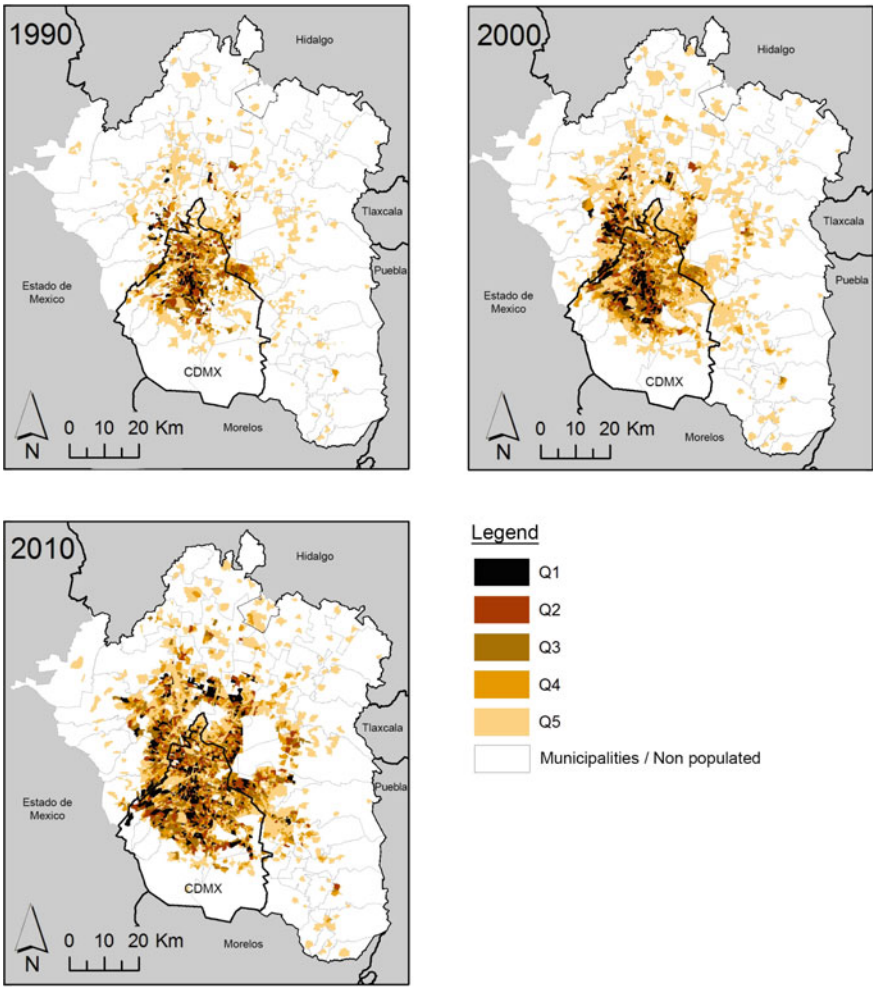

Fig. 20.5 Location of the highest educational group in the MCMA

The distribution of the lowest quintile (Q5) also changed, but not as drastically (from 65% in 1990 to 60% in 2010). While urban expansion is sometimes thought to be fueling the displacement of specific groups, a large proportion of the expansion is actually the appearance of Middle and Low-to-Middle income neighborhoods in the periphery (due to the social housing finance program that started in the 1990s).

The new clusters of Q5 located to the north and northwest areas outside of the urban core (Mexico City) signals a reorganization of the urban hierarchies of the past. The National Population Council [CONAPO] categorized these areas with a much lower degree of marginalization (measured by level of education, access to health, housing characteristics, and availability of household goods); the eastern and southeastern

areas where older incremental housing developments of Neza and Chalco are located, remain poor and with a higher degree of marginalization (CONAPO 2012).

20.5 An Uncertain Trajectory

Inequality is a necessary condition for socioeconomic segregation, but decreases in inequality do not always lead to lower levels of residential segregation, i.e., to higher levels of residential integration. When assessing social segregation using education levels, it is important to consider that a more systematic link between educational improvements and wage improvements would have likely led to greater segregationist pressures at the same time that it reduced inequality in the short term. According to the Mexican National Evaluation Council [CONEVAL], all municipalities within the MCMA experienced a reduction in inequality between 1990 and 2010—the average GINI coefficient dropped from 0.44 in 1990 to 0.40 in 2010. Mexico City had a Gini coefficient of 0.49 in 1990, 0.48 in 2000, and 0.42 in 2010. At the metropolitan level, inequality increased slightly between 1990 and 2000 for the municipalities outside of Mexico City (GINI coefficients of 0.41–0.44 for Mexico State and of 0.42–0.45 for Hidalgo[5]), but then dropped to below 0.40 in 2010 (CONEVAL 2017).

The decrease in segregation between 2000 and 2010 points to other factors influencing the spatial structure of the MCMA. The economic structure of the MCMA is stable and incomes have gone up. The number (though not the share) of people in high-wage occupations has increased. The large-scale provision of housing has likely contributed to the sorting of people and a selection process that affects segregation. Many of the people moving to the peripheries are doing so because of the government's housing fund, available only to formally employed, salaried workers. This leaves different types of people in the core city, including those with informal employment (and likely lower levels of educational achievement), as well as high income but non-salaried workers, and salaried workers who do not want to commute to jobs in the core city.

Mexico City is changing. Larger Middle and High-income enclaves and secondary business districts have emerged in the peripheries, especially at the edge of the urban core of Mexico City. The city's development is more fragmented and there

[5]These GINI coefficients are only for those municipalities that are part of the MCMA, not for the State of Mexico and Hidalgo.

are more differentiated spaces: gated communities of different income levels and internationally oriented districts. This is likely to accelerate the process of residential segregation yet it has not, at least in the way we can measure it.

20.6 Conclusion

The spatial complexity of the Mexico City Metropolitan Area, the vast amalgam of neighborhoods that make up its dozens of municipalities, does not translate to high levels of segregation. This fact contrasts with Mexico's rigid economic and social structures and underlying inequalities, which are likely why many observers—and experts—assume the city and the country are highly segregated. In this analysis, we find that the spatial distribution of people of different educational levels is relatively even across the city. Most neighborhoods have at least two groups (usually Low and Middle or Middle and High educational attainment), with an increasing number having representation of all educational groups.

There is an increase in the number of neighborhoods where one group dominates, most notably in neighborhoods where people with high education are clearly over-represented. This suggests distinct processes shaping economic returns to education and residence. Despite localized changes, citywide changes in education outcomes have not translated to increased segregation as measured by the dissimilarity index. The improved education of people living in Mexico City has not improved labor market outcomes, however. This, we hypothesize, has led to a city where people stay in place (including children with improved education still staying in parental home) to maintain access to family members, community, and jobs.

With the improvement of education but modest residential mobility, in situ education change in neighborhoods has been important, and we assume drive the decease of city-wide levels of segregation between 1990 and 2010. Separation is most systematic between those with the highest level of education and those with low educational attainment. This separation has translated into a rapid increase in the number of neighborhoods dominated by highly educated individuals. At the same time, mixed neighborhoods and areas where people with middle and high levels of education have become the norm, replacing the long dominant mix of low and middle educational attainment.

These shifts, while not increasing segregation, are reshaping the spatial structure of the MCMA. Newly built neighborhoods in the peripheries are receiving large numbers of residents, who risk being locked in places that lack access to quality education and jobs. People with high educational attainment are moving into newer developments that might afford them greater opportunities to isolate themselves from the rest of population compared to the traditional core areas that used to be the home of most highly educated residents. These changes were clearly visible in 2010.

Mexico City's new administration has already proposed new approaches to housing, including the idea of inclusionary housing[6] that may allow it to counter tendencies of social segregation in the core of the metropolitan area. Concurrent improvements in social services and educational opportunities in the State of Mexico and Hidalgo will reduce the disadvantage of the metropolitan periphery, but the tendency of employment centralization will be more difficult to change. The 2020 census will shed important light on which trajectory the city is following.

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[6]For more, see the program announcement https://www.cdmx.gob.mx/portal/articulo/programa-especial-de-regeneracion-urbana-y-vivienda-incluyente (last accessed 12/19/2019).

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Chapter 21
Reordering Occupation, Race, and Place in Metropolitan New York

Kasey Zapatka, John Mollenkopf, and Steven Romalewski

Abstract The New York metropolitan area is one of the oldest, largest, and perhaps most complex urban region in the United States (U.S.). Its 23.7 million residents live across four states, produce a GDP of more than $1.7 trillion, are governed by a fragmented political system, and experience persistently high degrees of geographic and racial/ethnic inequality and segregation. This chapter investigates the evolving spatial organization of occupation and race across the metropolitan area. While white professionals have traditionally lived in an outer ring of suburbs and blue-collar immigrant and minority groups have lived closer to the city center, our research shows that the forces of gentrification and minority and immigrant suburbanization have been turning the metropolitan area inside out. Specifically, young, usually white, professionals are increasingly located in and around the central city whereas many working-class minorities have shifted away from it. At the heart of this spatial reordering lie the diminishing plurality of native-born whites within the region and the increasing share of immigrant minority groups, especially for foreign-born Hispanics and Asians. This trend has lessened the share of white males in better occupations even as the region's occupational structure slowly but inexorably tilts toward managerial and professional occupations. Technology is transforming white-collar work as blue-collar work continues to disappear. Dramatic shifts are thus afoot, yet inequality

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and segregation remain high. We argue that these changes in the spatial organization of the metropolitan area challenge us to see these inequalities from a new vantage point. As elites are now more likely to live among less advantaged groups, this may provide the social basis for new thinking.

Keywords New York metropolitan area · Demographic change · Spatial inequality · Immigrant suburbanization · Segregation

21.1 Introduction

The New York metropolitan region is old, large, and complex. Settlers sent by the Dutch West India Company founded the colony on Lenape Native American land in 1624 at the southernmost tip of present-day Manhattan. The great protected harbor at the confluence of the Hudson River and the East River provided water access not only along the East Coast of the U.S., but also north and west to the Great Lakes and the inland U.S. (especially after the Erie Canal was completed in 1825). New York City firms made the most of these advantages, achieving dominance over the U.S. and the trans-Atlantic trading systems in the mid-nineteenth century. Building on these initial advantages, a vast regional system of work, residence, and recreation grew up around the city over time.

Today, the broadest official definition of the metropolitan region is the U.S. Census-defined Combined Statistical Area (CSA). The border of the New York CSA stretches from Atlantic City on the southern New Jersey coast northwest to Allentown, Pennsylvania, eastward across the Hudson River valley to Connecticut, and then southeast across the Long Island Sound to include the length of Long Island. This broad definition encompasses 23.7 million residents and more than 10 million workers producing a $1.7 trillion GDP—ten percent of the U.S. total. More than a third of these residents live in or just outside New York City at high-density levels (656 people per square kilometer or more). Narrower definitions of the metropolitan area include the U.S. Census-defined Core-Based Statistical Area (CBSA) and the OECD Functional Urban Area (FUA). The CBSA contains almost 20 million people and 9.8 million workers but excludes Connecticut and distant subordinate metro areas. This chapter analyzes patterns in the even smaller FUA delineation, pictured in Fig. 21.1. It consists of 16 New York and New Jersey counties accounting for 17 million people and 8.3 million workers. The denser, inner FUA thus contains almost three-quarters of the broader CSA population and four-fifths of its labor force.

The FUA's metropolitan hierarchy centers on one large, dense city (New York) surrounded by other smaller but still substantial cities (New Brunswick, Newark, Jersey City, Yonkers, White Plains, and the major Long Island towns) and an extensive network of suburbs. At present, New York City contains half of the FUA population—8.6 million residents, 4.1 million workers, and 4.6 million jobs, four-fifths of which are held by city residents. The FUA's satellite cities and suburbs contain the other half of the FUA's residents, with 8.4 million dwellers, 4.2 million workers, and 3.6 million

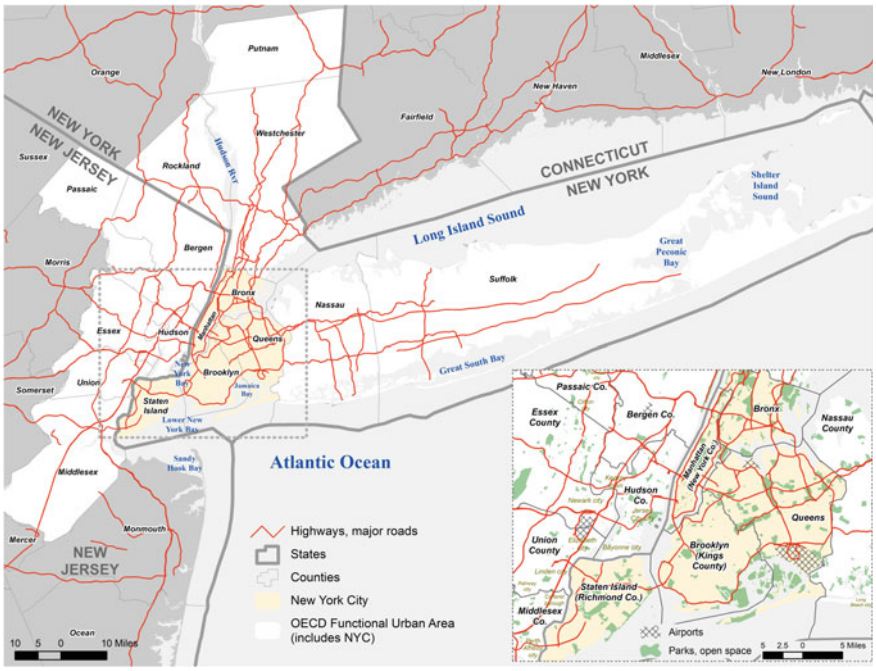

Fig. 21.1 Geography of New York metropolitan area (OECD Functional Urban Area)

jobs, which are overwhelmingly held by people living outside the city. About 790,000 suburban workers commute into the central city, while approximately 300,000 city residents work outside its boundaries.[1]

A multi-nodal, radial system of mass transit, highways, bridges, tunnels, and roads knits together the regional patterns of residence and work. While the core city is governed by a cohesive and centralized municipal government, the rest of the region is fragmented into several states and more than a thousand municipal jurisdictions, all of which have developed distinct social fabrics and identities. Patterns of defensive incorporation hardened these jurisdictional boundaries by the end of the nineteenth century, with some suburban towns using zoning and housing regulations to attract and serve better-off residents and leaving other places to house and serve the working classes.

These arrangements produced and reinforced a persistently high, if gradually declining, level of racial segregation, indeed currently the second highest of any

[1] As described below, sources include the 2000 U.S. Census STF3 tract file and Public Use Microdata Sample (PUMS) File and the American Community Survey (ACS) combined tract and public use microdata files for 2008–2012 and 2013–2017. Since the ACS is a rolling five-year average, we refer to 2008–2012 and 2013–2017 by their end year, 2012 and 2017, respectively, for simplicity. Employment by place figures come from the U.S. Bureau of Labor Statistics. The numbers here were calculated from the PUMs File using the person weight and excluding all people not living in households (i.e., group quarters).

U.S. metro area (Frey 2018). As it does elsewhere in the United States, class has a color in New York, since racial and ethnic groups cluster in specific occupations and industries. Whites are strongly represented in top occupations in the higher value-added industries while minority groups cluster in less rewarding occupations and industries (Waldinger 1996).[2] The residential segregation of different racial and ethnic groups is thus intimately intertwined with patterns of socioeconomic segregation and inequality. As the remainder of this analysis specifically discusses the regional occupational and socioeconomic patterns of FUA, readers should keep the patterns of the larger metropolitan region in mind.

21.2 Background: Changing Occupational Structures and Patterns of Inequality and Segregation

New York exemplifies the post-World War II American metropolis. From the 1950s through the 1980s, the decline of population and employment in inner cities with growing minority populations was a key feature of this regional mosaic. By contrast, growing suburbs attracted the white middle-class residents and workers with new housing, shopping malls, and corporate office parks. Since then, however, three potent forces have gradually begun to erode and alter this pattern. The first is demographic (declining native and rising immigrant-origin populations), the second involves occupational restructuring (the shift from production to services with a new ethno-racial and gender division of labor), and the third concerns the shifting geography of population concentrations (a shift in residential locations).

21.2.1 The Decline of the Native-Born and the Rise of Immigrant-Origin Populations

The twin patterns of declining native-born and rising immigrant-origin populations are reshaping the metropolitan region. The number and share of people living in households headed by native-born non-Hispanic whites have declined relatively and absolutely not just in the older central cities like New York City or Newark, but also in the whole region, falling from 6.4 to 5.9 million between 2000 and 2017 and from 52.1 to 47.9% of the FUA total. This story of the native white population decline

[2]The U.S. Census collects information separately on race and Hispanic origin. In analyzing census data, social scientists almost always group all Hispanics together as a distinct group, leaving non-Hispanic whites, blacks, Asians, and other races as the other categories. When we use the terms white, black, and Asian, we mean the non-Hispanic portions of those populations. Since "Hispanic" is the official Census term, we use it here, although sometimes preferred alternatives are "Latino/a" or "Latinx". The census PUMS also ask respondents about their ethnic ancestries, places of birth, and citizenship status, allowing researchers to identify specific ethnic groups (e.g., Irish, Italian, Jamaican, or Dominican).

is relatively old, but the pattern now also extends to native African American and Puerto Rican households (For most of the period between 1950 and 1980, Puerto Ricans contributed to the vast majority of Hispanic households). Membership in African American households declined by 129,000 and Puerto Rican households by 59,000. If this had been the only trend, the region would have shrunk greatly, just as it did on other rustbelt areas, but native out-migration was not the only force at work. The number of people living in immigrant-origin households grew within all the racial categories, more than offsetting the native declines.[3] The immigrant-headed household population surged by 1.34 million to 43.5% of the FUA total. As a result, the FUA's total population rose 6.5% between 2000 and 2017.

Ever since African Americans and Puerto Ricans became substantial groups in the region, high levels of white-black segregation and lower but still high levels of white-Hispanic segregation have characterized metropolitan residential patterns. Occupational segregation was lower, yet still considerable. Over time, however, deindustrialization and the shift to services have altered the types of industries and occupations in the regional economy. As new immigrant-origin racial and ethnic groups entered the metropolitan labor market, they tended to cluster in specific industry-occupation niches that were open to them because native groups were departing them, these occupations were less desirable to native workers, job growth outstripped the supply of native-born workers, or immigrant entrepreneurs found ways to enter them. Entering groups competed with each other to access the available niches that offered higher wages and more opportunity and achieve ethnic closure within them (Waldinger 1996). While workers from every ethnic or racial group span every occupation and industry, they do so unevenly, achieving significant clustering in some niches and remaining relatively sparse in others. To give one example, native-born whites make up 41.6% of the workers in the FUA, yet they hold 65% of the chief executive and only 6.9% of the dishwasher positions. Conversely, foreign-born Hispanics (12.6% of all workers) hold only 2.7% of chief executive positions but are 61.4% of the dishwashers. Racial and occupational segregation thus intertwine to create distinctive patterns in the geography of the labor force.

21.2.2 New Ethno-Racial and Gender Divisions of Labor

The interaction between economic and demographic change between 2000 and 2017 has gradually reshaped the ethno-racial and gender division of labor in the region. The dominance of suburban white males in the top occupations has diminished and inner-city minorities have slowly shifted away from low-paid service jobs. Women, minorities, and immigrants now hold increasing shares of higher-paying jobs.[4] Of

[3] We group people by the characteristics of the household head because this identifies the immigrant origin of native-born children with foreign born parents.

[4] Gender and family patterns are a critical part of this story, as more women enter the labor force and more families rely on two earners. Ideally, our analyses would not only take race and nativity into

course, dominant groups may still try to ensure that members of their own or other favored groups will succeed them by maintaining barriers to immigrant and minority upward occupational mobility. However, the declining number and share of workers from native-born groups, especially whites, and the rising shares of workers from minority immigrant households make it impossible for them to do so fully. White males are aging out of the Top occupations and younger cohorts do not contain enough white males to replace them. This has opened paths for what Richard Alba (2009, p. 15) has called "non-zero sum upward mobility."

21.2.3 A Shift in Residential Locations

Another important force reshaping the metropolitan area has been the shift in the residential preferences of younger native-born, non-Hispanic white managers and professionals away from their former distant suburban strongholds toward racially diverse neighborhoods in and around the central city (see Ley 1996; Smith 1996 for competing theories as to why and how this occurs). This has been paired with the outward movement of minority and immigrant workers. The period from 2000 to 2017 has been one of changing places: native white professionals and managers shifting into increasingly white, inner-city neighborhoods and minority and immigrant workers in the middle and lower occupations shifting into decreasingly white, inner suburban areas.

"Given the strong correlation between income and race in the United States" (Reardon and Bischoff 2011, p. 1093), it is hardly surprising that racial succession has resulted in declining real median household incomes in many inner suburbs. For example, between 2000 and 2017, the blue-collar city of Bayonne, New Jersey, suffered a net loss of 20,000 people living in white native-born households and 5,000 living in black native-born households, yet it gained 6,000 people living in black immigrant households, 11,000 in native Hispanic households, 15,000 in immigrant Hispanic households, 1,800 in native Asian households, and 11,000 in immigrant Asian households, thus more than offsetting native-born losses. At the same time, Bayonne's real median household income per capita declined by 5.5%. Reciprocally, the increasing movement of white, middle-class residents into many low-income inner-city neighborhoods has raised their median incomes. The gentrifying Brooklyn neighborhoods of Greenpoint, Williamsburg, East Williamsburg, and Bushwick collectively attracted 85,700 more people living in native white households while losing 19,300 members of native black households and 12,200 members of native Hispanic households. Real median household income per capita rose to 68%, erasing many of the previous effects of deindustrialization, disinvestment, and depopulation on these neighborhoods.

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account, but gender as well in terms of how groups are sorted across industry-occupation niches. We refrain from exploring that here because adding gender to the analysis would increase the eight major racial-nativity categories to sixteen.

More broadly, people with good jobs and high incomes have been recentralizing in recent years after diffusing away from their central cities in previous decades (Shearer et al. 2019). Although white managers and professionals and their families still live mainly in affluent suburbs located 30 to 40 miles away from Manhattan, the center of gravity of the net shift in this population has moved strongly toward neighborhoods surrounding the Manhattan central business district, including Harlem, the East River communities in Queens and Brooklyn, and Hoboken and Jersey City across the Hudson River. Simultaneously, the poor, minorities, and immigrants previously concentrated in central cities are shifting toward the inner suburbs beyond this gentrifying ring. While the overall spatial patterns of economic and social difference still bear many marks of the post-World War II period, they are clearly changing. If suburbanization of the white middle class and the growth of the central city minority poor defined the metropolitan form between 1950 and 1980, the recentralization of young professional households (primarily but not exclusively white) and the gradual dispersal of native and immigrant minority group members mark the period between 1980 and the present. A complicated mix of factors is shaping this dynamic, including changing preferences among those who have a choice of where to live, rising central city housing costs that directly or indirectly displace some former residents, and the fading of a post-World War II generation of suburban housing and family formation choices.

Economic restructuring has changed the mix of occupations; demographic change has altered the make-up of their workers; and altered location patterns have shifted the mosaic of jobs, residences, and commutes in the metropolitan area. This is particularly evident between the Manhattan central business district and the distant affluent, white suburbs. The predominantly black and Hispanic inner-city communities that experienced the largest gains in white residents were all in Brooklyn areas with good transit connections to Manhattan (Bed-Stuy, Crown Heights, Fort Greene, East Williamsburg, and Bushwick), or in Northern Manhattan (Harlem, West Harlem, East Harlem, and Washington Heights). Collectively, these communities gained 248,000 employed workers, doubled their number of managers and professionals, and lost office and factory workers. The overall drop in the FUA's white population reduced their standing in many communities, especially the inner suburbs on Long Island and in New Jersey. Arriving minorities (especially immigrant Asian and Hispanic households) more than offset the white population's departure. While these communities slowly gained employed workers, managers, and professionals, these communities' biggest gains were in health support occupations, food preparation, home, child and healthcare aides, and other service jobs.

While New York remains one of the country's most racially segregated metro areas (Logan and Stults 2011, p. 6), its core white and black neighborhoods are not as white or black today as they were in 2000. Hispanic and Asian immigrant households have settled in and between them, blurring their boundaries; new kinds of "global neighborhoods" have emerged in the process (Zhang and Logan 2016). The subsequent analysis investigates how the spatial redistribution and repositioning of racial and occupational groups have created new occupational mixtures and juxtapositions.

21.2.4 The Influence of the Welfare System

The U.S. has a comparatively fragmented welfare state that relies heavily on private provision (e.g., employer-sponsored healthcare and retirement systems) (Lynch 2014). The welfare system is largely funded by the federal government, but some states minimize or maximize the variety and quantity of services provided. In that context, New York and New Jersey have relatively extensive welfare systems, with New York City being one of the most social-democratic jurisdictions in the U.S. Its current Fiscal Year 2020 budget is $92.8 billion, spending large amounts on housing, social services, and other redistributive programs. The Department of Homeless Services alone will spend $2.1 billion. The City finances this high level of spending with the highest level of municipal taxation in the U.S. (Independent Budget Office 2007). While government spending levels are somewhat lower elsewhere in the region, the entire FUA is a relatively high tax, high public spending environment. Public employment is thus an important part of the labor market, with government contracts also sustaining high levels of employment in nonprofit organizations. New York City may be the business capital of the United States, but it also has the largest municipal hospital system; a huge municipal elementary, high school and university educational system; and a vast array of nonprofit organizations. Together, these systems help to sustain a substantial set of middle-income occupations held by City residents.

21.2.5 The Influence of Housing and Land Tenure

Before World War II, the vast majority of American households rented their homes; after the war, U.S. housing policy dramatically shifted in favor of homeownership (Schwartz 2015). As the Federal Housing Administration (FHA) instituted 30-year self-amortizing mortgages, insured mortgages issued by qualified lenders, instituted construction standards, and required housing inspections before sale, the Federal Housing National Mortgage Association (Fannie Mae) also purchased and securitized FHA-issued mortgages to provide capital so banks could issue more loans. Additionally, homeowners began deducting mortgage interest from their federal taxes, significantly subsidizing homeownership and making it more affordable than renting. As a result, the national homeownership rate grew from 44% in the 1940s to 62% in the 1960s. (Schwartz 2015). As of April 2019, it hovers at 64.2% (U.S. Census Bureau 2019).

Although these policies benefited many homeowners, systematic racial discrimination in lending and home sales prevented many minority groups from sharing in the gains. Restrictive covenants—private agreements preventing owners from selling to non-whites—were legal until 1948. FHA guidelines initially enshrined banking practices of refusing to lend in certain neighborhoods and did little to alter these practices even after Congress passed the Fair Housing Act in 1968 (Schwartz 2015). Failure

to aggressively enforce the Fair Housing Act has left informal but systematic racial discrimination in place, maintaining segregation and limiting minority groups' ability to leverage homeownership to generate wealth and transfer it between generations.

While homeownership predominates in the suburban areas of metropolitan New York, approximately 65% of City residents rent their homes, since high housing costs limit access to homeownership. Compared to other cities, New York City has strong rent regulation laws and a substantial stock of public housing. While 43% of New York City renters live in market-rate housing, 45% are protected by rent regulation and another 12% live in other types of regulated units, which is largely public housing (New York City Rent Guidelines Board 2018, p. 4).[5] Recently strengthened, these laws provide a degree of affordability and stability to renters in New York City (Paybarah 2019). As a result, median gross rent for all New York City renters was reported to be $1,830 in 2017, but $1,375 for rent-stabilized units (Gaumer 2018). It is against this backdrop that our analysis examines shifting patterns of residential segregation, growing income inequality, and a changing occupational structure over time.

21.3 Data and Methods

We created two datasets for our analysis: one spatial and the other individual. The first uses tract-level data from three time periods: the 2000 Decennial Census and the 2008–2012 and 2013–2017 American Community Survey (ACS) 5-year Estimates.[6] The second dataset is an individual-level dataset drawn from University of Minnesota's Integrated Public Use Microdata Series (IPUMS).[7] These data include two time periods that mirror the start and end of the spatial dataset; we used the 5% public use microdata sample from the 2000 Census as well as the public use microdata sample from the 2013–2017 ACS 5-year estimates (hereafter referred to as 2017). The census tract dataset provides a spatial analysis of small neighborhood areas called census tracts, which are small geographic areas that contain on average about 4,000 people. The second dataset provides a repeated cross-sectional analysis of individual and household data for geographic areas called Public Use Microdata Areas (PUMAs) that hold at least 100,000 people. The first dataset allows us to

[5] "Other types of regulated units" largely consists of public housing, but also incldues Mitchell-Lama, *In Rem*, HUD-regulated, Article 4, and Loft Board units.

[6] U.S. Census data can be found at https://www.census.gov/programs-surveys/acs. We used the 2008–2012 ACS 5-Year Estimates instead of the 2010 Decennial Census since the ACS 5-Year Estimates are meant to give a better sense of what is happening over five-year periods than the snapshot the Decennial Census offers. Additionally, the ACS 5-Year Estimates provides much greater demographic and economic detail than does the Decennial Census, which counts population only by age, sex, race, and housing tenure. Since the ACS is a rolling five-year average, we refer to 2008–2012 and 2013–2017 by their end year, 2012 and 2017, respectively.

[7] IPUMS has received several federal grants to harmonize and integrate U.S. Census microdata, which can be accessed on their website: https://usa.ipums.org/usa/.

analyze occupational trends by a neighborhood of residence within the FUA while the second allows us to analyze any combination of factors (including race, age, sex, education, and detailed occupation) for individuals and households within the larger PUMA areas.[8] (The FUA contains 4,652 census tracts nested within 151 PUMAs.) We use the terms census tract and neighborhood interchangeably and refer to PUMAs as communities.

Since census tract boundaries change over time, we used the Longitudinal Tract Database (Logan et al. 2014) to harmonize data from 2000 into 2010 boundaries, the same boundaries used in the subsequent ACS data panels. All monetary values in both databases were inflation adjusted to 2018 dollars using the Consumer Price Index (CPI) for New York-Newark-Jersey City, NY-NJ-PA (U.S. Bureau of Labor Statistics 2019a). We inflation-adjusted housing-related variables using the all-items-less-shelter CPI so as to not control away variation in housing costs across years (U.S. Bureau of Labor Statistics 2019b).[9]

21.3.1 Measures of Inequality

The most widely used measure of income inequality is the Gini coefficient (Hoque and Clarke 2015; Peñaloza 2016). Although these coefficients are typically calculated for individual or household incomes, we use them to examine the spatial patterns of inequality over time in the metropolitan area. The U.S. Census Bureau calculated tract-level Gini coefficients of income inequality for the two panels of tract data in our analysis but not for the 2000 Decennial Census. To create consistent measures across our data, we therefore used the von Hippel and colleagues' (2017) method of the cumulative distribution function and mean matching to approximate Gini coefficients with ordinal categorical data on household income from each of the three Census periods (see Peñaloza 2016; Reardon and Bischoff 2011; von Hippel et al. 2016, 2017). When we compare our results with the Census estimates from the two ACS tract data panels, they slightly underestimate the Gini's reported by the Census Bureau. This gives a slight conservative bias to our analysis of the changing spatial patterns of inequality compared to what we would find if we had Census Bureau-calculated Gini coefficients for all three periods.

[8] While both datasets are repeated cross-sectional, we refer to the first dataset that uses census tracts as the spatial dataset and the second that uses individual data as the cross-sectional dataset.

[9] The all-items-less-shelter CPI is similar to the all-items CPI; however, it does not include housing in its calculations of the overall CPI.

21.3.2 Measures of Residential and Socioeconomic Segregation

We used the U.S. Department of Labor's Bureau of Labor Statistics O*NET Resource Center to condense census occupational categories into their appropriate ISCO categories (O*NET 2019 and Bureau of Labor Statistics 2019c). Similarly, we calculated location quotients and dissimilarity indices according to the methodology described in Chap. 1. However, we slightly departed from these methods in two ways. Since the socioeconomic distribution in the New York City metropolitan area skews toward the high end, we altered the socioeconomic classification of neighborhoods used in Fig. 21.4 to be exhaustive of all neighborhoods (Appendix reports our alternative classification scheme.) Second, we used the SEG package in Stata developed by Reardon and Townsend (1999) to calculate dissimilarity indices.

21.4 Spatial Analysis

21.4.1 Changes in Income Inequality

According to the World Bank, between 1979 and 2016 the Gini coefficient for income inequality in the U.S. increased by one-fifth, from 34.6 to 41.5 (World Bank 2019). The largest increases happened between 1979 and 1986, rising from 34.6 to 37.5, rising again to 38.8 between 1991 and 1994 and then increasing more slowly, by 2.7% points, from 2000 to 2016. In short, income inequality grew dramatically across the United States in the early 1980s and early 1990s, but then grew more slowly between 2000 and the present, in part because of major recessions.

Metropolitan New York has a slightly different story. We calculated Gini coefficients separately for each neighborhood and the entire FUA. The average Gini across all FUA neighborhoods started at 42.6 in 2000, dropped slightly to 41.6 in 2012 (as the regional economy experienced recession), and then rebounded to 42.6 in 2017 (as the region recovered). The index fell primarily because the financial crisis reduced the highest incomes. While this level of inequality is high by international standards, this average neighborhood inequality rests just above U.S. levels as reported by the World Bank. In contrast, the Gini index for the overall FUA is higher, beginning at 47.8 in 2000, rising to 48.0 in 2012, and rising again to 48.8 in the 2017 period. The inequality of the overall metropolitan area is thus higher than that of the average neighborhood—as much as 6.2 points higher in 2017.

21.4.2 Changes in Occupational Structure

Figure 21.2 reports how the Top, Middle, and Bottom occupational shares have

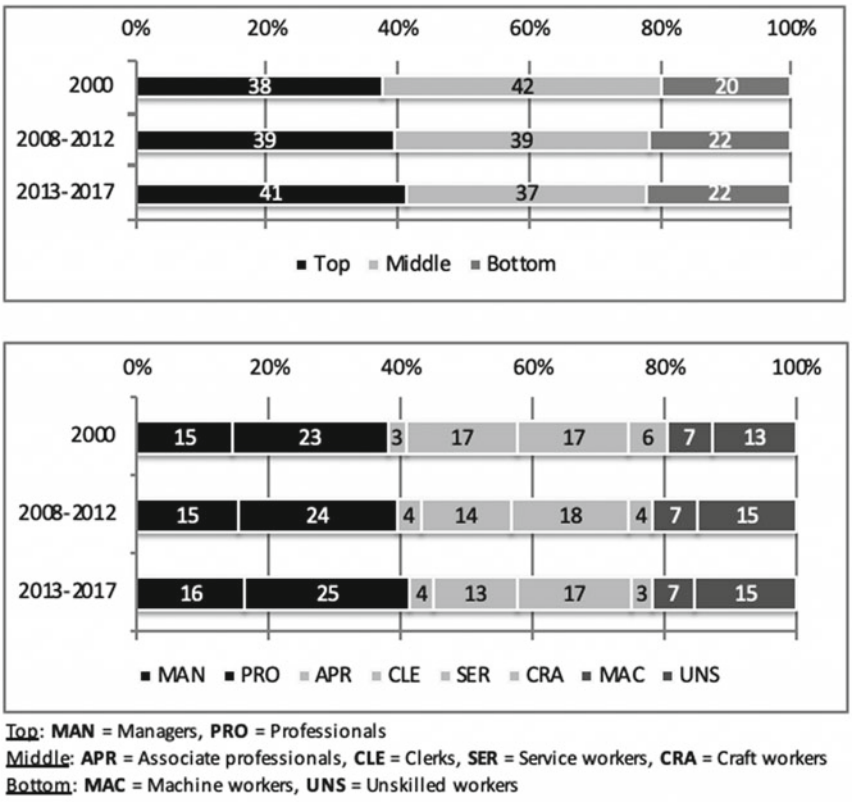

Fig. 21.2 Distribution of occupational groups and change over time

evolved slowly over the study period, gradually becoming more polarized. The share of Top occupations increased three percentage points from 2000 to 2017, the Bottom increased two percentage points, and the Middle decreased five percentage points. The increases in Top occupational groups were evenly distributed among managers and professionals, while the increases in the share of Bottom occupational groups were concentrated in unskilled workers. This reflects not only New York City's role as a national node in commercial and investment banking and the advanced corporate services as well as higher education and hospitals, but also the important role of low-skilled personal services of various types. The losses for the Middle occupational groups were concentrated in the shares of clerks and craft workers. Our research shows that in 2000, these occupations were concentrated around central cities like

New Brunswick and Newark in New Jersey, as well as in the Bronx, Queens, and along the central strip of Long Island. However, by 2017, these concentrations had begun to erode and diffuse across the urban area.

21.4.3 Changes in Residential Segregation Between Occupational Groups

Rising new immigrant Asian, Hispanic, and Caribbean minority groups have tended to locate between the traditional core areas of non-Hispanic whites and blacks, blurring the boundaries between them and making their cores less homogeneous. Simultaneously, native and immigrant minority groups have been moving out toward the suburbs, making the suburbs more diverse as well. As a result, new spatial constellations of group locations have been emerging within the historic patterns of high levels of white-black residential segregation. Since these groups also tend to be concentrated in specific occupational niches, this has affected the residential segregation between occupational groups.

Dissimilarity indices report the level of segregation between two groups, with values above 0.6 being considered high (Massey et al. 2009, p. 77). Table 21.1 reports the indices of dissimilarity for all the occupational groups, revealing their residential concentration relative to each other at the FUA metropolitan level. Overall, the dissimilarity between occupational groups is relatively low and has changed only slightly between 2000 and 2017. The dissimilarity between the Top–Bottom occupational groups changed the most—increasing from 0.35 in 2000 to 0.38 in 2017, approaching a moderate level of segregation. Middle-Bottom segregation remains low at 0.15 and 0.19 for 2000 and 2017, while Top-Middle remains nearly the same at 0.25 and 0.26, respectively.

Table 21.1 Indices of dissimilarity (multiplied by 100)

2000 \ 2013-2017	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS	UNE	TOP	MID	BOT
MAN		16	54	30	27	47	42	44	39			
PRO	13		48	25	22	44	37	39	34			
APR	53	49		37	37	44	40	33	32			
CLE	28	25	35		17	33	26	26	24			
SER	21	20	39	14		35	27	26	24			
CRA	44	42	40	28	32		33	29	37			
MAC	36	34	39	20	23	28		26	32			
UNS	41	38	32	21	25	20	22		26			
UNE	47	43	29	30	33	34	37	26				
TOP											26	38
MID										25		19
BOT										35	15	

Greater variation and levels of segregation emerge when we look at the dissimilarity indices between specific occupational groups. Reflecting the increasing residential concentration of Top occupations, the level of segregation between Top occupations like Managers and Professionals and both Middle and Bottom occupations like Service Workers or Unskilled Workers has generally increased. Interestingly, unemployed people have become less segregated from Top and Bottom occupations. Unsurprisingly, Managers-Professionals and Service Workers-Clerks have the lowest reported levels of segregation, likely because these are broad and overlapping white-collar occupational statuses. As already noted, the highest levels of segregation are between Top occupations and Middle or Low occupations; the dissimilarity indices between Middle and Low occupations are lower overall. Finally, Managers-Associated Professionals are approaching what is considered to be high levels of segregation (0.53 in 2000 and 0.54 in 2017).

Location quotients describe a group's share in a given neighborhood relative to its share of the overall metropolitan population. We computed location quotients for all the occupational groups at the tract level. Figure 21.3 above maps the Top and Bottom location quotients across all the FUA's census tracts for 2000 and 2017. They show strikingly inverse patterns and provide strong evidence of increasing residential segregation between occupational groups over time. Bottom occupations disproportionately cluster in a ring around Manhattan, as well as the eastern end of

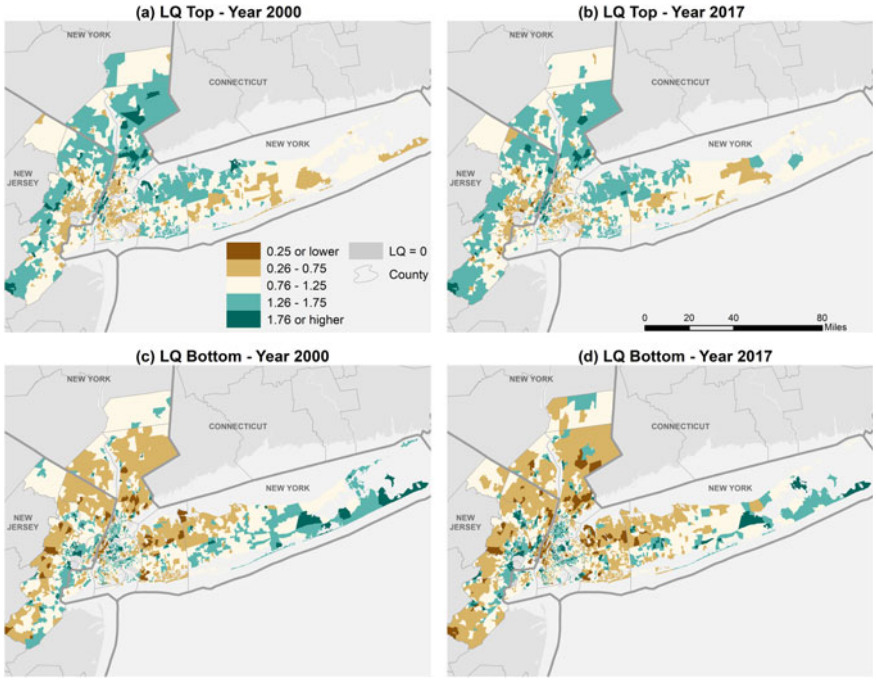

Fig. 21.3 Location quotient maps for the top and bottom occupational groups in New York

Long Island, and around Newark and New Jersey. Between 2000 and 2017, the ring around Manhattan moves out as Bottom occupations no longer cluster in Brooklyn but grow in the areas to the north and the east of Manhattan. Conversely, Top occupational concentrations parallel those of Bottom occupations, increasingly clustering in the core of Manhattan and Brooklyn. However, what were strong concentrations of Top occupational groups in pockets stretching out from New York City along northern Long Island, in Westchester north of the City, and to suburban areas west of Newark are becoming less concentrated, presumably as other occupations move in. In short, between 2000 and 2017, Bottom occupations have generally maintained their patterns of residential concentration yet become less concentrated in the core, while Top occupations have become more concentrated in the core of Manhattan and Brooklyn and declined in their formerly suburban strongholds.

Figure 21.4 allows us to see how the Top, Middle, and Bottom occupational groups mix within and across neighborhoods. Unsurprisingly, the pattern resembles that of Fig. 21.3: High Socioeconomic Status (SES) neighborhoods cluster in an "outer ring" around the central city while Middle and Low SES neighborhoods form a barrier between that outer ring and the increasing cluster of High SES neighborhoods in the heart of the metropolitan area, New York City. Mixed SES census tracts nearly doubled in number between 2000 and 2017 and are most common on the periphery of the outer ring or in the central city where High SES neighborhoods are replacing

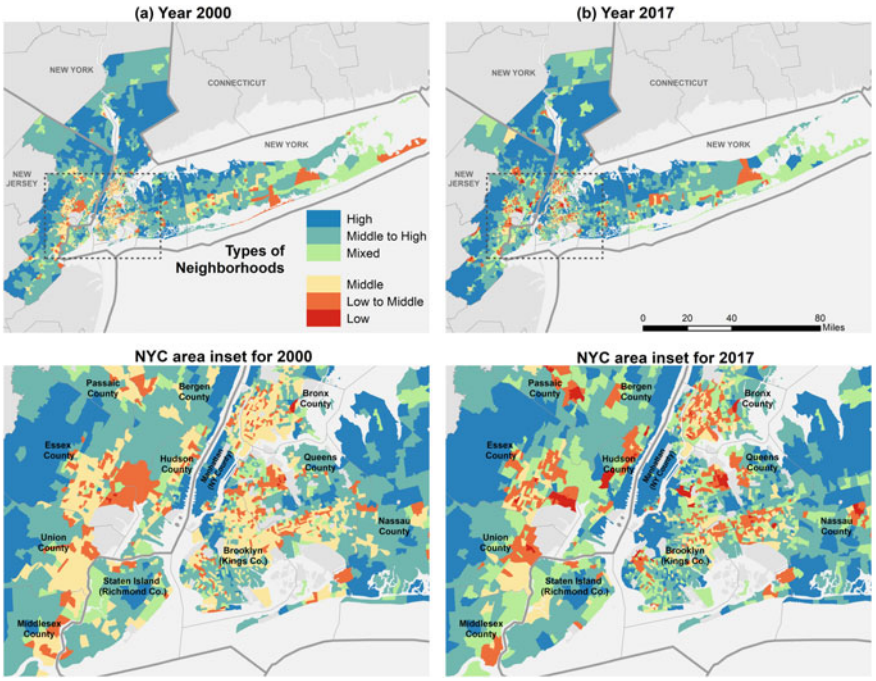

Fig. 21.4 Classification of neighborhoods by socioeconomic composition in New York

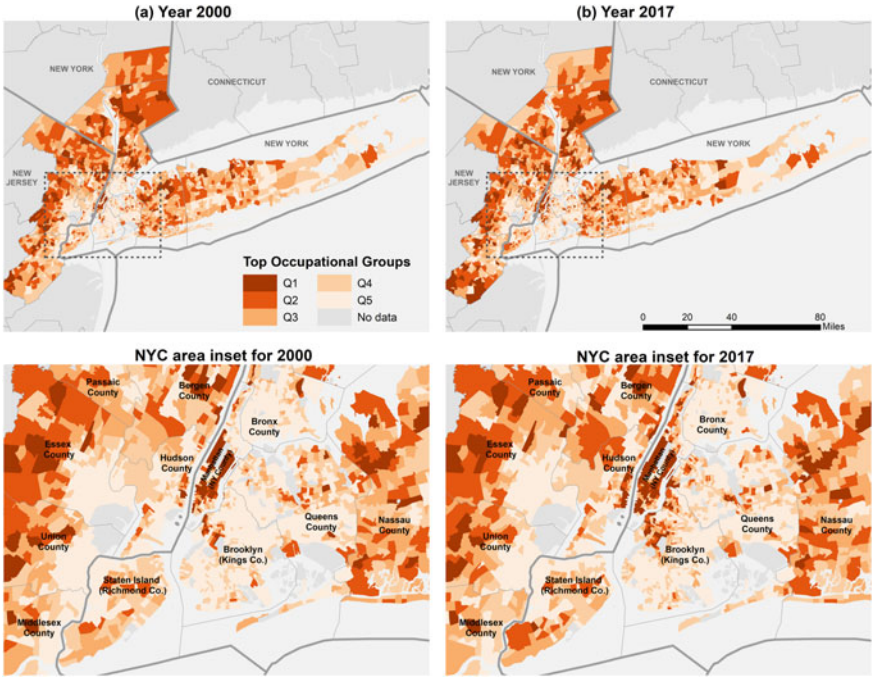

Fig. 21.5 Location of the top occupational group in New York

Low ones (i.e., parts of Brooklyn, Queens, the Bronx, and areas around Newark, NJ). This is most evident in Westchester County in New York, around Newark and New Brunswick in New Jersey, and in areas of Brooklyn and Queens with good access to the city center. A large share of neighborhoods across the metro area with High SES concentrations became more uniformly High and less Middle-High or Middle.

Figure 21.5 provides a final way to examine socioeconomic segregation by mapping the quintile distribution of Top occupational groups in neighborhoods across the metropolitan area. The neighborhoods in quantile 1 represent the top fifth of incomes for all Top occupational groups. This approach reveals an increasing concentration of top-earning neighborhoods. Between 2000 and 2017, all of the losses of Top occupational groups were from neighborhoods in quintile 5; neighborhoods gaining Top occupational groups were distributed evenly across the other quantiles. Gains at the top are most apparent in quintile 1. Looking closely, Fig. 21.5 reflects the trends discussed at the outset of the chapter: Brooklyn and Queens neighborhoods near Manhattan have moved into the top 1 or 2 quintiles from the bottom 4 or 5 over the study period, offering further evidence of the re-concentration of Top occupations and income in the core.

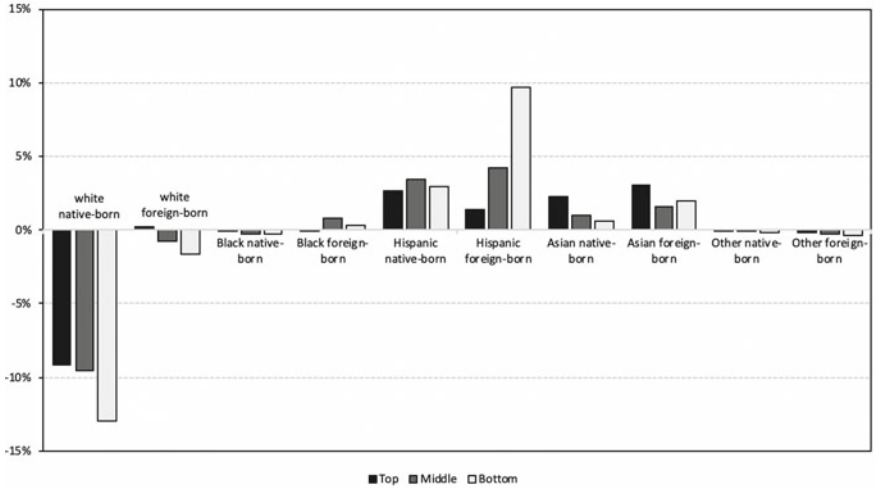

Fig. 21.6 Percentage point change in the racial and native make-up of occupational categories, New York CBSA, 2000 and 2017

21.5 Repeated Cross-Sectional Analysis

The following analysis uses census microdata to look at shifts in the residential location of job holders by race and occupation across the communities with at least 100,000 inhabitants (PUMAs). For each period, we cross-classified job holders by their occupational category, race, and community of residence (for example, we identified the number of black professionals living in each PUMA). This allows us to study both the changing occupational of each racial group and how the changing residential distribution of each racial-occupational group. We summarize the general patterns between 2000 and 2017 for each racial group at the community (PUMA) and aggregate New York metropolitan area (FUA) level.[10] At the outset, we noted that although the adult labor force and occupational employment grew, the growth of Hispanic and non-Hispanic Asians, along with the stability of the non-Hispanic black population masked the significant decline in non-Hispanic whites in the region. Figure 21.6 clearly reflects these trends.

21.5.1 Non-Hispanic Whites

The total, working-age, and employed populations of non-Hispanic whites (both native-born and immigrant) all declined significantly in the FUA over the study

[10]Remember that PUMAs are too large to be neighborhoods–and in some cases represent one or more counties–so we refer to them as communities. A PUMA contains at least 100,000 persons. In New York City, they correspond roughly with city-established Community Districts.

period. This reflects net outflows of native-born groups to other parts of the U.S., their comparatively low fertility, and their aging populations. While the overall growth in employment drew more whites into the workforce, the non-Hispanic white share still declined across all occupational groups in a way that left non-Hispanic whites slightly redistributed toward Top occupations.[11] According to our analysis, the drop in the white share of Top occupations was as large as 9% points, and even larger in Bottom occupations like services and sales (13% points) or plant and machine operators (14% points).

Interestingly, the net loss of non-Hispanic whites in Top occupations was concentrated in the distant upper-middle-class suburbs. As discussed in the introduction, the number of whites in Top occupations actually rose in gentrifying areas close to the Manhattan central business districts. White managerial losses were particularly large (above 20% points) in the New Jersey suburbs of Elizabeth, Englewood-Fort Lee, and New Brunswick, as well as the Bayside-Little Neck area of Queens and Bensonhurst in Brooklyn. By contrast, older and more centrally located neighborhoods like Prospect Lefferts Gardens, Crown Heights, East Williamsburg-Bushwick, and Bedford Stuyvesant in Brooklyn and Central Harlem in Manhattan had substantial gains (20% points or more) in white managers. In short, non-Hispanic whites in Top occupations decreased their share in their long-term suburban strongholds but gained in gentrifying neighborhoods close to the urban core.

21.5.2 Non-Hispanic Blacks

Non-Hispanic black managers and professionals presented a mirror image of the white pattern. While the occupational distribution among blacks was relatively stable, the number and share of non-Hispanic black managers and professionals decreased in the central city neighborhoods where non-Hispanic whites saw large increases, including central city black strongholds like Bedford-Stuyvesant, Central Harlem, East Harlem, East Williamsburg-Bushwick, Crown Heights, and Prospect Lefferts Gardens. On a net basis, black managers and professionals moved away from these central city areas and deeper into Long Island or New Jersey suburbs. Despite sharing an occupation, black managers and professionals earned substantially less than their white counterparts, which further limited their residential choices.

[11] Small occupational categories of Agriculture, Forestry, Fishery as well as Military were excluded from all cross-sectional analyses.

21.5.3 Hispanics

In direct contrast to non-Hispanic whites, Hispanics gained numbers and shares in all ISCO occupations. They made the smallest gains in Top occupations like managers and professionals and the largest in Bottom ocupations like machine operators and elementary occupations. Since just under 60% of Hispanic workers are immigrants, this positioning in the labor market reflects both their low levels of educational attainment upon arrival as well as constraints on achieving further education in greater New York. It appears that the growth of the Hispanic working class has also supplanted the loss of non-Hispanic whites in Middle and Bottom occupations in certain communities. For example, the non-Hispanic white share of machine operators in the northern New York suburb of Ossining-Peekskill, where this occupation was relatively common, dropped from 64% to just under 39%, while the Hispanic share in this occupation grew from 30 to 54%. This is a continuation of a phenomenon noted by Waldinger (1996) in which immigrant groups find a place even in declining industries and occupations if whites were exiting them even faster than they declined. This was also true of other suburban areas like North Fork-Hamptons, White Plains, and West Milford-Wayne as well as satellite city areas like Bayonne-Kearny and Newark. As Top occupations and non-Hispanic whites shifted toward the central city area, minorities and Bottom occupations moved from the central city areas and into the inner suburbs—a literal turning inside out of the urban socioeconomic fabric of the New York metropolitan area.

21.5.4 Non-Hispanic Asians

The Asian story differs from that of the other groups. Like whites, they have become more concentrated in Top occupations (specifically managerial and professional occupations), but their immigrant origins initially clustered them in Middle and Bottom occupations. This represents great progress; the share of Asian workers who are managers rose from 14 to 19%, while the Asian share of all managers rose from 9 to 15%. In general, Asians are now more likely than other minority groups to hold Top and Middle occupations, with managerial, professional, technical, and clerical positions accounting for over 60% of all Asian employment in the New York FUA. Since almost 90% of Asians in the labor force are foreign born, this reflects both significant upward mobility for them as well as the higher levels of educational attainment among Asian immigrant groups compared to other immigrant groups (Kasinitz et al. 2009).

The rate of occupational change was relatively stable across communities, with larger shifts among Top occupations and smaller ones for Bottom occupations. In 2000, Asian managers and professionals were concentrated either in central Manhattan, Brownstone Brooklyn, Northeast Queens, or the ring of upper-income suburbs 30–40 miles distant from Manhattan. The single largest number of managers

lived in and around Saddle River, New Jersey, while the Upper East Side in Manhattan had the highest share of managers. Because employment in the managerial and professional occupations grew substantially over the period, their numbers increased in almost every community, with only the Upper East and Upper West Sides and Kingsbridge losing numbers and share. Some large gains in the numbers of managers and professionals occurred as expected in well-established upper-middle-class communities, but they also took place in the neighborhoods closely ringing Manhattan, such as Jersey City (sometimes called New York City's sixth borough), and Brooklyn Heights, Fort Greene, Bedford-Stuyvesant, Williamsburg, and Greenpoint, just across the East River from Manhattan.

A few communities that gained managers and professionals also attracted those with craft and trade occupations (Englewood-Fort Lee and Bayside-Little Neck). This out-migration of managers and professionals is consistent with the general movement of minority groups that have achieved higher socioeconomic levels out of central city areas, while Bottom occupations like craft and trade production saw a reshuffling within the city core, with neighboring areas often seeing some of the greatest gains and losses. As Asian managers and professionals moved out and away from the central city and toward more suburban and wealthier areas, Bottom occupations reshuffled within the urban core.

21.6 Conclusion

For many years, European scholars worried that the cities of Western Europe might be moving toward an American model, with the middle class moving to suburban jurisdictions in a way that would undermine the high levels of social provision in the big cities. The continued commitment of the professional and managerial occupations to dense central city locations often sustained these high levels of social provision (Häussermann 2005; LeGales 2002; Tammaru et al. 2015). Ironically, as European metropolitan areas get less dense and more spread out, the New York metropolitan area may be moving in a more (traditional) European direction, where Top occupations are becoming more concentrated in and around the center and the post-industrial working classes are being repositioned in the inner suburbs (Ehrenhalt 2013).

At the same time, the New York region has undergone a racial, ethnic, nativity, and gender transition that is just beginning to be widely felt in West European cities. Not only do native-born, non-Hispanic whites make up a fairly small minority of the central city population (with less than a fifth of the city's residents living in households headed by native-born, non-Hispanic whites), but this group accounts for only 35% of the total FUA population. While they remain the single largest race and nativity group, they are a diminishing plurality. No other single group has risen to supplant them. The region's next largest groups live in foreign-born Hispanic households (16.2%), foreign-born non-Hispanic Asian households (10.9%), native-born black households

(10.1%), native-born Hispanic households (9.5%), and foreign-born non-Hispanic white households (8.3%).

Given that the occupational structure of the regional labor market is slowly tilting toward managerial and professional occupations that require higher levels of education, that white males hold a diminishing share of those occupations, and that younger cohorts of white males are too small to replace aging white males, new patterns of opportunity and constraint are opening up in the regional labor market. The educational attainment of many minority and immigrant groups is rising across generations. Whether and how the growing racial-ethnic-gender-nativity groups get access to opportunities for career advancement will be the key to whether the region becomes less or more equitable. Many informal and formal factors shape which groups can access what employment opportunities. As recent work by Chetty and colleagues (2018) shows, New York City and its surrounding region have done a slightly better job in promoting upward mobility from the lowest income quintile than might be expected, given their finding that high levels of segregation and poverty generally hinder upward mobility. This may reflect how institutions of higher education, particularly the City University of New York, can play a critical role in opening pathways of career advancement. In our view, however, the public and private elites of the city as well as the region have not put nearly enough effort into making sure these pathways are open to disadvantaged groups. We hope that the increase of elites living among less advantaged groups in central neighborhoods will provide a social basis for new thinking in this regard, even as it raises inequality within them.

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Part VII
South America

Chapter 22
Socioeconomic Residential Segregation and Income Inequality in Bogotá: An Analysis Based on Census Data of 2005

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Abstract Residential segregation is both a cause and consequence of socioeconomic inequalities. Since the 1990s, segregation patterns in Latin American cities have changed significantly. This is related to major urban transformations caused by privatization policies related to urban development, commercialization, and real estate activity. The main purpose of this chapter is to study residential socioeconomic segregation in the city of Bogotá, Colombia in 2005, using educational attainment as an indicator of socioeconomic status while considering the drivers of segregation during the 1990s. We also introduce a brief analysis of the relationship between residential segregation and inequality based on a model that allows replicating the income distribution of the population using census variables. This chapter shows that residential segregation in Bogotá is related to per capita income inequality, however, segregation may be caused by the dynamics of land and housing markets rather than inequality.

Keywords Socioeconomic residential segregation · Income inequality · Bogotá

22.1 Introduction

Residential segregation has become relevant in recent decades due to the economic, social, and cultural effects of urban development which depend on the capitalist accumulation model (De Mattos 2002, 2012). Territories are not homogeneous in their material or symbolic components and Latin American cities are no exception.

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Segregation patterns may change according to the characteristics of each city which, while adjusting under a neoliberalism logic, reveal the differential distribution of population groups, both at a macro- and micro-scale (Sabatini 2003). Distribution of population groups is determined by government, market, and population interactions in the social production of space, the actions of these actors that territorializes, sectorizes, and segregates people as a result of the social and economic relationships developed in their territories.

This chapter focuses on residential segregation of educational groups, and how it is related to income inequality. Addressing this relation is supported by literature that indicates that inequalities and segregation tend to reproduce each other (Elorza 2013). This happens because economic inequality is attributed to the labor market, which creates varied living conditions for different demographic groups, including differences in access to land and housing, which causes diverse residential location patters, i.e., segregation between groups with different economic resources. Also, belonging to a certain social group allows or constrains access to opportunities to improve one's welfare (Kaztman 2003) which occurs depending on the role different groups play in the social division of labor.

In this chapter, two dimensions of residential segregation between educational groups are considered. First, at the urban scale, characterized through the analysis of location quotients of the main demographic groups with high educational attainment; second, block scale level analysis is used for obtaining the socio-spatial distribution of population groups. The proceeding two sections address the theoretical background and changes in socio-spatial segregation patterns in the city of Bogotá. The methodology is presented in the third section, including data sources and variables used for measuring segregation and inequality. The fourth section presents the results. Finally, conclusions are drawn from the main findings.

22.2 Changes in Socio-spatial Segregation Patterns

When communities are socially segregated or intentionally separated from other social groups, we are referring to the phenomenon of socio-spatial segregation (Kaztman 2003). This phenomenon is often produced and reproduced through the institutional control of resources which allow barriers that restrict the physical and social contact of internally homogeneous groups with other groups which have different characteristics based on income, education, or any other characteristic (De Queiroz 2003).

Segregation as a concept has been approached from differences in residential location and unequal access to land and housing. In the first case, within the framework of classic social ecology theory from the Chicago School in the early twentieth century, the concept of segregation was developed by Robert Ezra Park and Ernest Burgess as a means to analyze the "natural concentration" of certain groups in an urban population. Thereafter, segregation was considered as a neutral topic of urban

ecology for characterizing spatial differentiation of population groups in the cities (Salas 2008).

With the arrival of Modern Social Ecology in the 1950s, quantitative studies of the urban social structure and socio-spatial segregation were carried out. The precursors were Shevky and Williams (1949) and Shevky and Bell (1955) who, under a deductive analysis of homogeneous social areas in the urban environment, categorized demographic groups by their social rank, that is, by their socioeconomic situation, by variable urbanization which is related to the family situation, and by their ethnic characteristics (Buzai 2003, p. 43). Thus, it was possible to analyze the social differentiation and stratification of a specific group, by means of several variable techniques. Since the 1970s, segregation has been analyzed within the unequal access framework by the classic urban theorists—Lefebvre, Lojkine, and Castells—[1] who agree that residential segregation is revealed by the organizational form of space in capitalist societies.

However, segregation is a phenomenon that has been present since the time when cities emerged and is not only present in capitalist societies. Urban segregation is expressed differently depending on the age in which it is studied. Until the 1980s, the traditional pattern of socio-spatial segregation in Latin America was characterized by the residential localization of high-income population groups near the historical downtown in a concentrated way, while low-income populations were concentrated in suburbs and dangerous areas of the city (Sabatini 2003; Sabatini and Cáceres 2005). There are additional layers that make segregation patterns more complex, including (a) the demographic diversity of middle-income populations in the historical downtown, (b) a duality of the city with stigmatized areas related to poverty conditions, and (c) other zones that have emerged in the modern city.

On its own, patterns of segregation are expressed in the urban structure where (a) high-income population groups are becoming increasingly scattered throughout the city and not concentrated in a high rent area in the city center, (b) construction of new commercial and service sub-centers are located outside the traditional center with the aim of gaining new markets, (c) a rise in land prices that isolate low-income groups into suburban zones with low-cost housing, and (d) urban renovation in the deteriorated downtown areas in the form of gentrification (Sabatini 2003).

This new spatial expression emerged in the 1990s, at the beginning of the neoliberal era when land started to be treated like merchandise since. It was at this point when the government downgraded its role to that of a regulator by means of laws and norms, and real estate and other market actors obtained a stronger role in the housing market, especially when it came to the supply of new housing (Janoschka and Glasze 2003; Moura 2003; Sabatini and Cáceres 2005; Torres et al. 2009). Such dynamics have allowed the extension of existing affluent neighborhoods and the

[1] Lefebvre (1976, 1978a, b) pointed out that segregation was an implicit analytical category in the space's production and appropriation, while the sociologist Lojkine (1979) considered that the concept guided an investigative work and Castells (2008) established a definition of urban segregation based upon dimensions, intra homogeneous status and different from others, and as a process because such inequalities tend to perpetuate through time.

dispersion of the concentrated elites to the suburbs due to capital concentration and the liberalization of land markets (Sabatini and Cáceres 2005).

In this context, it can be said that housing access in Bogotá is determined by the laws of: "(…) housing distribution and therefore, produces re-grouping in function of the social capability of people in the capitalist system" (cf. Castells 2008, p. 203), in which a user-client-consumer relationship develops (Aprile and Mosquera 1984). Then, it is possible to state that socio-spatial segregation appears when there is a contradiction between the production of space in the city and private appropriation (Alessandri 2013), where land and housing become a trade value rather than a usage asset.

To be more specific, three main agents intervene in the segregation process, the government, the real estate market, and the population (Ábramo 2003). These agents are related to the three relevant causes that produce such process: the economic inequality between people generated in the labor market, land valorization through the real estate market, and the urban legislation regulated by the state (Torres et al. 2003).

The living conditions of different social groups are attributable to the labor market since it is partly responsible for economic inequality, which leads to unequal access to land and housing and, therefore, residential segregation between different demographic groups. Members of different social groups may or may not have access to opportunities for improving their welfare (Kaztman 2003) and, as a consequence, are differentially positioned across urban socio-spatial dividing lines.

On its part, the geography of opportunity theory suggests that the physical proximity between varied population groups (based on their socioeconomic level, race, religion, etc.) could overcome social problems by means of opportunity structures and positive socialization (Howell-Moroney 2005). However, this approach presents a neoliberal bias since it indicates that the proximity between poor and rich areas encourages social mixing, which is needed in order to improve the standard of living of the poor (Ruiz-Tagle and López 2014). This approach ignores the fact that behind such an "opportunity" is an implicit market-oriented assumption (Ruiz-Tagle 2016), which does not take into account the role that institutions must carry on to secure a just redistribution of resources and opportunities that mitigate the formation of enclaves. In this way, the activities of the three main urban agents and the consequent spatial order of cities also contribute to the reproduction of urban socio-spatial inequalities.

22.3 Residential Segregation in Bogotá

The phenomenon of residential segregation in Bogotá is not new, and some studies have corroborated that from the colonial model to the fragmentary model that characterizes the city today (Bäbr and Borsdorf 2005), the city has shifted from a macro to a micro-scale of segregation (Secretaría Distrital de Planeación 2011). Since the 1950s,

Bogotá has been characterized by urban expansion driven by population displacement due to the search for better opportunities and by migration caused by political violence in rural areas (Aliaga and Álvarez 2010).

In the colonial era, the city (until 1920), maintained its spatial configuration around the main square, which matches a concentric residential differentiation model (Cardeño 2007) characterized by the fact that high-income population resided near the administrative, commercial, and political zone. It can be said that segregation at that time was low. Later, technological advancements in transport, road networks, and the increase of cars in the city paved the way to the growth of industry in the city. In the late 1930s, Bogotá shifted from an economy based on commercial capitalism to an industrial one, with its spatial model characterized by sectoral differentiation focused on growth around and along main roads and to areas with sufficient workforce, following a north–south expansion and leading to a mixed commercial and residential land use (Salas 2008). In other words, industrial activities were located along the main roads and to areas with a sufficient workforce, leading to a mixed commercial and residential land use. It is important to stress that the city's expansion in this era was not continuous since working-class neighborhoods were built in a scattered way over the Bogotá savanna. High-income residential neighborhoods consolidated to the north of the city with the aim of ratifying its economic and social power, while neighborhoods in the southern zone provided shelter to lower socioeconomic groups (Cardeño 2007).

Around the mid-twentieth century, due to the rural in-migration to the city caused by the civil war,[2] population growth intensified, shaping the segregation at a macroscale because the newly arrived people did not have sufficient income to buy a house. The construction of houses for those displaced from violence took place in peripheral areas and at the same time, the high-income population was more worried about its social status—from the center to the northeast—as it happened in other Latin American countries (Aliaga and Álvarez 2010). The high-income population had low a population density, residing near green areas such as the Oriental Hills, and in neighborhoods with quality infrastructure, aspects that commonly determine higher land and housing values (Salas 2008). So, low-income populations clustered in the formal and informal settlements in the peripheral zone, generating irregular urbanization patterns in the form of neighborhoods that lacked basic public services (Aliaga and Álvarez 2010). In this manner, a dual city was developed, with a rich north and a poor south.

As a consequence of this duality, some zones grew in value and other urban zones lost value, and the functioning of a private market for the production and construction of new housing sorted people into those neighborhoods according to the buyer's payment capacity. However, since the 1980s, due to the promotion of gated housing complexes for the upper middle class, fitted with private security and high-end equipment to, the center welcomed again such a population. As a result, a mixture of rich and poor people with different characteristics and population

[2]The population of the city of Bogotá increased from 330,000 to 1,130,000, between 1938 and 1958, the urbanized area went from 2,514 to 8,084 m^2 in the said years (Salas 2008).

densities emerged. Nevertheless, this micro-scale segregation is embedded within the persistent macro-scale segregation in Bogotá (Aliaga and Álvarez 2010).

In relation with land and house prices in different localities, Amézquita et al. (2017) discovered that higher housing prices were found in Usaquen in the Northand Chapinero in the Northeast, while lower prices were found in Bosa, Ciudad Bolívar, Usme, and San Cristóbal in the Southwest. This situation again reinforces the link between land and housing prices, and segregation, especially related to the broader socioeconomic stratification[3] of the city. For example, there is diversified stratification in the neighborhoods of Usaquen and Suba in the North and Chapinero in the Northeast. However, higher social classes (4 and 5) predominate in the north area, while in the South there is less stratification (1 and 2) and are located in the localities Bosa, Ciudad Bolívar, Usme, and San Cristóbal (Amézquita et al. 2017). This shows an important correlation between the price of land and housing, and the socioeconomic stratification of the city (Fig. 22.1). It must be noted that Bogotá is the capital of Colombia, with an approximate population of 6 840 116 habitants in 2005 (Rubiano, 2017). The city has an administrative political division of 19 localities. Among the most notable locality is Chapinero, where the city's historic core is located (Annex 1).

Educational level is another factor related to segregation. Dureau et al. (2012) found a positive relationship between the level of education and the social status index (SSI).[4] Table 22.1 shows a relationship between educational level and social class in 1993 and 2005. Households heads with a higher level of education mainly belong to the higher SSI classes (5 and 6), and household heads with lower levels of education mainly belong to the lower social SSI classes (Dureau et al. 2012).

Furthermore, while it is true that in Colombia, residential segregation has been studied more from an economic view via the dimensions proposed by Massey and Denton (1988), it is also true that this phenomenon has been addressed from the perspective of land prices in Bogotá (Fuentes 2010), social housing in Medellín (Velasquez 2011), and urban development and segregation in the Municipality of Barrancabermeja (Molina 2008). The main findings for segregation in Bogotá from a socioeconomic view are the following. According to the residential segregation index, housing prices are a key factor that increases segregation. The socioeconomic segregation index shows that the segregation is high. We used large spatial units to measure segregation, using smaller spatial units would show even higher levels of segregation (Sabatini et al. 2008, pp. 24–25). Therefore, some authors (Secretaría Distrital de Planeación 2007, 2013) propose that public policies must be oriented to diminish both exclusionary and discriminatory practices in order to reduce the gap between the rich and the poor.

[3]It is a classification that seeks differentially to grant subsidies in the payment of domiciliary public services.

[4]SSI = Average years of education of household members over 15 years of age/Overcrowding of housing. This is a proxy variable of the social class in which every home in the city is located (Salas 2008).

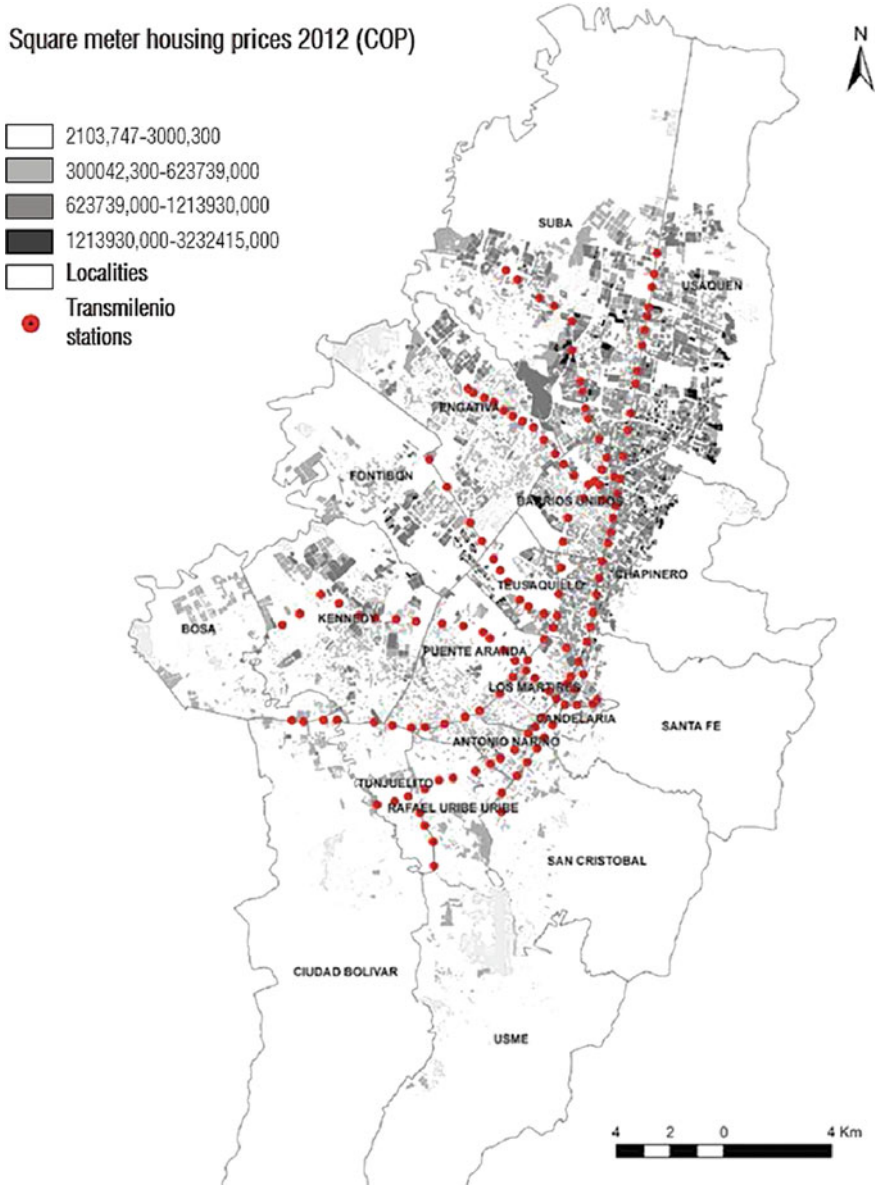

Fig. 22.1 Square meter housing prices in Bogotá, 2012. *Source* Amézquita et al. (2017, pp. 275–276)

Table 22.1 Social status index and educational level by head of household for the urban area of Bogotá, 1993 and 2005

Level of education of the head of household	Social class of SSI (1993)						Total	% 1993	% 2005
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6			
Without education	56.13	19.89	16.10	6.57	1.12	0.19	100	2.40	2.30
Primary level	18.80	26.55	30.65	30.65	4.82	1.13	100	34.60	27.60
Secondary level	3.03	13.58	28.54	28.54	13.80	7.55	100	41.40	40.90
Upper level	0.07	0.78	5.47	5.47	37.21	31.03	100	21.60	29.20
Total	9.36	15.75	24.27	25.68	15.07	9.87	100	100.00	100.00

Source Dureau et al. (2012, p. 5)

For its part, the analyses of residential segregation indexes (spatial autocorrelation) reveal spatial dependence, that is, higher valuations of property or land are linked with their residents and that in turn have high neighborhood values of said variable (Secretaría Distrital de Planeación 2013). Another investigation renders that educational level is a key determinant for a higher residential segregation in both Bogotá and Medellín (Aliaga and Álvarez 2010; Medina et al. 2008), which means that population groups are spatially localized and segregated according to their human capital.

22.4 Methodology

In order to be able to determine segregation levels and their relationship with income inequality for the city of Bogotá, we rely on two data sources. The 2005 Population Census which covers nearly 6.8 million persons living in more than 35 thousand blocks of the city, and the 2007 Life Quality Survey-Bogotá that provides information on the income of people. Both data sources are published by the Statistics National Administrative Department (DANE, by its Spanish acronym). The census data was made compatible with the census codes of the National Geostatistics Framework established by the DANE, so that it was possible to form a harmonized data set for analyzing the spatial differentiation of the variables studied. We used educational attainment of the household head as the variable to analyze segregation because in the Colombian census, income is not available. However, education level also differentiates, separates, and segregates population. Education levels may also have a positive effect on segregation as it is "the main way of social mobility and privileged scope for the social integration of new generations" (Kaztman 2001).

Table 22.2 shows an increase of people with the highest level of education (higher and postgraduate), while the proportion of people with basic levels of education (preschool and primary) decreased during the period between the two censuses of 1993 and 2005 in Bogotá. Since there is no income variable in the 2005 census, we

Table 22.2 Variation of population groups by education level in Bogotá, 1993–2005

Education level	1993		2005		Intercensal variation 1993–2005	
	N	%	N	%	N	%
Higher and postgraduate	507.064	24.9	1003.857	32.5	496.793	98.0
High school	962.309	47.2	1429.509	46.2	467.200	48.5
Preschool and primary	547.770	26.8	624.484	20.2	76.714	14.0
None	23.165	1.1	35.349	1.1	12.184	52.6
Total	2.040.308	100	3093.199	100	1052.891	51.6

Source Fuentes (2012, p. 283)

constructed a representative variable for average income distribution at the block-level based on the 2007 Life Quality Survey-Bogotá. It is harmonized with the Colombian population and housing census and it provides and an additional perspective for analyzing the relationship between residential segregation and inequality.

Dissimilarity index (*DI*) was used[5] to determine city-wide levels of segregation. The *DI* compares levels of segregation between specific groups (Massey and Denton 1988), and we express it in an unitary interval where values near zero imply low segregation and one indicates high segregation. Its interpretation suggests that the group's proportion in focus must change its spatial unit with respect to the rest of the population in the same area, in order to accomplish an equal distribution (Martori et al. 2006). However, spatial indexes such as the *DI* don't reveal statistical significance (Garrocho and Campos-Alanís 2013). For this reason, we used the spatial autocorrelation index in order to determine the existence of a random distribution between adjacent units for the same variable, as well as the Morán Global Index (IGM, by its Spanish acronym)[6] (Reardon and O'Sullivan 2004) which allows researchers to determine the existence of clustered population groups in a given geographical space.

In order to measure inequality in light of the non-available information regarding income and employment structure, we built a representative variable of average income distribution at the block scale using microdata from the 2007 Bogotá Quality of Life Survey and the exercise was replicated with the 2005 census. We estimated a linear regression model with the 2007 Bogotá Quality of Life Survey data to identify the weight or factors of population and housing characteristics regarding the average income distribution at the block level. Then the obtained weights were applied to the census variables in order to estimate a measure for average income distribution for the 2005 census.[7]

This exercise was initiated with an estimation, adjustment, and aggregation at the block level (geographical scale) for the variable of the 2007 Bogotá Quality

[5] $D = \frac{1}{2}\sum_{i=1}^{n} \left| \frac{x_i}{X} - \frac{y_i}{Y} \right|$

where: x_i = group's population in the spatial unit i;

X = group's population in the whole city;

y_i = reference group's population in the spatial unit i; and.

Y = reference group's population in the whole city.

[6] $I = \frac{n\sum_{i=1}^{n}\sum_{i=1}^{n} w_{ij}(y_i - y)(y_{j-y})}{(\sum_{i=1}^{n}(y_i - y)^2)(\sum_{i\neq 1}\sum w_{ij})}$

where: y_i = variable or attribute value en each spatial unit i;

y_j = variable or attribute value in each adjacent spatial unit i;

w_{ij} = proximity between spatial units i and j; and

n = number of spatial units.

[7] This exercise has its empiric background in the estimation of socio-economic levels (NSE, by its Spanish acronym) carried on by the Mexican Association of Market Intelligence and Public Opinion Agencies (AMAI, by its Spanish acronym) in order to classify households by socio-economic groups highly correlated with income levels (AMAI 2018).

of Life Survey in order to make them equivalent with those in the 2005 census.[8] The response variable selected in the model was the per capita income logarithm per block. A correlation analysis was made between the available variables and the response variable in order to identify those variables with higher explanatory power. The model considered 17 variables grouped in three analytical dimensions in order to explain the income: (*i*) human capital and employment, (*ii*) demographic structure, and (*iii*) housing and services. Table 22.3 presents an estimation of all variables. With this set of determinants, the least weighted squares regression model was estimated for the average per capita current income, in order to consider the expansion factor associated with each household in the 2007 Bogotá Quality of Life Survey (see Annexes 2 and 3). The weights estimated by the model are used in the estimation of per capita income with the 2005 census data in order to map the spatial distribution of income in the neighborhoods of Bogotá (Fig. 22.4) and compares the income map with the educational attainment map (Fig. 22.3).[9]

22.5 Inequality and Socio-spatial Segregation in Bogotá

Before establishing the relationship between income inequality and residential segregation in Bogotá, a brief review is made of the evolution of the Gini Index at a national level and for Bogotá in the last twenty years. Figure 22.2 shows that income inequality has decreased both in Bogotá and in the country, but to different degrees. The index has changed in a range between 59 points in the second half of 2000s (Colombia's highest Gini level was in 2008) and 49 towards the end of the analysis period (lowest level in 2017 both for country and Bogotá). Bogotá shows less inequality than the whole country except in the period between 2002 and 2006. However, Sanchez-Torres (2017) and Hoyos (2016) state that Bogotá always was in the top 5 of the most unequal cities in Colombia. Bogotá shows a remarkable decrease in inequality between 2006 and 2012, and since then the Gini Index value indicated no significant variations. By 2017, the city's index value was almost equal to the national average. Nevertheless, in 2018 the level of national inequality showed a rebound in contrast with a decreasing tendency between 2008 and 2017.

When considering the location quotient (see Fig. 22.3), household heads with a high education level are concentrated in the Northeast of the city, where there is a medium to high socioeconomic stratification (Secretaría Distrital de Planeación 2007). It is very unlikely to find households heads with low education level in this

[8] Even though income information is asked and recollected in tables at individual level, ECV-B2007 is a representative survey with micro data available at household level. On other hand, the access to census' information has block as maximum disaggregation level given the confidentiality and information protection parameters.

[9] In Bogotá, the population density in 2005 was 175.4 people per hectare and the population density of household head was 50 per hectare (Alcaldia Mayor de Bogotá; Secretaria Distrital de Planeación 2010). However, the population density of the head of household may change depending on his geographical location.

Table 22.3 Estimated weights of variables for per capita income

Dependent variable	Dimension	Explicative variables	Estimated weights
Per capita income logarithm	Human capital and employment	1. Persons with less than complete elementary education	−0.017*** (4.02)
		2. Persons with elementary education	−0.027*** (5.45)
		3. Persons without complete high school	−0.016*** (3.82)
		4. Persons with high school	−0.007* (1.79)
		5. Persons with higher education	0.073*** (18.0)
		6. Number of employed persons	0.066*** (23.8)
	Demographic structure	7. Persons under 15 years old	0.015*** (4.18)
		8. Persons over 65 years old	−0.015*** (3.14)
		9. Number of domestic employees	0.128*** (8.85)
		10. Size of average household	−0.013* (1.68)
		11. Total population	−0.339*** (4.75)
	Housing and services	12. Telephone availability	0.031*** (6.57)
		13. No sewage system availability	−0.128*** (11.52)
		14. House	−0.060*** (2.67)
		15. Apartment	−0.049** (2.19)
		16. Room	−0.097*** (4.26)
		17. Another residential type	−0.075*** (2.92)

Absolute value of *t*-statistic in parenthesis. ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$
Source Elaboration by the authors based on ECV-B2007 (DANE 2007)

urban zone. Block-level segregation, as indicated by the DI, between household heads with a high education level is 0.57, while block-level segregation household heads with a low educational level is 0.67. These results are as expected, considering previous research which used the same index for Bogotá (cf. Salas 2008; Aliaga and Álvarez 2010).

The previous results contrast with those of the Morán Global Index (see Annex 4), which shows that the probability for each group to be distributed randomly in the city is low and household heads with a high education level are the most residentially segregated (0.44), clustering in Bogotá's northeast neighborhoods (See Fig. 22.4).

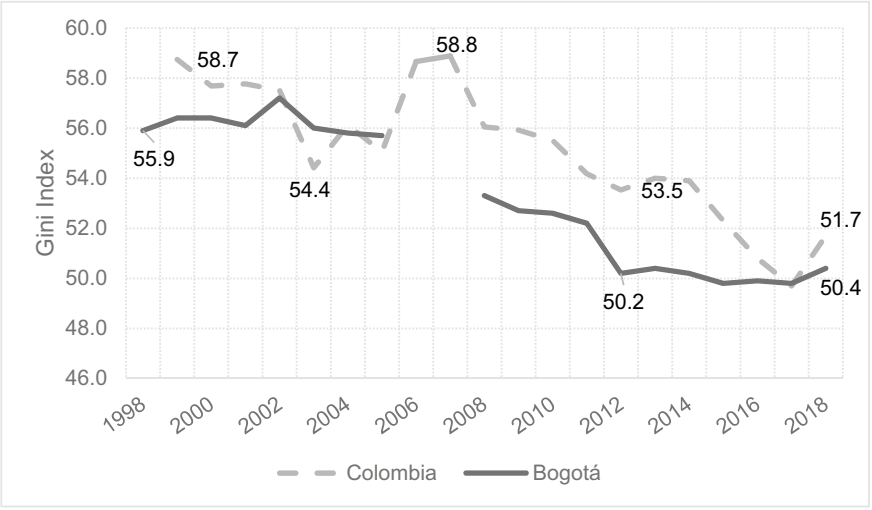

Fig. 22.2 Evolution of inequality in Colombia and Bogotá 1998–2018. *Source* Elaboration by the authors base on National Planning Department (DNP) report with data from Continuous Employment Surveys

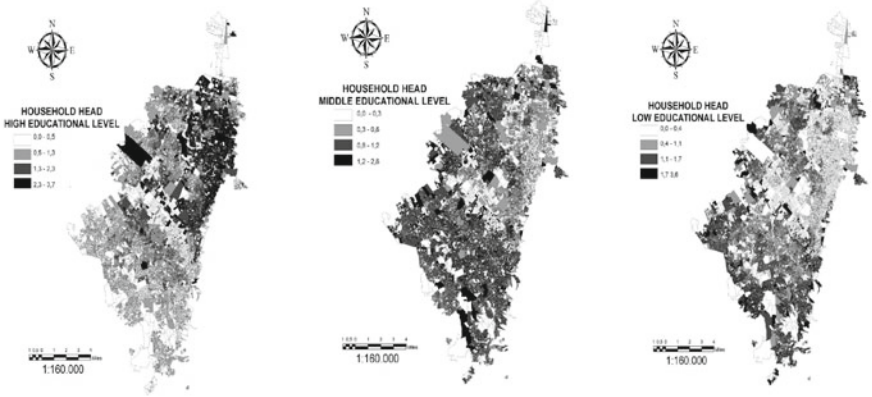

Fig. 22.3 Location quotient for household leader by high, medium, and low education level in Bogotá, 2005. *Source* Elaboration by the authors based on Population Census DANE (2005)

These findings are similar with discovered those of census sector geographic scale for the average years of education of the household head which in 2005 rendered a higher value (0.72) in relation with the other variables, such as poor households and households by socioeconomic class (Aliaga and Álvarez 2010).

Regarding the inequality index, income inequality in Bogotá is 56%, which coincides with other works for the same year and a different source (DANE 2012). This result, in addition to suggesting that inequality is related to segregation, shows which

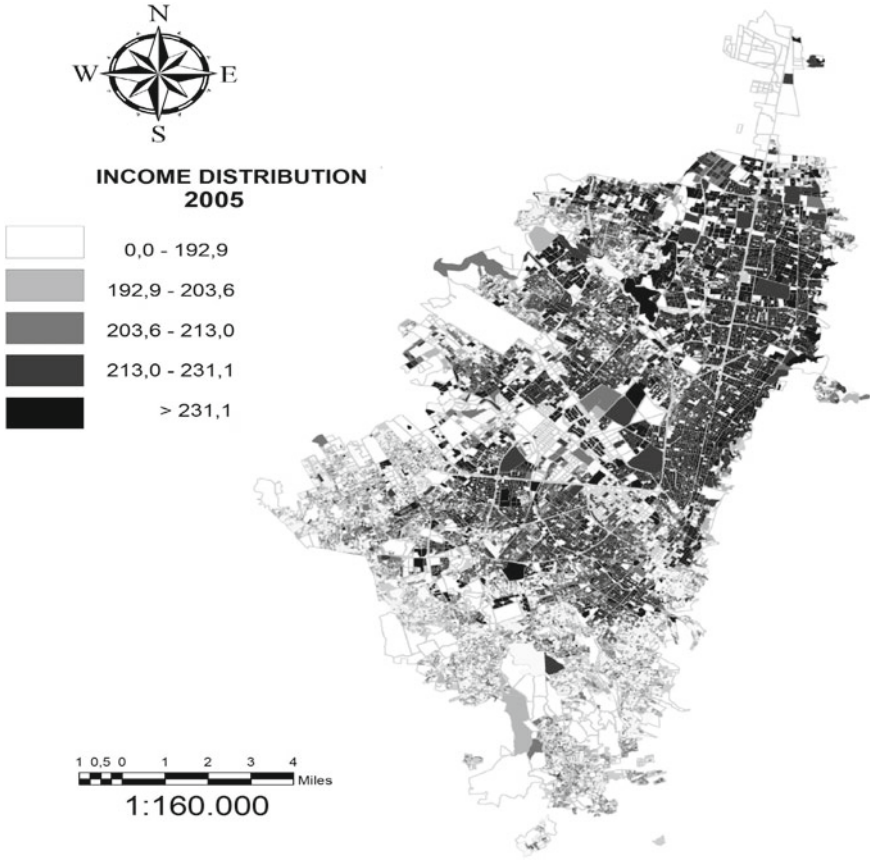

Fig. 22.4 Estimation of per capita current income in Bogotá, 2005. *Source* Elaboration by the authors based on ECV-B2007 (DANE 2007) and Population Census DANE (2005)

the neighborhoods with a higher concentration of high and low-income populations when considering the spatial distribution of the current estimation of income at block scale (see Fig. 22.4). Nevertheless, to claim that inequality is a direct cause of segregation may be an arbitrary statement when taking into account that it is possible that land and housing markets are responsible for socio-spatial segregation in Bogotá (Aliaga and Álvarez 2010; Almonacid 2014; Salas 2008). The latter is due to the strong relationship between public and private agents in shaping which individuals have access to certain types of housing and which individuals don't (Salas 2008). The former is due to the relegated role of the State in housing provision and promotion, mainly through subsidies and norm setting, i.e., the state's ability to influence the land and housing markets is not relevant. Rather, private agents are the key players who develop real estate projects and who provide housing for those population groups that want to and are able to buy homes at a higher price point in order to obtain maximum

gains. This is achieved by private agents localizing medium–high socioeconomic groups in a differential and fragmentary way. This is the way in which residential segregation plays a role in the functioning of land and housing markets.

22.6 Conclusions

The socio-spatial segregation analysis for Bogotá presented new insights into the segregation dynamics of the city. Bogotá is commonly referred to as the city with a rich north and a poor south, when considering the education levels of the heads of the households and average per capita income. Despite these two differentiated macro areas of Bogotá, it is clear that small concentrations of individuals with a low level of education and a low income can be found across the entire city. This is not evident in the case of individuals with higher educational levels. This group mainly resides in the Northeast of the city. It is important to mention that despite the fact that segregation exists between the North and South in terms of social status, segregation is also amplified at a small scale. The fact that education level segregates the population in a similar way to per capita income implies that it is possible that these two variables have an effect on social capital due to the fact that when education segregates it may affect mobility and social integration (Kaztman 2001).

Accordingly, it can be said that land value may be a more significant determinant of land concentration for a few individuals rather than income, due to the fact that land policies may be able to counteract such concentration. This is because there are housing and territorial organization policies, as well as norms and laws, which egulate the pursuit for ran urban equality in order to eliminate privileges in the distribution of urban equipment (of education, sport, culture, others) independently of the localization of a certain population group.

This is how the actions of social agents, such as urbanists, have changed the way in which segregation manifests, because they have intervened in the city under the logic of land and housing market liberalization. This liberalization manifests as the differentiation of segregated residential areas that have an effect on the social structure of class by making it more complex. In turn, this complexity reproduces certain production relations (between capitalist and the proletariat) and at the same time reinforces class diversity, which may stress the symbolic value that individuals give to the territory by means of their behavior and in the choice of different types of housing, a consideration that has been scarcely studied and that would be important to address in future investigations about the subjective dimensions of segregation.

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Chapter 23
Socio-Economic Residential Segregation in Greater Buenos Aires: Evidence of Persistent Territorial Fragmentation Processes

Florencia Molinatti

Abstract Socio-economic residential segregation is a common feature of almost all Argentinean cities, neatly divided into poor, middle-class, and affluent neighborhoods. At the end of the 1980s, and especially over the 1990s, the process of suburbanization for affluent and upper middle-class groups was consolidated as a generalized model. This study concentrates on the trends and the patterns of socio-economic segregation in Buenos Aires and focuses on two major dimensions of segregation: the spatial concentration patterns of a given social group in specific areas and the degree of social homogeneity within such areas. Socio-economic segregation is described using the highest level of education that a householder has completed as a proxy for socio-economic status. The indices of segregation and dissimilarity are used as the main measure to compare the level and changes of residential segregation but other metrics—such as location quotient index—are also used to estimate the degree of homogeneity or heterogeneity in neighboring areas. This study uses population and household census data from 1991, 2001, and 2010 provided by the National Institute of Statistics and Censuses (INDEC), and the data are presented at the spatial disaggregation level of block groups called '*radios censales*'.

Keywords Fragmentation · Residential polarization · Suburbanization of elites · Educational inequality

23.1 Introduction

Residential segregation accounts for the degree of inequality acquired by the spatial distribution of the population. Over the last decades, social sciences have shown renewed interest in the study of this phenomenon in the United States and in Europe as well as in Latin America. Although these studies share the objective of evaluating the magnitude and effects of certain spatially concentrated population groups on people's

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living conditions, they differ in relation to the criteria used for social differentiation. While in the United States and Europe, the research was, to a large extent, focused on racial and ethnic segregation and migration, in Latin America the analyses that focus on territorial relations among socio-economic groups were favored (Groisman 2009; Molinatti 2013; Sabatini 2006).

In the latter group of countries, the emphasis on the socio-economic dimension of residential segregation is understandable considering that the rigidity of the social structure and substantial social, income, and class inequalities represent perhaps the most outstanding characteristics of the social structure of Latin American countries (Groisman 2010; Sabatini 2006). In this context, the functioning of labor markets is a key element to understand the fluctuations in the well-being of the vulnerable populations, mainly because, due to the absence of generalized credit markets, lower social classes' homes obtain most of their income from the labor insertion of their members, usually in unsteady and low-paid jobs (Groisman 2009).

The interrelationship between the social structure and the urban spatial structure is multifaceted. Residential segregation takes place when the existing inequalities of a community are made visible in a territorial or geographical manner. However, residential segregation is not a simple reflection of social reality, since space is considered a dimension that composes the processes that structure social reality. Likewise, there are other intermediate processes or mechanisms that encourage segregation or counteract its outcomes, including, among others, land markets, housing policy, and the labor market (Molinatti 2013; Sabatini 2006; Torres et al. 2003).

Since the end of the twentieth century, Latin America has witnessed a proliferation of theoretical investigations and, to a greater extent, empirical research related to residential segregation, especially in large metropolises of the most urbanized countries in the region. The emergence of this line of research is linked to the processes of impoverishment of Latin American societies during the 1990s pertaining to the implementation of the neoliberal development model. The opening of the regional economies, in conjunction with policies aimed at reducing state intervention in the economy, caused a rapid increase in unemployment and a resulting decrease in the income of households belonging to lower social class.

Other phenomena also influenced the revitalization of residential segregation studies in the region. In particular, an increase in the concentration of elites and the affluent middle classes was a process reflected in the proliferation of gated communities and in the resulting suburbanization of these social groups (Caldeira 2007; Svampa 2004; Torres 2001). Both phenomena led to the reorganization of the Latin American cities, mainly represented

> …. as the displacement of an "open city" model, basically European, focused on the notion of public space and on values, such as political citizenship and social integration, towards a "closed city" regime, more associated with the North American type, marked by the affirmation of patrimonial citizenship centered on the figure of the taxpayer (Svampa 2004: 16).

The impact of these changes on socio-economic residential segregation shows opposite trends in Latin American cities. A trend would indicate a reduction in

the level of residential segregation as a result of the relative dispersion of closed condominiums, shopping centers, offices, and services located outside the city center and the high-income area leading to physical proximity between popular and elite groups. As signaled by various authors, it is important to mention that this greater physical proximity does not produce social integration or mixture per se. Another trend, however, corresponds to the increase in the level of segregation of new groups of lower class housing that have access—by formal or informal means—to urban lands located far away from the city, as a result of real estate speculation and its impact on land prices (Sabatini 2006).

At the beginning of the twenty-first century, there was a positive growth in the Gross Domestic Product (GDP) of Latin American economies, although there remained variations in social indicators. In the regional context, Argentina is a particular example as this change took place dramatically. After the great economic crisis of 2001–2002 (when the GDP shrank significantly and poverty spread to more than 50% of the population), the Argentinian economy had seven years of sustained GDP growth at average annual rates of 8–9% (Groisman 2009). In 2009, despite the international economic crisis, the country registered an annual GDP variation rate of 0.9% above the average of the region that showed −1.8% (ECLAC 2010). After that crisis, Argentina returned to a vigorous growth rate with average annual increases of 7–9% between 2010 and 2011.

In this context, it is necessary to investigate how social inequalities and socio-economic residential segregation indicators evolved in Greater Buenos Aires, the main urban agglomeration of the country, and whether these political, social, and economic transformations produced consistent changes in the spatial distribution of the population.

23.2 The Functioning of the Labor Market and the Concentration of Income

At the beginning of the 1970s, the Argentinean labor market was characterized by being relatively integrated, with a high presence of salaried work and low levels of underemployment. However, as a consequence of the poor macroeconomic performance experienced by the Argentinean economy during the mid-1970s and early 1990s, this trend was overturned and the period was marked by stagnation and instability (Altimir and Beccaria 1999, Arceo et al. 2008).

Labor regulations were key elements in the structural reforms of the so-called "neoliberal decade" (1989–2001).[1] These measures were aimed at the convenience of adapting legislation concerning individual and collective relations in order to provide more flexibility and, basically, to reduce non-wage labor costs (social security

[1] This "neoliberal decade" comprises two governments: the one of Carlos Saúl Menem (1989–1999) and the one of Fernando de la Rúa (1999-2001). The latter resigned in the context of the major Argentinean crisis at the end of 2001.

contributions and costs related to events, such as dismissal or accidents, or making the distribution of work time more flexible and the decentralization of negotiation) (Altimir and Beccaria 1999; Arceo et al. 2008).

Flexibility in the labor market, combined with the process of foreign trade opening for foreign trade in the context of an increasingly overvalued exchange rate that led to a significant loss of competitiveness in the goods and services production areas, resulted in a significant reduction in workforce demand, a rise in unemployment, and it created instability, insecurity, and low productivity. This phenomenon, typical of the informal side of the economy, caused a progressive gap between workers with lower qualifications and those with higher ones (Arceo et al. 2008). One of the most severe consequences of the subsequent changes introduced in labor legislation during this period was job insecurity, characterized by an increase in time-related underemployment and unreported employment, which, together with unemployment and wage stagnation, negatively affected the living conditions of the population. The profound economic recession that the Argentinean economy suffered between 1998 and 2002 significantly worsened the current problems in the local labor market, resulting in the great economic and political crisis at the end of 2001 and 2002, which caused a shrinking of approximately 20% of the GDP (Basualdo 2008).

After this great economic crisis, there was a change in the macroeconomic system that led to a period of sustained and long-lasting economic recovery between 2003 and 2006. This period was characterized by a strong increase in employment and purchasing power, an increase in the number of registered workers, and a decrease in unemployment and time-related underemployment (Arceo et al. 2008). Likewise, there was a substantial reduction in absolute poverty even though some authors claim that at the level of redistribution, the evolution was not so satisfactory (Groisman 2010). Although income distribution has a tendency to reduce in concentration, the distribution of wealth remained highly unequal (Báez 2017).

This process of expansion and growth was fuelled by an increase in payroll as a result of a decrease in the unemployment rate (from 16.3% in the third quarter of 2003 to 7.5% in the third quarter of 2010), the increase in the average real wage of 35% between 2003 and 2010, the increase in the adjustable minimum living wage, the increase in minimum retirement benefits, and so on.[2] This was also due to the implementation of new social policies: the incorporation of three million people into the Social Security System through the Provisional Inclusion Plan (2004–2007), the execution of the Universal Child Allowance (*Asignación Universal por hijo, AUH*) in October 2009, among others (For further information about new social policies applied, consult Alonso and Di Costa 2012).

Regarding income distribution,[3] during the so-called "neoliberal decade," there was a deepening of income inequality and regressive income distribution. Between 1991 and 2002, the Gini index rose from 0.468 to 0.538. The reversal of this trend

[2]The main changes in labor legislation between 2003 and 2007 can be consulted in: Centro de Estudios para el Desarrollo Argentino (2007).

[3]Values corresponding to the estimates conducted by: World Bank, Development Research Group (2019).

started in 2002/2003 when the former President Néstor Kirchner took office, with a Gini index decreasing to 0.507 by 2003. From this moment on, there is an unquestionable reduction in income inequality—the index decreased to 0.483 in 2004 and further to 0.410 in 2013. However, some authors show that the slight improvement in equity at the beginning of the expansive phase diminished from 2004 (e.g., Groisman 2010). At the same time, a view of greater global scope shows that this relative improvement is significantly worse during most of the 1980s when the index fluctuated around 0.400.

23.3 Characterization of Greater Buenos Aires

Greater Buenos Aires (Gran Buenos Aires, GBA)[4] is the main urban agglomeration of Argentina and the most important economic and industrial center of the republic. This agglomeration constitutes an urban entity both from the functional point of view—since it is an area that many people commute to for work on a daily basis—and from the physical point of view—an urban sprawl ("*mancha urbana*") without any important solutions for continuity.

According to the National Institute of Statistics and Censuses (Instituto Nacional de Estadística y Censos, INDEC) of 2003, this agglomeration is formed by the City of Buenos Aires (central area and federal capital city of the Argentine Republic) together with a group of 24 municipalities, also called "*partidos*"—of the Province of Buenos Aires. The 24 municipalities formed the first and second regions of the Buenos Aires Conurbation (*Conurbano Bonaerense*). Whereas the first one is a semi-circular crown that extends up to approximately 25 km from the center and involves those municipalities adjacent to the capital, the second one is a subsequent semi-circular crown that extends up to 40 or 50 km from the center (Fig. 23.1).

Buenos Aires, compared with other Latin American metropolises, displays an extended process of metropolization and had earlier access to a process of industrialization. Though, paradoxically, it least resembles the ideal 'industrial' model according to the tendency of the high socio-economic strata to move from the center to the suburbs, while the lower strata increasingly occupy the central area abandoned by the 'elite.' In this regard, the density structure in Buenos Aires did not advance regularly from condensed to scattered forms accompanying the technological development of transport, urban growth, and economic development, as proposed by Clark (1977). On the contrary, the alternation between the periods of concentration and dispersion are not only accounted for by transport technology (the transition from tram to public transport) but also by the organization and funding of the transport

[4] According to the latest National Census of Population and Housing (2010), Greater Buenos Aires has 12,806,886 inhabitants, of whom 2,890,151 people live within the border of the City of Buenos Aires. While the population of the main urban area decreased to an annual rate of 0.14% during the period analyzed (between 1991 and 2010), the population of Buenos Aires conurbation increased to an average annual rate of 1.16%.

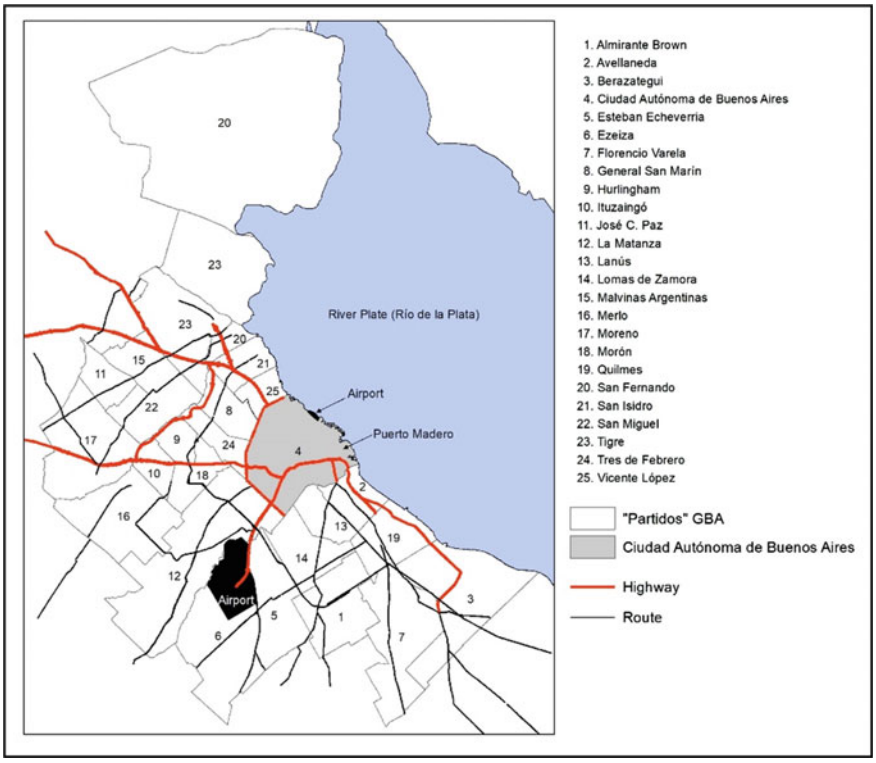

Fig. 23.1 Geography of greater Buenos Aires. *Source* Based on INDEC 2003 and http://mapas-lsig.ungs.edu.ar/visor/map.phtml

system as a factor in the creation of the urban space (Torres 1975). These specifications have resulted in a complex territory, highly influenced by a tendency toward fragmentation and polarization. This can be summarized as follows:

- The process of suburbanization during the period of 1940–1960 took place earlier and was much more significant in comparison with other Latin American metropolises. This displacement of the population was motivated by the sale of parcels of land in the urban periphery and by large subsidies that radically reduced the costs of suburban transportation, which facilitated daily commuting.
- The suburbanization of groups with higher incomes—the elite—took place with high intensity in the 1990s in Buenos Aires, but at a slower pace in comparison with American and many of the Latin American metropolises. The new real estate developments respond to the type of gated community and are inserted into the urban fabric establishing a clear contrast with the open ones that characterized the early development of Buenos Aires metropolitan area.
- The polarization of the main urban center—the City of Buenos Aires—during the 1990s was characterized by a significant increase in construction activity in the

conventional market directed mainly toward the luxury homes and by a considerable increase in the number of people living in shantytowns ("*villas miserias*"). Likewise, the central area remained pre-eminent in the City of Buenos Aires regarding its political and administrative functions as well as the location of higher, middle and upper classes, despite the process of deterioration that took place in central regions during the 1980s. Since the 1990s, the local government of Buenos Aires has been promoting an intense process of urban transformation in the central area and the neighborhoods in the Southeast (Puerto Madero, La Boca, Barracas, Parque Patricios, and Nueva Pompeya). However, gentrification processes took place to a very limited extent and its impact has been marginal due to the fragmentation of the urban structure, the weight of negative environmental factors, as well as the presence of a high proportion of low-income populations (Di Virgilio and Guevara 2014; Suárez 2011; Torres 2001).

23.4 Data Collection and Methods

23.4.1 Data Collection and Study Period

The sources used were the census micro databases from the 1991, 2001, and 2010 population and housing censuses available in Redatam format (INDEC 1991, 2001, 2010). These census data provide representative estimates for small geographical areas. The spatial units chosen for segregation analysis were block groups called '*radios censales*', the smallest geographical area available to the public (c. 300 dwellings and around 800 people per unit on average, regardless of its geographic size).

To analyze the patterns of socio-economic segregation in Greater Buenos Aires, we used an educational attainment indicator[5]: the highest level of education that a household member[6] has completed. Four categories are distinguished from each other:

- Low educational level (lower than primary education, including people who never attended an education program),
- Middle-low educational level (completed primary education, including people with some secondary education),

[5]No data available on the occupational structure for smaller geographic areas for the censuses of 1991 and 2010. We used as a proxy variable the highest level of completed education under the assumption that there is a strong correlation between the education of the householders, the occupation, and the probability of obtaining higher income and a better quality of life in general. Detailed information about the relationship between income, education, and occupation can be found in Tammaru et al. (2016).

[6]In order to avoid a distorting effect of the age structure on the education of a population, and trying to capture a special group of influence, we worked with householders of 30–59 years old.

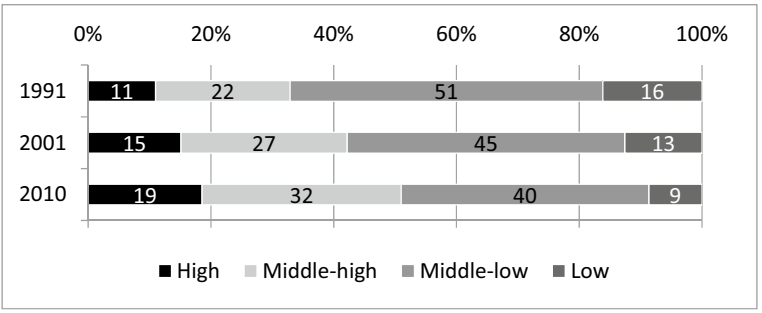

Fig. 23.2 Distribution of educational groups and change over time. *Source* Population and housing censuses 1991, 2001, and 2010, INDEC, author's maps

- Middle-high educational level (completed secondary education, including people with some tertiary or university education), and
- High educational level (completed tertiary or university education).

Between 1991 and 2010, in the City of Buenos Aires as well as in Buenos Aires conurbation, a substantial improvement was observed in the educational profile of households. The relative weight of the categories that put together the householders with low education with those who did not finish secondary school diminished significantly in the period analyzed (from 67.1% in 1991 to 49.0% in 2010); although the absolute increase in the middle-low group stood out during the years 2001–2010.[7] Consequently, there was an increase in the absolute and relative presence of householders with complete secondary education or more, especially, among those who had access to higher education and completed their studies, the absolute number doubled between 1991 and 2010, and its relative participation rose from 11 to 19% during the same period (Fig. 23.2).

This apparent improvement in educational level is a phenomenon that can respond to different factors, and it should not be automatically understood as the upward social mobility of householders that improved their education. Rather, it is likely to respond to other factors, such as the generational change due to the constitution of new homes with householders younger and better educated than their parents and grandparents, and help by the progressive democratization of access to secondary school, despite the substantial social inequalities that still prevail.

[7]Between 1991 and 2001, the absolute number of householders with middle-low educational level decreased by just over 58 thousand people. However, between 2001 and 2010, that same group increased by little more than 56 thousand people, showing between 1991 and 2010 a decrease of 1.800 people in the number of householders with middle-low educational level.

23.4.2 Data Analyses

This study consists of two stages. In the first stage, we use the traditional indicators of segregation to compare levels and changes of socio-economic segregation. We calculate indices of segregation (IS) and dissimilarity (D) for all four educational categories of householders. Given that socio-economic segregation is usually lower than ethnic and racial segregation, we interpret values below 20 and above 40 as low and high, respectively (Tammaru et al. 2016).

In the second stage, we investigate the patterns and local geographies of socio-economic residential intermixing, using:

- Local segregation indices, specifically the Location Quotient (LQ). The LQ is a ratio between the share of a given group in a given spatial unit and the city-wide share of this group. If the ratio is less than 1, the group is underrepresented in the given neighborhood, and if it is more than 1, the group is overrepresented in the given neighborhood. We use LQ maps for the highest and lowest educational attainment categories to visualize the relative spatial concentration or dispersion of educational groups in the neighborhoods of the city.
- Classification of neighborhoods, in this paper '*radios censales*', based on the socio-economic composition of residents. Having divided the householders into three general educational categories (higher, middle, and lower educational groups), we merge different threshold combinations to capture the socio-economic status (SES) of the neighborhoods. Consequently, we distinguish seven types of socio-economic intermixing, based on Marcińczak et al. (2015): high SES neighborhoods, high to middle SES neighborhoods, mixed neighborhoods, middle SES neighborhoods, low to middle SES neighborhoods, and low SES neighborhoods. The typology is then illustrated in choropleth maps to revel the local geography of socio-economic intermixing in GBA.
- Location of the top socio-economic status groups, based on the distribution of householders with a high educational level in '*radios censales*' by quintiles. The spatial units in the first quintile (Q1) will be the spatial units that house 20% of householders with the best educational levels in GBA.

23.5 Results

23.5.1 Socio-Economic Segregation According to Global Indices

According to Musterd et al. (2015), previous studies on socio-economic residential segregation in the United States of America and European countries reveal that higher socio-economic groups are generally more segregated than lower socio-economic ones. Such patterns have also been found in cities of Latin America (Agostini et al. 2016; Becceneri et al. 2019; Molinatti 2013; Sabatini et al. 2009, among others). The

Table 23.1 Indices of segregation for educational attainment of the householders

	1991	2001	2010
High	53.1	51.8	50.3
Middle-high	36.4	32.3	25.4
Middle-low	25.3	32.9	38.1
Low	46.0	46.5	45.2

Source Population and Housing Censuses 1991, 2001, and 2010. INDEC. author's maps

Table 23.2 Indices of dissimilarity for educational attainment of the householders

High	Middle-high	Middle-low	Low		Low	Middle-low	Middle-high	High
	28.9	61.6	78.0	**High**	76.7	61.6	31.0	
27.0		40.3	63.1	**Middle-high**	57.3	38.6		
59.1	39.1		29.7	**Middle-low**	25.7			
27.8	65.5	33.0		**Low**				

Source Population and housing censuses 1991, 2001, and 2010. INDEC. author's maps

results for Greater Buenos Aires are presented in Tables 23.1 and 23.2 and support these findings. Householders with a high education level are the ones who are more segregated than householders with a lower educational level, with IS above 50% in the last three years analyzed. The least segregated, by contrast, correspond with the group of householders with middle-high education with values that can be interpreted as intermediate (Tables 23.1 and 23.2).

If we analyze the variations between 1991 and 2010, taking into account the economic fluctuations that occurred during the period analyzed, it can be observed that the levels of socio-economic residential segregation showed a little variation for the extreme socio-economic groups, defined according to the highest educational level attained. For the intermediate groups, which include slightly more than 70% of householders, there are clear trends although segregation levels can be interpreted as intermediate in the 3 years of census data. Whereas the lower middle class raised its segregation level by 50%, reaching values close to 40 by 2010, the segregation in the higher middle class diminished from 36 in 1991 to 25 in 2010[8] (Table 23.1).

Given the strong increase in the educational level of household heads between 1991 and 2001, the small decrease in the indices of educational segregation are indicative of the persistence of segregation. However, as Tammaru et al. (2019) showed for eight European urban areas, the relationship between inequality and spatial segregation can lag and changes in inequality can take, for example, 10 years to produce different levels of residential segregation between educational groups.

[8]However, these indices can be affected by the difference in the number of minorities in the total population. In the period analyzed, the lower middle class diminished 11 percentage points in size and the higher middle group increased 10 percentage points. These variations can be linked to significant improvements in the educational level in the Argentinean population due to the increased schooling in the middle level during the 1990s.

Regarding the degree of residential segregation among the social categories analyzed, especially between the opposite ends of the social hierarchy, the D between the groups shows a narrow correlation between the educational level of the householders and their residential localization, suggesting a high correspondence between the spatial distribution of the groups and the present education gap between them. The index reaches lower values when it is calculated between contiguous educational groups and higher values between the opposite ends (Table 23.2).

Among the variations observed between 1991 and 2010, it can be highlighted, on the one hand, the high values of residential segregation between low and high educated householders with D over 70, despite a minor setback during the period analyzed. On the other hand, the increase in residential segregation of the heads of household with higher education in relation to those with medium-low education and, especially, medium-high education. For example, among the social categories with greater educational achievements, the index increased almost 15 percentage points, signaling a progressive differentiation in the residential localization of the educational elites (those householders that completed higher education) in relation to those that only finished compulsory education (Table 23.2).

23.5.2 Changing Local Patterns of Segregation

In the previous section, it was established, in a general way, that the most concentrated and segregated educational group in relation to the remaining groups was the one composed of the most educated householders (complete higher education), followed by the group of householders with lower educational level. In order to analyze the local patterns of segregation, we used LQ maps, which show how concentrated a specific group is in a particular area in comparison to the concentration in the city as a whole.

Figure 23.3 shows that the concentration of educational elites is higher in the City of Buenos Aires, mainly in the spatial units located in the communities of the center and the north, and in the northern localities of Buenos Aires conurbation (San Isidro and Vicente López). Additionally, the householders with a low educational level are concentrated mostly in the periphery of GBA—forming a ring—especially in the localities of GBA not adjacent to the capital city, which belong to the second crown of Buenos Aires conurbation (Florencio Varela at the south-east and José C. Paz, Malvinas Argentinas, Merlo, Moreno and San Miguel at the northwest and west).

Between the period between 1991 and 2001, this pattern of territorial organization remains, generally speaking, but it has an in-depth increment of urban fragmentation and residential polarization. On the one hand, the householders who belong to the educational elite are over-represented and growing over time in the central and northern regions of the City of Buenos Aires (high-rise buildings of very good quality). Similarly, in the districts of San Isidro and Vicente López (both with very high average purchasing power and characterized by a large percentage of permanent housing in gated communities, and particularly, in Vicente López with high-rise

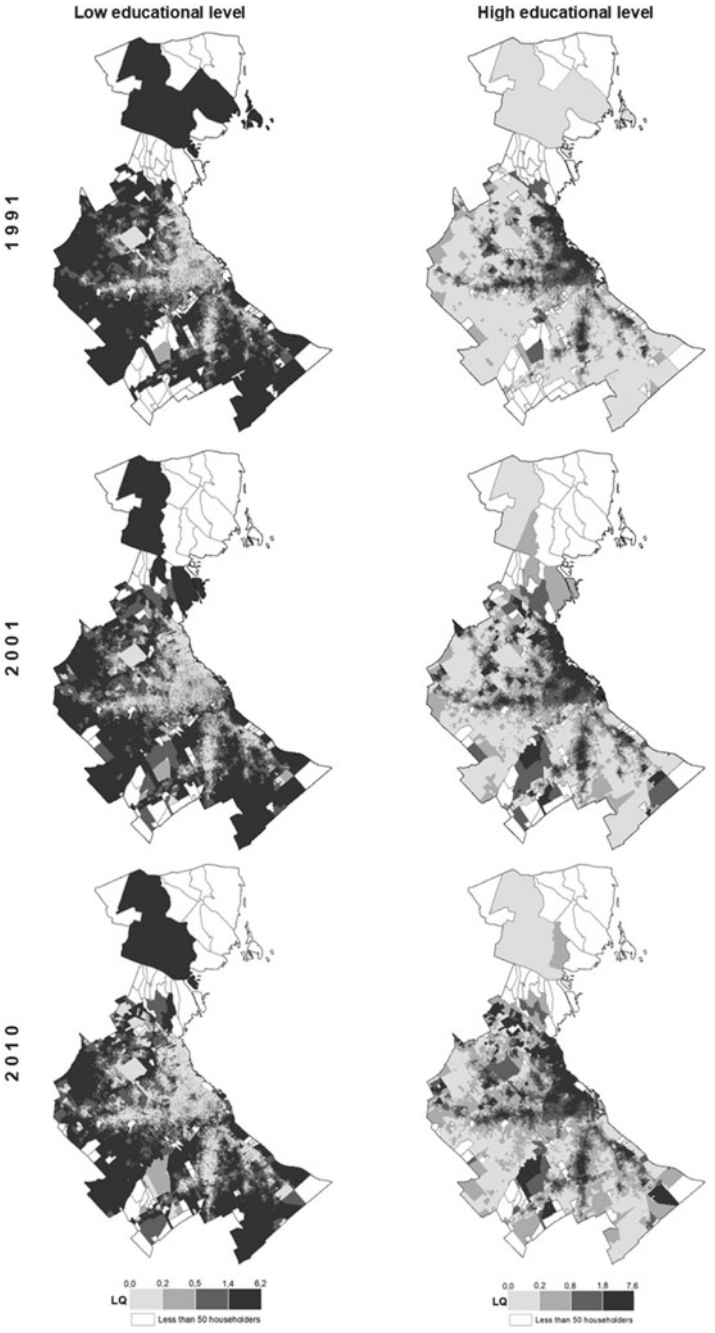

Fig. 23.3 Greater Buenos Aires: location quotient maps for selected educational attainment categories, 1991–2001–2010 (on the level of discrete territorial units). *Source* Population and housing censuses 1991, 2001, and 2010, INDEC, author's maps

condominiums with amenities, due to its proximity to the capital city). On the other hand, the least educated householders keep concentrating in the periphery of GBA, which highlights a growing over-representation in time of this group in the locality of La Matanza.[9]

The typology of the 'radios censales' based on the SES revealed additional information about the local patterns of socio-economic mixture (Fig. 23.4), among which it stands out that

- Most "radio censales" fall under the Middle category and, in the three census years, above 55%.
- There is a greater absolute and relative presence of 'radios censales' classified into the higher categories of SES over time. Whereas, in 1991, about two out of every ten spatial units corresponded to residential spaces with a high concentration of householders with high educational level and low presence of householders with low educational level, in 2010 that relation increased to about four out of ten.
- An absolute and relative decrease in 'radios censales' classified as low-middle, mainly between the census of 2001 and 2010, since their reclassification in middle.
- The absence of polarized 'radios censales 'probably occurred due to the traditional high presence of middle segments in Argentinean society and to the increase in the universalization of middle education.

Figure 23.5 shows the localization of the socio-economic group situated in the upper end of the social scale; for example, householders with a high educational level. Between 1991 and 2010, there was a spatial deconcentration of this group, which coincides with a trend of constant growth, the suburbanization of the elites. The first quintile of the distribution expands from the center of the City of Buenos Aires to the North and toward the northern localities of GBA—areas that have the best services, qualified workforce, fastest communication speed, and better resources, in general. For example, during the 1990s, in that area, three-quarters of all building developers in Buenos Aires were located here, as was almost all new business centers and the international hotel industry, two-thirds of the industrial investment and highway construction network, and more than half of the shopping centers and hypermarkets (Marcos 2009).

[9]La Matanza is a locality of the first cordon of Buenos Aires conurbation—although due to its extension, it is divided between the two of them—that experienced, in conjunction with José C. Paz, Moreno and Florencio Varela, the greatest demographic growth between 1991 and 2001. Moreover, in the same period the number of the population in shantytowns and settlements tripled. This trend continues growing until 2010, and as a consequence of the growing difficulties of the popular areas to access urban land, there is a huge densification of the current shantytowns and settlements (Cravino, Del Río and Duarte 2008). This locality, as well as most of the other ones belonging to the second cordon, presents significant deficits in infrastructure and urban and domiciliary services at the beginning and end of the period analyzed.

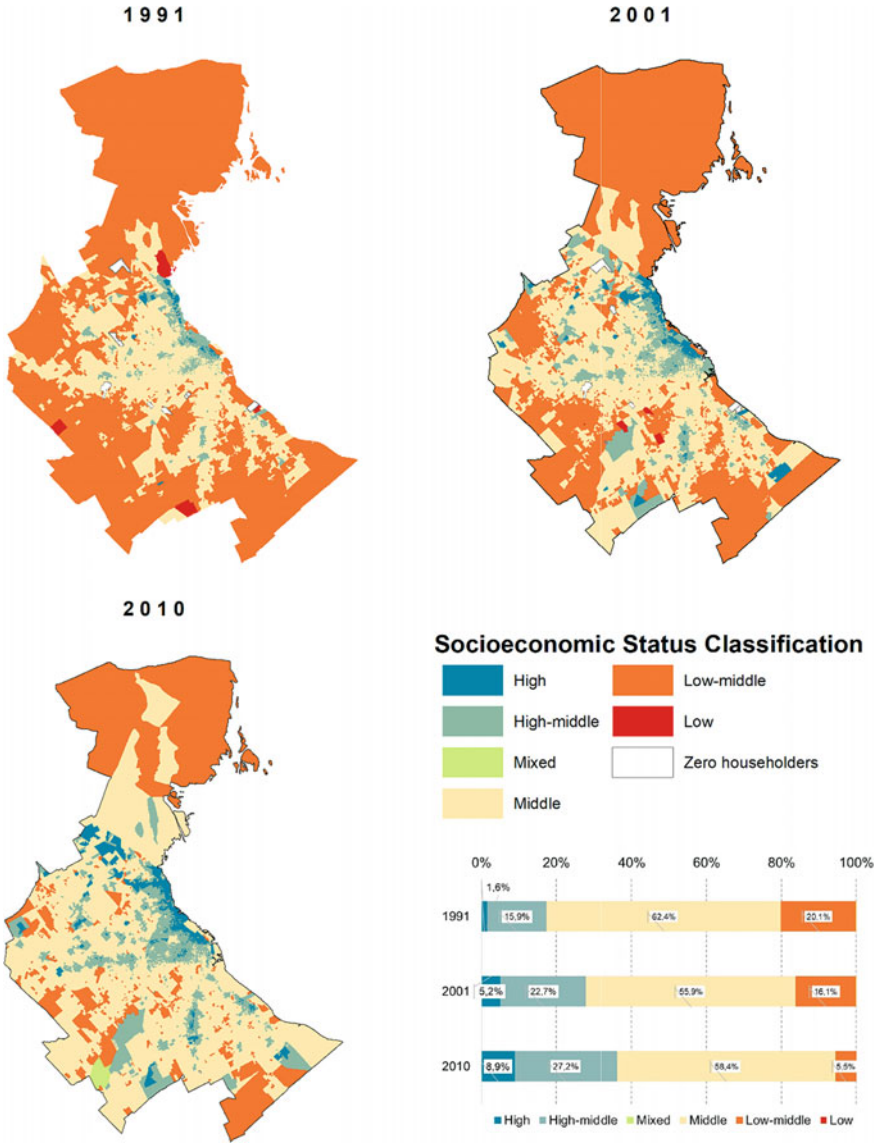

Fig. 23.4 Greater Buenos Aires: neighborhood types by socioeconomic composition, 1991–2001–2010. *Source* Population and housing censuses 1991, 2001, and 2010, INDEC, author's maps

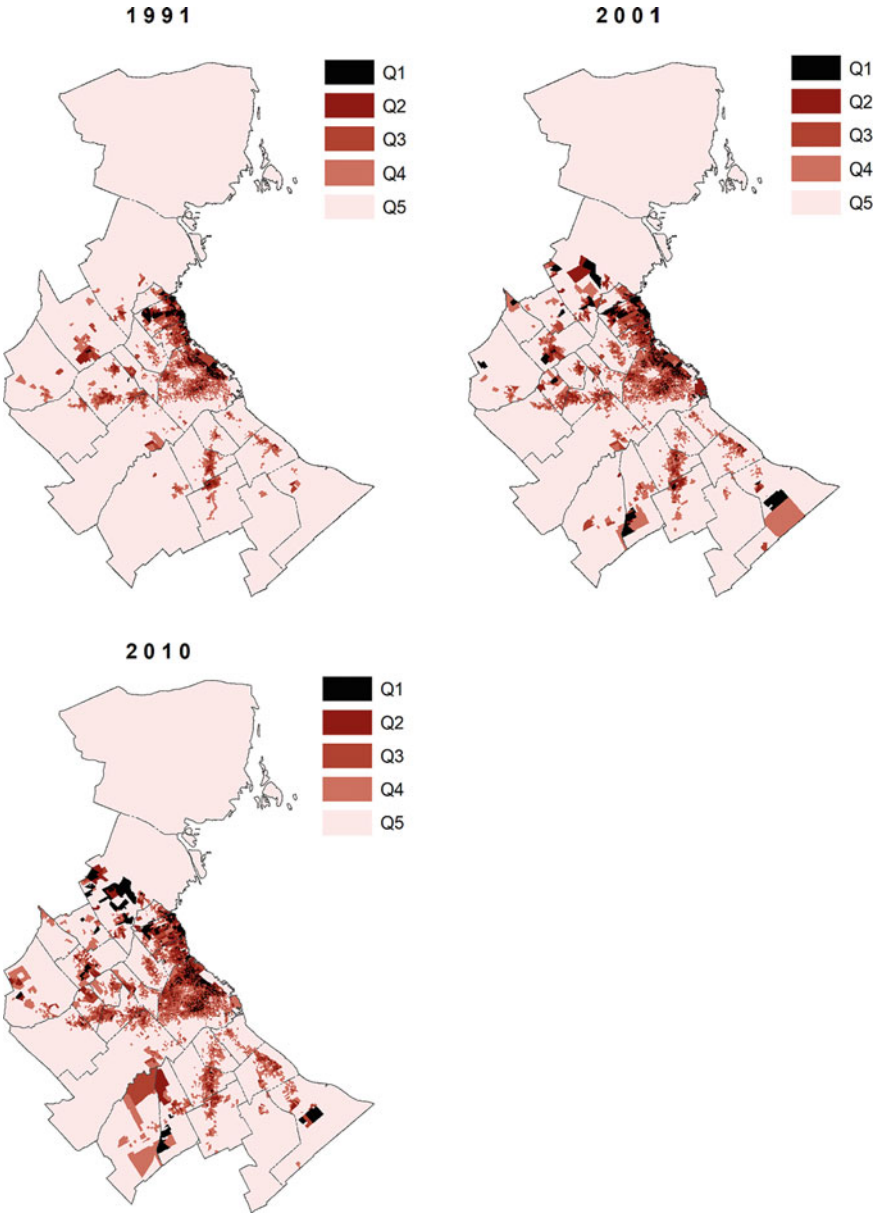

Fig. 23.5 Greater Buenos Aires: localization of top socioeconomic status group, 1991–2001–2010. *Source* Population and housing censuses 1991, 2001, and 2010, INDEC, author's maps

23.6 Discussion and Conclusions

Buenos Aires is complex in many ways, with its jurisdictional complexity being a characteristic that pushes the current trends toward urban fragmentation and residential polarization. GBA's current structure crystallizes the historical north/south and center/periphery contrasts. Moreover, new contrasts are added which delimit full and inclusive access to the city for a part of its population (Marcos and Mera 2018).

During the study period, there were important structural economic changes in Argentina (Groisman 2010; Marcos 2009; Suárez 2011; Torres 2001). On the one hand, the establishment of an open accumulation model, which, although it was implemented from the mid-1970s onward, the most drastic transformations occurred in the 1990s—particularly the subsequent amendments in labor legislation aiming at a higher labor flexibilization. On the other hand, after the great crisis of 2001, there was a change in the macroeconomic regime that gave rise to a period of sustained and long-lasting economic recovery. Simultaneously, there were changes in the way of planning and management of the city, which can be summarized in a transference of the management of urban development to private capital, and in the resulting residential polarization.

The aim of this study was to investigate how the indicators related to socioeconomic residential segregation developed in a context characterized by major social, economic, and political transformations. These results confirm some tendencies probed by other researches in the process of urban spatial structuring and residential segregation in GBA (Groisman 2010; Rodriguez 2016; Suárez 2011; Torres 2001). First, the main trend of the 1990s was the residential polarization in the City of Buenos Aires as well as in the conurbation, where the group of a greater socioeconomic level was the most significant actors of that period regarding the definition of social spaces. Second, the process of suburbanization of the elites intensified; it was a process that was parallel to the increase in closed urbanization (at the beginning of the 1990s, there were around 90 undertakings and by 2007 there were nearly 550). At the same time, there is a rise of precarious settlements, combined with the generalized deterioration in traditional neighborhoods where people from lower and middle classes lived. Third, the sustained growth of the economy after the great economic crisis of 2001 would not have had a sharp effect on the reduction of segregation, for two main reasons: on the one hand, the values of the indices are still high, especially, between the two opposite ends of the social scale, and on the other hand, because local patterns were not substantially modified and in some areas of GBA, residential polarization increased.

During the first period, 1991–2001, the growth—or the persistence of high levels—of residential segregation, especially between the opposite ends of the social scale, was the result of an ongoing trend of job insecurity and social exclusion of certain individuals, despite significant increases in the educational levels of the population. During the second period, 2001–2010, the educational improvement of the population continued, but in a context of economic recovery and equity improvement. Evidence suggests that economic growth would not have had a profound effect as

the ones observed in labor indicators, especially during the first period of the expansive phase (2002–2004) on socio-economic residential segregation. The levels of residential segregation remain high and continue to assert themselves through new forms of spatial separation, such as through gated communities. The arrival of elites in traditionally popular residential areas would seem to reflect greater social heterogeneity of the conurbation and a reduction in residential segregation. However, the characteristics of new neighborhoods intensify residential segregation on a reduced geographical scale. Private fences, walls, and security checkpoints guarantee the isolation of elites from the surrounding poor areas and split the territory.

All these characteristics highlight a trend toward an extremely segregated and divided city, and the determination of the processes of territorial fragmentation and residential polarization, in spite of substantial improvements in the educational attainment of the population and the period of sustained economic growth that GBA and a great number of Latin American countries went through at the beginning of the twenty-first century. The results of this study confirm the findings of other research that account for the great force of the processes of urban space development. Therefore, it must be emphasized the need for active public policies that promote social diversity space and full and inclusive access to the city, dismantling the areas of residential and socio-occupational marginalization that deteriorate the conditions for urban integration and reproduce concentrated poverty.

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Chapter 24
Changes in Spatial Inequality and Residential Segregation in Metropolitan Lima

Graciela Fernández-de-Córdova, Paola Moschella, and Ana María Fernández-Maldonado

Abstract Since the 2000s, Lima city shows important changes in its socio-spatial structure, decreasing the long-established opposition between the centre and the periphery, developing a more complex arrangement. Sustained national economic growth has allowed better socio-economic conditions in different areas of the city. However, high inequality still remains in the ways of production of urban space, which affects residential segregation. To identify possible changes in the segregation patterns of Metropolitan Lima, this study focuses on the spatial patterns of occupational groups, examining their causes and relation with income inequality. The analysis is based on the 1993 and 2007 census data, measuring residential segregation by the Dissimilarity Index, comparing with the Diversity Index. The results confirm trends towards increased segregation between occupational groups. Top occupational groups are concentrated in central areas, expanding into adjacent districts. Bottom occupational groups are over-represented in distant neighbourhoods. In-between, a new, more mixed, transitional zone has emerged in upgraded formerly low-income neighbourhoods. Areas of lower occupational diversity coincide with extreme income values, forming spaces of greater segregation. In the metropolitan centre–periphery pattern, the centre has expanded, while the periphery has been shifted to outer peripheral rings.

Keywords Residential segregation · Spatial inequality · Index of dissimilarity · Occupational diversity · Lima

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24.1 Introduction

Inequality is a complex social condition with multiple dimensions that leads to economic, social and environmental imbalances and generates spatial disparities between and within different territories (ECLAC 2018; Jordán et al. 2017). Measured by the Gini index, Latin American countries comprise the most unequal world region, a position verified through analysis of tax data on personal income in selected countries (Barcena and Byanyima 2016). Inequality generates socio-spatial segregation when the formation of residential areas of groups of people with similar socio-economic status—be it voluntary or forced—limits the interactions between those groups. The intensity of residential segregation will then depend on the degree of income inequality (Chapin 1965; Sabatini 2006). Consequently, Latin American cities are highly residentially segregated, which is illustrated by notorious examples of gated communities and 'fortified enclaves' for the rich and upper middle class (Caldeira 2000; Coy and Pöhler 2002).

The objective of this chapter is to analyse the recent changes in residential segregation by socio-economic status in the city of Lima, the capital city of Peru. And additionally, to explore the extent of the effects that national economic trends have had on the conditions of socio-spatial segregation in Metropolitan Lima. In a country as Peru, whose societal relationships are characterized by highly asymmetrical power relations (Drinot 2006), socio-economic segregation has been a common and persistent urban phenomenon. However, socio-spatial segregation only became a mark of the city during the process of rapid urbanization that Lima experienced since the mid-1950s. The impact of the widespread emergence of peripheral informal settlements on Lima was overwhelming. The process definitely modified the structure of the city (Driant 1992), shaping it into a strongly segregated pattern of centre–periphery.

Sustained improvement of the national economy in the 2000s has led to a substantial growth of purchasing power of population groups living in the older periphery, at the intermediate zone of urban expansion in Metropolitan Lima. This process promoted the expansion of public and (mostly) private investments in infrastructure, services and housing towards this area (Chion 2002), contributing to social diversification and the improvement of quality of life. These changes have led to trends towards the reduction of the degree of socio-spatial segregation, observed in some of these peripheral areas (Fernández-de-Córdova et al. 2011). Desegregation was also observed in many other cities in Latin America (Sabatini 2015; Aguilar and Escamilla 2015).

This study is carried out following Sabatini's (2006) segregation scale approach, which pays attention to the spatial scale in measuring inequality. Its main assumption is that high levels of inequality are not necessarily negative, but the impact of high inequality depends on the size and hierarchy of socio-economic groups. "If segregation occurs within a reduced geographic scale, like a small city or through the conformation of smaller, socially homogenous neighborhoods, the negative effects of segregation can be less significant or non-existent." (Sabatini 2006: 9). The analysis is based on occupational categories, which are used as a proxy for socio-economic

status. Residential segregation is measured by means of the Dissimilarity Index and then compared with the Diversity Index to examine the utility of the different indices and spatial units for understanding residential segregation between occupational groups. Residential segregation is related to income inequality. The study uses data from the 1993 and 2007 national census of population and housing, and where possible other census data.

The text is organized into five sections. The following describes the context of Metropolitan Lima: the main features of its urban development; the welfare and housing systems in the country, forms of income inequality in Peru, and the occupational structure in Lima. The third section presents the analysis of residential segregation based on the index of dissimilarity, location quotient and the classification of neighbourhoods according to the occupational composition. Section four presents the analyses of occupational diversity by income level. The last section presents the main findings and conclusion.

24.2 The Context: Metropolitan Lima

Metropolitan Lima is the largest Peruvian metropolis, and the fifth largest in Latin America, housing 9.5 million out of the 31.25 million Peruvian inhabitants in 2017 (INEI 2018). The city is divided into 50 districts that belong to the two provinces of Lima and its port, Callao (see Fig. 24.1). Lima faces the Pacific Ocean and has a

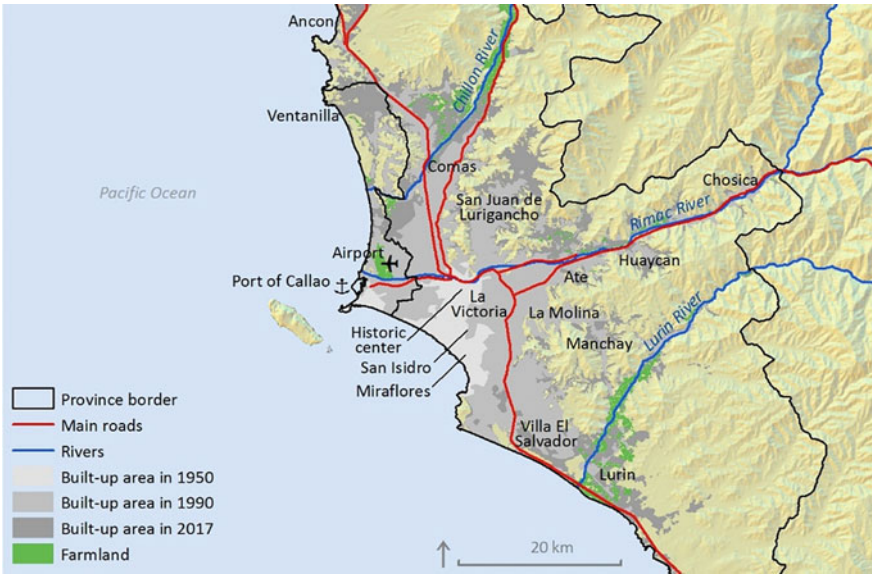

Fig. 24.1 Geography of metropolitan lima

central position on both the Peruvian and the South American west coasts. Its urban area is developed along two main axes, extending themselves more than 100 kms from north to south, and 60 kms from east to west. Its urban structure has two main zones, central and peripheral.

The central zone is composed of the historic centre surrounded by districts urbanized under formal patterns in the plain areas. It is extending from the historic centre of Lima to the coastal Miraflores district in the South, concentrating commerce, employment and urban amenities. It also has a larger share of apartment buildings, although the higher population density is located towards the east and north (Vega-Centeno et al. 2019). The informal peripheral zone follows an urban continuum of radial and irregular morphology that responds to the expanding of the self-built settlements on the Andean slopes (Fernández-de-Córdova et al. 2016).

24.2.1 Metropolitan Lima's Urban Development

Lima has experienced significant levels of residential segregation since its foundation. The historical patterns of social and economic exclusion inherited from the centuries-long Spanish rule have guided the processes of urban growth and development since then (Fernández-de-Córdova et al. 2011). In the twentieth century, Lima's urban evolution has been strongly marked by the presence of informal self-built neighbourhoods (Driant 1992). Between the 1940s and the 1970s, a demographic transition process radically increased the size of the Peruvian population, attracting people from over-populated rural areas to the cities, and especially to Lima, which was initiating a process of industrialization by imports substitution. From 1940 to 1972, Lima's population grew five-fold, from 0.64 million to 3.3 million (INEI 2007). Most newcomers were unskilled rural migrants, who were unable to find a place in the formal labour market. Without other possibilities, they built their own settlements on the hillsides, during a period in which the state promoted the formation of massive informal neighbourhoods in peripheral areas in order to solve the acute housing problem in the city (Calderón 2012).

After the 1970s, Lima continued extending itself horizontally, mostly through low-rise self-built housing in the urban periphery. In the 1981–1993 period, Lima's urban population increased by 37.3%, from 4.6 million to 6.3 million, while its urban area increased by 51.4% in the same period. Likewise, in the 1993–2007 period, the population grew by 33.6%, up to 8.4 million. while its urban area extended itself by 74.5% to 69,033 hectares (INEI 2008). Since the 2000s, visible transformations have been observed in Lima's segregated urban structure, associated with the structural adjustment policies initiated in the 1990s. They prompted a significant growth in the service, financial, telecommunications, construction and employment sectors (Chion 2002). In spatial terms, they led to trends towards the formation of Lima's intermediate zone located between the historic core and more distant neighbourhoods. The recomposition brought along the diversification of social groups in this intermediate zone according to income, occupation and migratory origin, as well

as by greater complexity of functional relations, leading to the formation of new sub-centres (Fernández-de-Córdova et al. 2016).

24.2.2 The Peruvian Welfare System

Peru clearly follows the liberal welfare model, shaped by the free-market ideology that is dominant in the country's political economy. In the liberal system, welfare is the responsibility of each individual, according to their own ability to respond to market conditions. The Peruvian state considers that social welfare will be generated by a competitive economy delivering high rates of economic growth. Studies about the conditions of public welfare in Latin America consider that the region has welfare states 'in transition' (Esping-Andersen 1996), as their efforts to spread public welfare to all are still fragmentary. The Peruvian welfare system, therefore, provides a relatively low coverage and exhibits a low level of social expenditure even when compared to other Latin American countries. An OECD study on global inequality (2015) verified this, noting that the Peruvian redistribution policies are minor in comparison to other Latin American and emerging countries, leading to lower redistributive effects.

Three priorities guide social interventions in Peru (El Peruano 2004): (1) the development of human capabilities; (2) the promotion of employment and generation of economic opportunities; and (3) developing a network of social protection. Following this, Peru has increased public spending in the education sector, especially in basic education, in the last 10 years. However, in a comparative perspective these spending levels are much below the average education expenditure in OECD member countries, below other countries of Latin America, and below countries with similar GDP per capita (Guadalupe et al. 2017). Furthermore, the generation of considerable tax revenues during the period of high economic growth (2004–2014) was helpful to increase social investment and to expand assistance programmes for the most vulnerable population. The total budget for social expenditure increased by 230% between 2004 and 2016 (Trivelli and Urrutia 2018). This contributed to important reductions of child malnutrition; maternal mortality; and income poverty (from more than 50% in 2004 to less than 23% in 2014); while the coverage of basic services was extended (Mendoza Nava 2015).

The Peruvian Ministry of Development and Social Inclusion is in charge of social programmes to tackle extreme poverty. These include *Qali Warma*, *Pensión 65, Cuna Más, Juntos*, Foncodes, *Contigo* y *PAIS*; executed through direct social assistance, localized investments and income redistribution through monetary transfers. *Pension 65* and *Juntos,* which deliver direct cash transfers to vulnerable households, are the ones that have more significantly contributed to social welfare. Together they received 1.3% of the 2016 national budget and greatly contributed to reducing inequality (Trivelli and Urrutia 2018).

24.2.3 Income Inequality in Peru

Peru has also experienced a period of high economic growth and macroeconomic improvements in the 2000s, leading to one of the most significant poverty reductions in Latin America. Poverty levels were reduced by 61% between 2004 and 2014 when economic growth reached an annual average of 6.4%, which also enabled the reduction of inequality levels, although less significantly. This was more visible in Lima, whose Gini index was reduced to 0.40, while the country's index decreased to 0.46 in 2017 (ECLAC 2018). In the same period, 40% of lower income households in Lima increased their per capita income by 6.8%, a proportion higher than the national average (4.4%) (Grupo Banco Mundial 2015). In 2017, the average monthly income per capita in Lima was US$ 581.6, widely exceeding the national average of US$ 417.1 (Zucchetti and Freundt 2018).

Going into more detail when it comes to changes in income inequality in Peru as measured by the Gini index between 1997 and 2016 with data from the World Bank (2019), we find a switch from increase to decrease. The values of the Index peaked in 1999 (56.3), decreasing during the period of high economic growth (2003–2015), down to 43.5 in 2015. Despite the decrease during the 'economic miracle years', income inequality is still high in Peru. From the total country income, the share of the first quintile is 5%, while that of the fifth quintile is 43% (ECLAC 2018). Furthermore, the steep decrease of the Gini index in Peru has been questioned because its values are based on national household surveys (Encuesta Nacional de Hogares), which are focused on measuring the needs of lower income groups, and do not properly include the highest income groups (Francke 2017; Alarco et al. 2019). Corrected estimates give higher values than the official ones, although they also show reduction trends as of 2005. Measures of economic inequality by means of the Gini index of wealth and bank deposits, however, show upward trends in the last decade (Alarco et al. 2019).

24.2.4 The Housing System in Peru

According to the results of the 2017 census (INEI 2018), 76% (5.8 million) homes were owner-occupied, 16.3% (1.2 million) were rented and 7.5% were homes without ownership or rent exchange. Social housing is not considered as an apart category, so it is included in owner-occupied. An unequal country as Peru carries a long-standing housing shortage, which deepened during the period of rapid urbanization. Affordable housing has been a constant challenge. Laissez-faire political attitudes towards informal housing, coupled with the inexistence of deliberate housing policies, have led to a vast housing shortage. Furthermore, in the early 1990s, the Peruvian state practically withdrew from the housing sector. In 1992, the Fujimori administration closed the Ministry of Housing, the Central Mortgage Bank, the Housing Bank and dismantled housing cooperatives and public programmes for land delivery. Housing

finance lost all priority, and the right to adequate housing was removed from the 1993 constitution (Fernández-Maldonado 2010). According to census data, home construction in the 1990s—amounting to 120,000 homes per year—was mostly produced through informal urban processes.

In 2001, the new democratic government reorganized and rebuilt the housing sector, establishing a deliberate social housing policy to tackle the huge housing demand. As a typical neoliberal policy, it promotes access to 'formal markets' subsidizing the housing demand and creating financial mechanisms to facilitate housing affordability. The private construction sector is responsible for the production of affordable housing, the financial sector provides the mortgage loans (in which in the event of non-payment the state assumes the debt), while the state provides direct subsidies to meet the demand. To encourage the private construction of affordable homes, an effort was made to create favourable conditions for the builders, both in terms of regulations and finance (Calderón 2012). The state had to take almost all risks of the financial transactions (Calderón 2009).

The policy is implemented through two different programmes: *Mivivienda* (FMV) and *Techo Propio*. FMV targets middle-income households to finance the purchase of new homes valued less than 127,000 US$, providing a subsidy to contribute to the down payment, which depends on the amount of credit requested and the type of building materials (traditional or sustainable) of the new home. *Techo Propio* targets lower income households to finance the improvement of substandard dwellings; the building of a home in own land; or the purchase of new homes valued less than 15,500 US$. Its subsidy varies according to the modality to which the household is applying: home improvement, building or buying a new house (Fernández-Maldonado and Bredenoord 2010).

The housing policy had a rebound effect, pushing downward the property prices, promoting a real estate push in the commercial housing market, which allowed the redirection of construction capital to income sectors never previously considered before (Calderón 2009), producing a real estate boom in Metropolitan Lima and other large cities during the mid-2000s. On the other hand, the free market dynamics in the social housing sector—in aspects of home construction, land market and financial market—gave the large construction companies almost free hands to decide where to invest and for whom. In this context, the social housing system has mainly benefitted middle- and low-middle-income groups, considered more profitable for the construction sector (Fernández-Maldonado and Bredenoord 2010). The social housing policies for low-income groups have had many problems, failing to meet the policy goals. This is mainly due to limitations of these groups' access to credit, as they generally lack formal (stable) employment (Romero et al. 2005). Only 30% of the national target—to build 100,000 houses between 2003 and 2012, 10,000 per year—was met (Calderón 2014).

Despite the real estate boom, the total number of homes built has been very low in relation to the enormous housing deficit. There was a slight reduction of the quantitative deficit in the 1993–2007 inter-census period, but the deficit coming from informal housing increased by 135% in the same period. This led to an increase

in the total housing shortage by 82%, to 1.86 million homes nationwide. Neighbourhood improvement policies have been almost completely focused on the legal regularization of land property, through an agency created in 1996, COFOPRI, the Agency for the Formalization of Informal Property. Only granting land titles, and without improving access to housing, education and employment, COFOPRI does not help much to tackle the housing shortage (Calderón 2016). So far there are no realistic proposals promoting a sufficient amount of affordable housing to counteract informal urbanization processes.

24.2.5 Occupational Structure in Metropolitan Lima

Figure 24.2 shows the percentage of occupational categories in Metropolitan Lima according to the 1993, 2007 and 2017 censuses, in terms of Top occupational categories (managers, professionals) Middle occupational categories (associate professionals, clerks, service workers, craft workers) and Bottom occupational categories (machine operators, unskilled workers). In the three census years, the trend is towards professionalization, as the top occupational groups grow and bottom groups diminish. The predominant are middle occupational categories: the highest proportion is in services and sales (SER), which increased in each census year (16, 20 y 22%); while crafts and related trades (CRA) tended to decrease. Associate professionals and technicians (APR), and clerical support workers (CLE) also grew slightly. Elementary occupations/unskilled workers (UNS) conform the highest proportion among the bottom occupational categories, although they decreased in the last inter-census period (18, 19 and 15%). The population of migrant origin in Metropolitan Lima, 10% of the total number of occupied persons, is mostly engaged in elementary occupations. In 1993, 34% of recent migrants (referred to the last 5 years prior to the census) were engaged in this category, while in 2007 their proportion decreased to 28%.

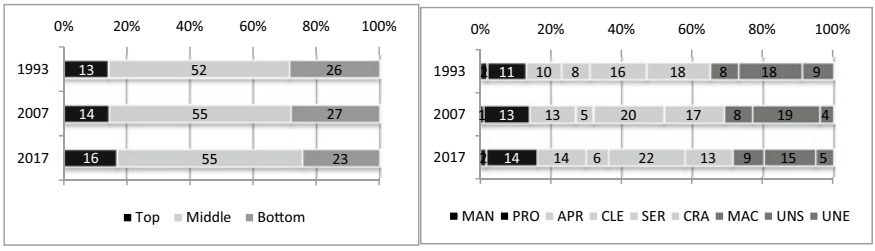

Fig. 24.2 Distribution of occupational groups and change over time in Lima in 1993, 2007 and 2017. (*Data source* INEI 1993; 2007; 2018)

24.3 Residential Segregation According to the Analysis of Occupational Groups

24.3.1 Segregation Between Extreme Socio-Economic Groups: Index of Dissimilarity

The dissimilarity index proposed by Duncan and Duncan (1955) allows comparing the segregation between two groups across all spatial units in the city in order to evaluate the degree of inequality of their spatial distribution. The dissimilarity index between top and bottom occupational categories in Metropolitan Lima was 0.42 in 1993 and remained the same in 2007. This is an intermediate value, which indicates that almost half of the people employed as managers and professionals groups would have to be relocated to achieve a uniform residential distribution across the census areas of the city (average population size 5,443 in 2017). In 2007, the dissimilarity index at the district level (average population size 188,247 in 2017) indicates that the districts of the central area are very uniform in the internal distribution of these occupational groups, with values between 0 and 0.4 in the study period. On the other hand, districts with greater dissimilarity are found in Lima's south and east, but without exceeding the 0.6 value.

Among occupational groups, the highest dissimilarity index was found between managers and craft workers, which did not change over time (Table 24.1). Other high index values correspond to managers and machine operators, as well as to managers and unskilled workers. During the period under study, the dissimilarity increased between the associate professionals, and some middle and bottom groups. On the contrary, it decreased between the unskilled workers, and the middle and bottom groups. It also declined among the managers, professionals and associate professionals.

Table 24.1 Indices of dissimilarity in Lima (multiplied by 100)

1993 \ 2007	MAN	PRO	APR	CLE	SER	CRA	MAC	UNS	TOP	MID	BOT
MAN		13	22	25	42	53	49	47			
PRO	17		14	18	36	47	43	41			
APR	28	18		8	25	37	33	31			
CLE	25	15	9		24	36	32	31			
SER	42	35	21	28		15	13	13			
CRA	53	47	33	39	16		10	12			
MAC	50	44	29	36	15	12		13			
UNS	45	41	29	34	17	16	19				
TOP										32	42
MID									33		13
BOT									42	14	

24.3.2 Distribution of Extreme Occupational Categories According to Location Quotient in 1993 and 2007

The distribution of the top and bottom occupational categories is analysed at the urban area level (census tract), which corresponds to a census unit of an area of approximately 60 blocks and with an average population of 5,443 people. The information available at the census tract level makes it possible to compare data only from 1993 and 2007, as the results of the census of 2017 are not yet available at this level.

24.3.2.1 Spatial Distribution of Top Occupational Categories

In 1993, the analysis of the spatial distribution of managers and professionals reveals a high concentration in the central area and some districts located at the eastern periphery with a location quotient of 1.6–3.2. In contrast, in the peripheral districts, the concentration of managers and professionals is lower than the city average (0.0–0.8) and the values are shown in a scattered manner (Fig. 24.3). Analysis for 2007 shows that the highest residential concentrations of managers and professionals changes, the special mix decreases and the distribution becomes more homogeneous, where older neighbourhoods have a greater presence of managers and professionals. In the near periphery towards the north, north-west and south, the concentration of managers increases (location quotient higher than 1.2) together with the expansion of the higher income areas and the physical improvement of neighbourhoods there.

24.3.2.2 Spatial Distribution of Bottom Occupational Category

The location of machine operators and unskilled workers is less uneven than the top category with a predominance of location quotient values between 0.4 and 1.6. In 1993, values similar to the metropolitan average predominate (0.8–1.2). Values above average (1.2 or more) are scattered, especially in the periphery, while lower than average values (0–0.8) are concentrated in the central area. In 2007, analysis shows that the low concentration values of unskilled workers are maintained; however, their distribution changes and a pattern of centre–periphery residential segregation intensifies. The central area only has the lower intermediate value (0.4–0.8) and forms a large homogenous area, while no average value groups are found, as it was in 1993. In contrast, the periphery has a higher concentration of unskilled workers, mainly in the more distant periphery. Only some groups at the northern and eastern periphery close to the centre maintain the concentration of middle-low value (0.4–0.8).

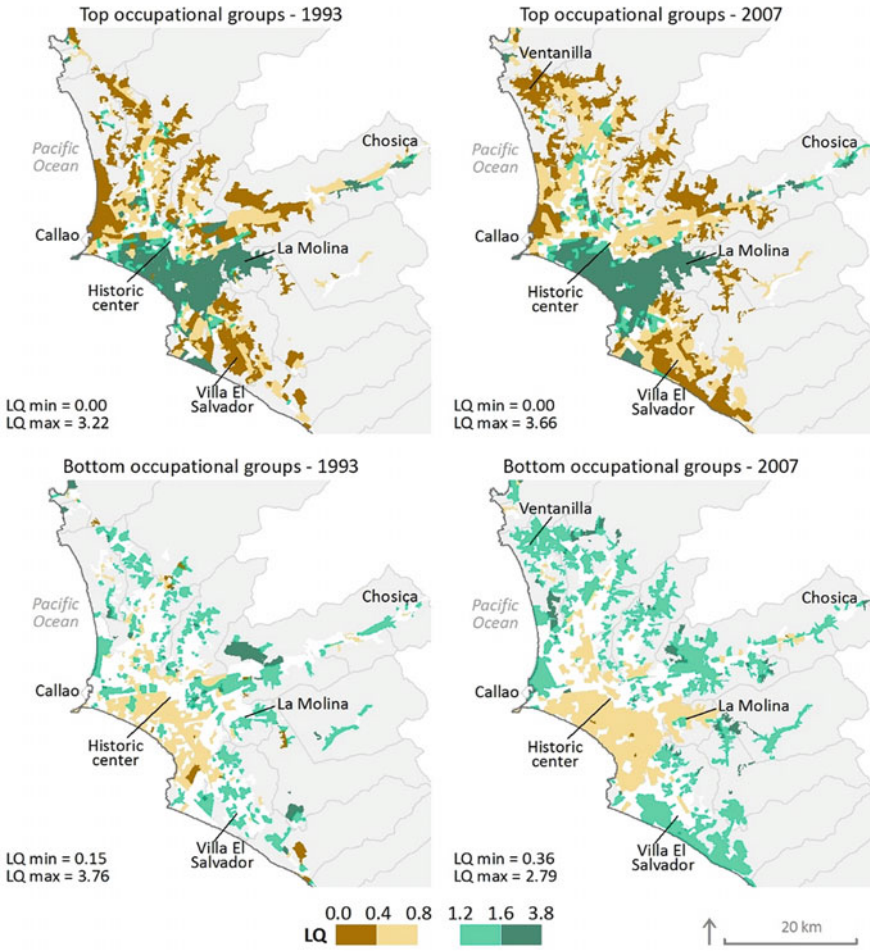

Fig. 24.3 Location quotient maps for the top and bottom occupational groups in Lima. (*Data source* INEI 1993; 2007)

24.3.2.3 Relationship of the Residential Distribution of Top and Bottom Occupational Categories

An opposite segregation pattern for the top and bottom occupational categories in the study period. Top occupational groups are over-represented in the central area that is very homogeneous, and the top group expands towards the east, incorporating the district of La Molina. In the periphery, there are two axes with high presence of top groups in the north and east (Chosica), which coincide with the roads and the earlier settlement of the periphery (see Fig. 24.1). Otherwise, bottom occupational groups

are over-represented in the urban periphery. The results indicate that the centre–periphery residential divide between top and bottom occupational groups has been reinforced. On the one hand, there is a greater homogeneity of concentration of top occupational groups in the central area and first peripheral expansion; on the other hand, bottom groups concentrate in the most recent peripheral expansions.

24.3.3 Classification of Neighbourhoods According to Occupational Composition

According to the share of occupational categories, a typology of neighbourhoods types can be built related to their socio-economic composition (Marcińczak et al. 2015). Considering the low share of top occupational categories in Lima's population, there is no neighbourhood classified as High SES with more than 50% of employees being Managers and Professionals. In most neighbourhoods, more than 50% of the population belong to the middle SES classification (Technicians and associate professionals, Clerks, Service workers and Craftworkers), while the bottom occupational categories predominate in only a few dispersed neighbourhoods (Fig. 24.4).

In 1993, the distribution of middle-to-high groups was alternated with mixed neighbourhoods. In 2007, many mixed neighbourhoods became middle to high, so that an axis of upgrading SES neighbourhoods was formed. This concentration did not spread across the entire central area, but included neighbourhoods from the south of the historic centre (San Isidro and Miraflores) to the east (La Molina), forming a

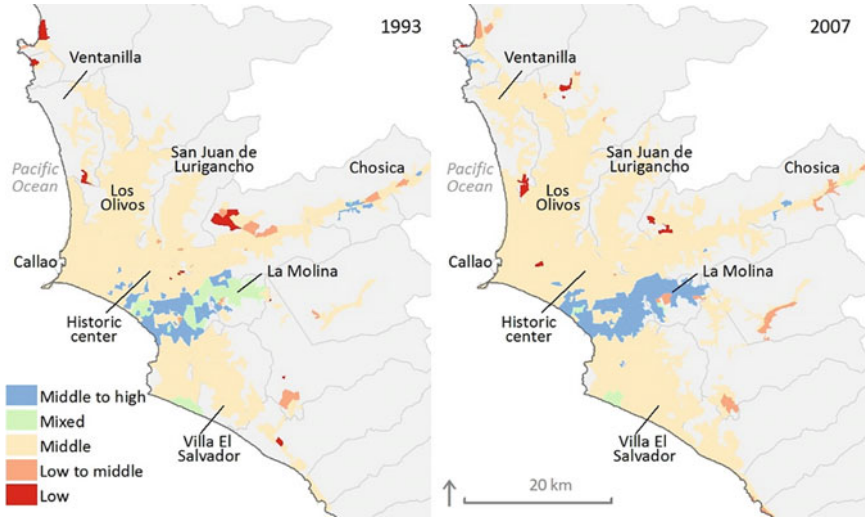

Fig. 24.4 Classification of neighbourhoods by socio-economic composition in Lima. (*Data source* INEI 2009; 2016)

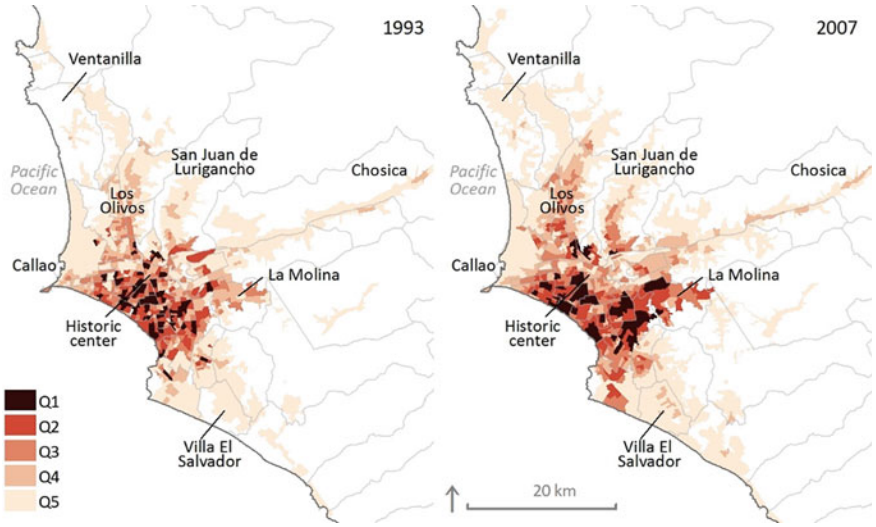

Fig. 24.5 Location of the top occupational group in Lima. (*Data source* INEI 1993; 2007)

new centre–east axis from the centre of the bay to the east. This new axis is located at the south of the central–east foundational axis road linking the port with the highlands. This new distribution shows the differences between the new central axis and the rest of the city, which is remarkable when taking into account the previous findings showing a traditional centre–periphery structure (Fig. 24.5).

The distribution of employees belonging to the top occupational group (Fig. 24.5) shows their tendency to expand the central area with the highest proportion groups (Q1 and Q2). Group Q1, corresponding to neighbourhoods with 20% of the top group employees, is dispersed and atomized throughout the central area. In 2007, neighbourhoods in this category form small groups in the central area and the surrounding east and north areas.

24.4 Differences in Occupational Diversity by Income Level

24.4.1 Occupational Mix in Neighbourhoods

The residential distribution of socio-economic groups can also be analysed with diversity indices that allow to examine the mix of different groups or categories. The diversity index of Simpson (1949) is one of the most often used measures of spatial diversity. It has been widely used in ecology and also in social studies to measure income diversity (Fernández-de-Córdova et al. 2011; Talen 2006; Miles et al. 2010), race (Nguyen 2010), ethnicity (Laurence 2011; Walks and Maaranen

2008), language (Greenberg 1956), family and housing type (Talen 2006), among other variables. Simpson (1949) proposed an index of diversity independent of the size of the sample that indicates the probability that two individuals chosen at random belong to the same group. The inverse version of the formula of the Simpson index is used, known as Simpson's Diversity index $D = 1\text{-}\sum(n/N)^2$, where n is the total number of individuals of one category and N is the total number of individuals of all categories. The value of D ranges from 0 to 1, where 1 represents the greatest diversity, in other words, the presence of individuals from a greater number of categories with an even balance among categories.

The diversity of occupational groups in Lima's neighbourhoods in 1993 shows the predominance of high and similar values (between 0.8 and 0.88) in different parts of the city (Fig. 24.6). Different degrees of reduction of the diversity index and the conformation of clearer residential patterns are observed, compared with the occupational diversity in 2007. The most salient is the greater homogenization of the occupational groups in two specific parts of Lima where the values of diversity index range between 0.6 and 0.8. One is located in the new centre–east axis, south of the historic centre and belongs to the highest income districts. The second is located at the north end of the city and belongs to the lowest income districts (Ventanilla). These are recently formed low-income neighbourhoods with poor accessibility to/long distance from central areas. All the neighbourhoods of greater diversity of occupational groups are located outside the city's central axis, in the north, east and south axes.

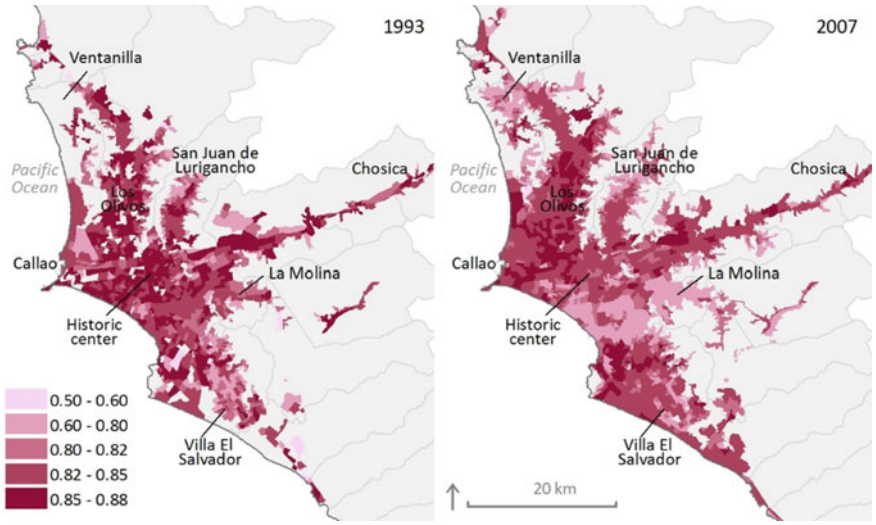

Fig. 24.6 Diversity index of socio-economic groups at census tract level in Lima. (*Data source* INEI 1993; 2007)

24.4.2 Changes in the Spatial Distribution of Income

Data about the estimated income at block level by the INEI (2009; 2016) indicates a marked residential differentiation in Metropolitan Lima. The central areas congregate the population with medium and high incomes, while the lower income populations are located in the periphery. The high-income population is concentrated in the new centre–east axis. Conversely, the low-income population is scattered and located in the urban periphery in the north, east and south. This pattern of income distribution is clearly related to the phases of metropolitan growth, confirming the findings from previous studies (Driant 1992; Piron et al. 2015) stating that the older neighbourhoods present larger levels of consolidation and integration.

The analysis of the changes in income between 2007 and 2013 reveals a greater polarization (Fig. 24.7). The high-income areas have remained at the centre–east axis and have expanded to the east and west. In contrast, low-income areas have spread to the extreme north and north-east of the city. This corresponds to a trend of change of the high-income zone that was traditionally located between the historic centre and its southern expansion (Miraflores), while in 2007, there is a greater concentration from the centre of the bay to the east. In 2013, the high-income groups had residentially spilled over to the new centre–east axis of the city, which includes La Molina (Fernández-de-Córdova et al. 2011).

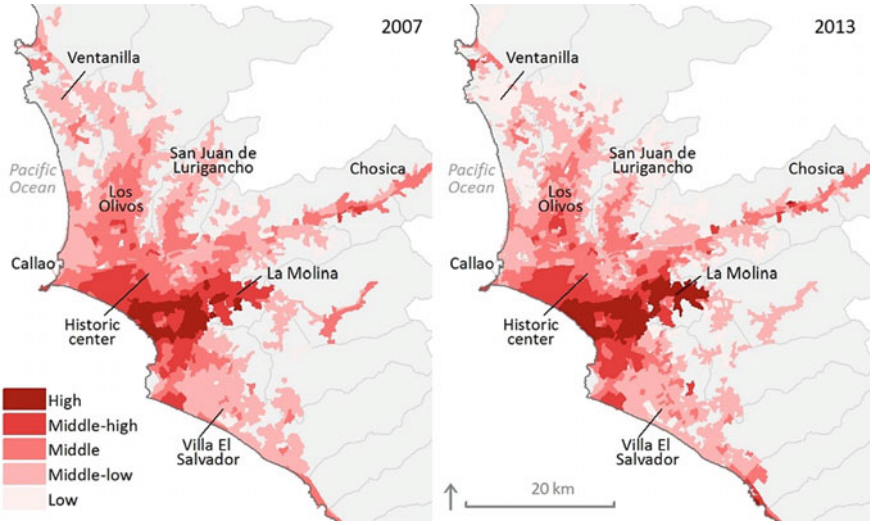

Fig. 24.7 Average income strata at census tract level in Lima. (*Data source* INEI 2009; 2016)

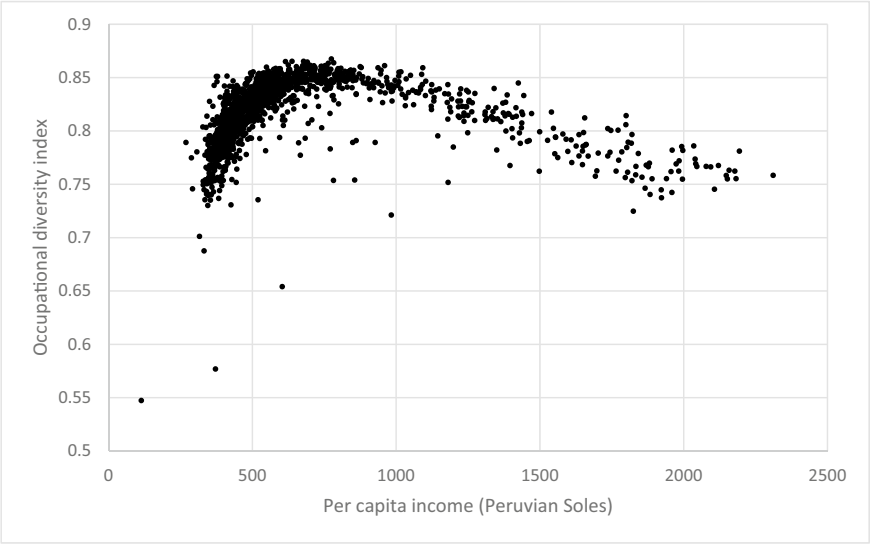

Fig. 24.8 Relationship between occupational diversity and average income at census tract level in Metropolitan Lima. (*Data source* INEI 2007; 2009)

24.4.3 Income and Spatial Relationship with Occupational Diversity

Analysis of the spatial relationship between the residential distribution of income groups (Fig. 24.7) and occupational diversity of neighbourhoods (Fig. 24.6) revealed that the areas with lower occupational diversity coincide with extreme values of income. As observed in the Scatter Plot (Fig. 24.8), there is a high curvilinear correlation between these variables. This indicates that middle-income and lower middle-income groups live in neighbourhoods with greater diversity of occupational groups. In contrast, higher income groups tend towards self-segregation, living in areas with less occupational diversity (between 0.72 and 0.8). At the opposite extreme, the poorest populations live in less diverse neighbourhoods, too, with diversity values around 0.75, and in some cases as low as 0.55. Furthermore, the gradient toward self-segregation in medium-income to high-income population is smooth. On the contrary, the gradient of the exclusion of the low-income population is quite pronounced. This means that, among the poor, a slightly different lower income level implies a significant change in the occupational diversity in the neighbourhoods where they reside.

24.5 Conclusions

The objective of this chapter was to identify the conditions of socio-spatial segregation in Metropolitan Lima, exploring the effects that recent economic trends may have had in those conditions. The study relies on an analysis of the residential distribution of occupational groups based on the Peruvian 1993 and 2007 national censuses data. In general terms, a process of professionalization is taking place in Metropolitan Lima but middle occupational groups are still the largest occupational groups. The results obtained from the analyses between 1993 and 2007, according to the different indices indicate that, at the level of the metropolis, the dissimilarity between the extreme categories has an intermediate level with little changes over time. The analysis of the residential clustering of occupational categories and occupational diversity in the neighbourhoods confirm the trends towards increased segregation. In the central area, a high concentration of top groups and low levels of diversity remains, and these characteristics expand into adjacent districts. Bottom groups are over-represented in the more distant neighbourhoods. In -between the centre and periphery, a new transitional zone has emerged where formerly low-income neighbourhoods have upgraded and become more mixed.

In the bottom occupational groups, there is a clear segregation between the central zone and the periphery in 2007. The areas of lower occupational diversity coincide with extreme income values, forming spaces of greater segregation. The location preferences of higher income groups are recent neighbourhoods in, or closer to, the central area. While lower income groups live segregated in recently formed peripheral neighbourhoods. Even when in the closer periphery the levels of inequality and segregation have been reduced, between the more homogeneous urban spaces of the central and periphery zones, the dual city effect is reproduced. It appears that in the centre–periphery pattern, the centre has been expanded, while the periphery has been shifted to the outer peripheral rings.

The decrease in income inequality is related to the positioning of Peru as a middle-income country during the 2000s (Grupo Banco Mundial, undated), which contributes to greater diversity in the middle sectors located in the periphery near the centre. However, segregation is increased in the extreme groups, located downtown (higher SES) and recent peripheries (low SES). These findings coincide with the effects of the trends in the country's economic growth in the two last decades. First, a decline in socio-spatial segregation in the closer peripheries was observed, associated with a visible improvement of income inequality and decrease of poverty at the country level and metropolitan level. However, the deceleration of economic growth that has occurred in recent years has mostly affected the groups living in the more distant periphery, which usually are the most exposed to such negative economic trends (Jordán et al. 2017; Cohen and Debowixz 2001). Since the decisions guiding (public and) private urban investments respond to market criteria, income inequality is then translated into limited access to mobility, infrastructure, urban services and employment.

It is now widely recognized that the reduction of inequalities is critical for all countries and regions (OECD 2015). The development priorities towards inclusive and sustainable growth require to act frontally against income inequality and residential segregation, implementing public policies for the redistribution of income, employment and social welfare (Barba Solano 2011).

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Chapter 25
Socio-economic and Ethnic Segregation in the Greater Paramaribo Region, Suriname

Kimberley Fung-Loy and Anton Van Rompaey

Abstract Income inequality has steadily increased in Suriname and it is considered to be at one of the highest levels in the Caribbean. This chapter analyses socio-economic and ethnic segregation between 2004 and 2012 in the Greater Paramaribo Region in Suriname. To investigate the link between income inequality and socio-economic segregation, occupation is used as a proxy for socio-economic status. The Dissimilarity Index is used to evaluate the level of segregation between different socio-economic and ethnic groups. The link between ethnicity and socio-economic status is also analysed. Results show that the highest level of socio-economic segregation exists between the higher socio-economic group (top occupational categories) and the lower socio-economic group (bottom occupational categories). It was also found that even though the Region is ethnically diverse, different ethnic groups tend to concentrate in different neighbourhoods. These segregated ethnicities are in turn linked to the higher and lower level socio-economic groups.

Keywords Socio-economic segregation · Ethnic segregation · Residential segregation · Dissimilarity index · Suriname

25.1 Introduction

The Republic of Suriname lies at the northern coast of South America and is home to 541,638 people (General Bureau of Statistics Suriname 2013). Suriname is made up of ten districts, with 62 ressorts (the smallest administrative unit established by law). Around 70% of the total population live within the Greater Paramaribo Region (GPR), consisting of the three districts Paramaribo, Wanica and Commewijne (comprising 22 ressorts). The ressorts are indicated in Fig. 25.1 with bold letters. The capital

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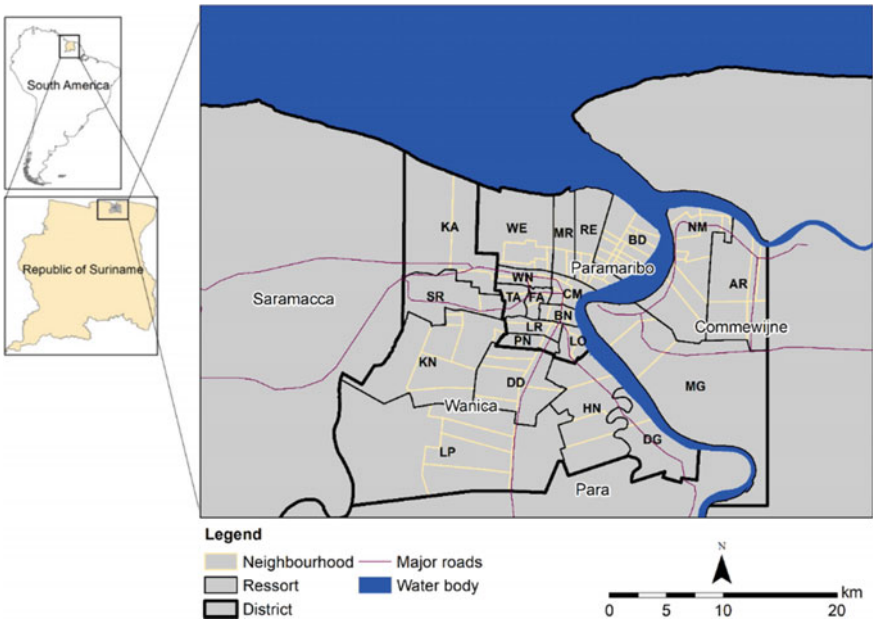


Fig. 25.1 Geographical location of the GPR

Paramaribo can be considered a medium-sized urban core, with a population of 240,924 and population density of 1324 inhabitants/km^2 (OECD 2012). Its population has increased by 16% between 2000 and 2012. This, in turn, has resulted in an increased demand for residential land. Consequently, the GPR has experienced urban sprawl, with ribbon development occurring outward from Paramaribo into Wanica and Commewijne (Fung-Loy et al. 2019). Uncontrolled urban sprawl can have negative consequences such as residential segregation, where specific groups end up in specific locations.

The research presented in this chapter examines socio-economic and ethnic segregation within the GPR. Socio-economic segregation is assessed by using ISCO occupation groups as a proxy for socio-economic status. In addition, ethnic segregation is also examined in this multi-ethnic country. Furthermore, the relationship between ethnic group and occupation, and thus socio-economic class is analysed. This study uses data from the 2004 and 2012 Censuses, which were obtained at ressort level. As ressorts are relatively large and heterogeneous, ressort-level data was downscaled to the neighbourhood-level, which is more suitable for segregation analysis. 106 neighbourhoods were defined based on archival maps acquired from the National Planning Office Suriname (Stichting Planbureau Suriname 1985), which were georeferenced to the ressorts. In 2012, the average neighbourhood population size was 3611.

25.1.1 Housing Composition

Land in Suriname can be acquired through two processes, namely government allocation and private purchase. Every Surinamese citizen can apply for governmental land; however, the process is bureaucratic, lengthy and often littered with corruption. In addition, as most plots within Paramaribo itself are already allocated, government land is mainly located far from the city, and is often deprived in terms of water and electricity supply. Governmental allocation usually occurs in the form of social housing projects. Nevertheless, many residents cannot afford buying these plots and/or houses on their own; therefore the projects are subsidised (McHardy and Donovan 2016). While waiting for governmental allocation, people usually rent a house, stay in a family-owned house, or squat an unoccupied house or empty plot. Squatter settlements consist of rural migrants, who do not have a social network in place to assist them (Hoefte 2014).

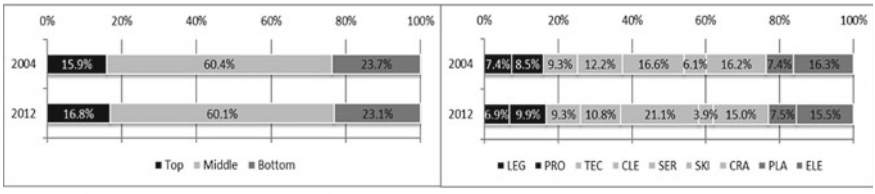
Purchasing land and/or a house through private purchase is reserved for the better off, due to high building costs, high interest rates for loans and high prices for privately owned land. Therefore, who owns what piece of land is (in part) determined by socio-economic status. Moreover, private real estate developers develop housing projects for a specific socio-economic group in mind. Similarly, social housing projects are also targeted towards a certain group. These processes can lead to spatial sorting of the socio-economic groups into different neighbourhoods. In 2014, of 134,329 households, the shares of private owners, renters, people in social housing, as well as people living in squatter settlements were 69%, 12%, 4% and 0.5%, respectively (Namdar and Caupain 2015).

Residential area can be differentiated by socio-economic status. This was studied for the GPR by Fung-Loy et al. (2019), where the authors used housing type as a proxy for socio-economic status. Residences were differentiated based on spatial characteristics. The residential urban area was divided into rich, middle, middle to low and poor residences. Residences on plot sizes larger than 600 m^2 and houses bigger than 300 m^2 were considered to be residences for the rich. The residences for the poor consisted mainly of squatter settlements and social housing projects initiated by the government. Based on this residential differentiation, Fung-Loy et al. (2019) found that the GPR as a whole is fairly heterogeneous in terms of residence types (indicated by multi-group dissimilarity indices $\approx$0.4). There was, however, a certain level of segregation between rich and poor residences, both being concentrated in specific areas. Rich residences were mostly located in the north of Paramaribo in ressort Blauwgrond (BD in Fig. 25.1), while poor residences were concentrated in the south (in ressorts Latour (LR) and Pontbuiten (PN)).

25.1.2 Occupational Composition

As stated by Verrest (2010) and Hoefte (2014), residential segregation is linked to socio-economic status and income inequality between different population groups in Paramaribo. The correlation between income inequality and residential segregation of socio-economic groups was also observed in European countries (Tammaru et al. 2019).

Income inequality and thus socio-economic status of individuals is linked to their occupation, time of arrival into the city and the level of education (Verrest 2010; Hoefte 2014). For the occupational categorisation, the census classification is based on the ISCO-88 classification (International Labour Office 1990). This classification divides occupations into ten major groups, ranging from Legislators, Senior officers and Managers to Elementary occupations. These occupation groups were further classified into three socio-economic groups, namely, Top, Middle and Bottom. The Top socio-economic group consisted of Legislators, Senior officers and Managers and Professionals. Research suggest that this group generally has the highest earnings out of all groups and as such is linked to the Top socio-economic group (Leetmaa et al. 2015). From the census data, a higher education was proven to correspond with a higher income (Schalkwijk 2015), and thus a higher socio-economic status. In Suriname, Legislators, Senior officers and Managers can have varying levels of education (World Economic Forum 2013), but mainly achieve Tertiary and Secondary education levels (General Bureau of Statistics Suriname 2014). The Middle socio-economic group consists of Technicians and Associate Professionals, and Armed Forces, Clerks, Service Workers and Shop and Market Sales Workers, Skilled Agricultural and Fishery Workers, and Craft and Related Trade Workers. The Bottom socio-economic group was made up of Plant and Machine Operators, and Elementary occupations. Figure 25.2 shows that the largest occupational groups in the GPR in both census years were Service Workers and Shop and Market Sales Workers, as well as Elementary occupations. Combined, these accounted for around 34% of all workers in 2012. Meanwhile, Legislators, Senior officers and Managers accounted for only 6% of all workers in the GPR in 2012. Between 2004 and 2012, the Top group experienced an increase of 6%, while Service Workers and Shop and Market Sales Workers and Elementary occupations combined increased by 41%.



LEG Legislators, Senior officers and Managers
PRO Professionals
TEC Technicians and Associate Professionals, and Armed Forces
CLE Clerks
SER Service Workers and Shop and Market Sales Workers
SKI Skilled Agricultural and Fishery Workers
CRA Craft and Related Trade Workers
PLA Plant and Machine Operators
ELE Elementary occupations

Fig. 25.2 Distribution of occupational groups and change over time

25.1.3 Ethnic Composition

In Suriname, occupation, time of arrival into the city and the level of education of individuals are linked to ethnicity. As a result of colonisation, Suriname has a very ethnically diverse population. The main ethnic groups are shown in Fig. 25.3. The largest ethnic groups in the GPR, according to both the census of 2004 and of 2012, are the Hindustani (descendants of contract labourers from India), the Creoles (descendants of former African slaves who stayed within the city) and the Javanese (descendants of contract labourers from Indonesia). Other smaller ethnic groups include Mixed (people of mixed ethnicity), Maroons (descendants of African slaves, who escaped into the interior of the country), Caucasians, Chinese and Amerindians (indigenous people of the Americas). Maroons were the most segregated ethnic group within the GPR, specifically in Paramaribo. This uneven distribution of Maroons can be seen in Fig. 25.3, where we see a concentration of Maroons in the southern ressorts of Paramaribo, mainly LR and PN.

The different ethnic groups arrived in Suriname at different times in history and for different purposes. Consequently, they were historically located in different areas in the country. For example, before the abolition of slavery in 1863 the Caucasian elite were located in the city centre in Paramaribo, with their servants (mainly Creoles) living in small servant quarters at the back of the plots. After 1863, other areas were established for free Creoles migrating from the plantations to the city. These areas, such as Frimangron (Free people's land, established for emancipated slaves), were the smaller, less affluent areas in the city centre. In 1921, almost 80% of Paramaribo residents were Creole. In addition, mainly Asian contract labourers, the Hindustani (first arriving from India in 1873) and the Javanese (first arriving from Java in

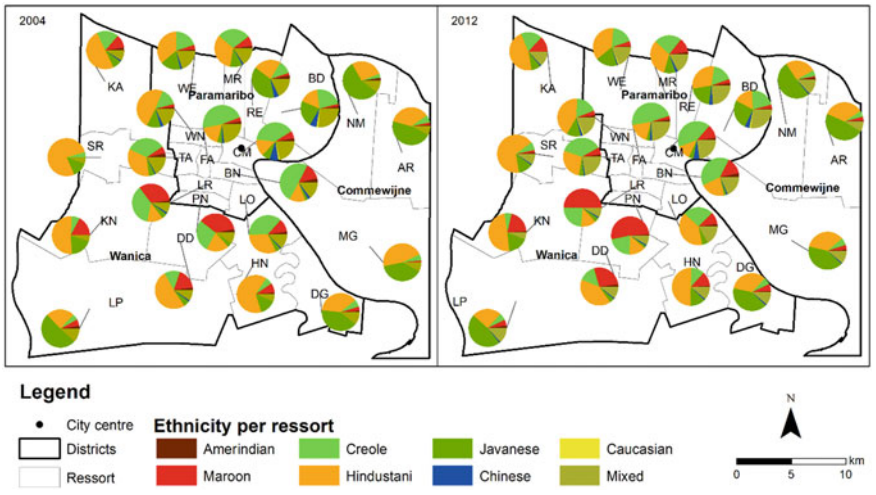


Fig. 25.3 Ethnic distribution per ressort for both census years

1890), were found for the colony to work on the plantations. The Maroons settled in tribal communities in the interior of Suriname, after escaping the plantations. The Amerindians were also concentrated in the interior districts of Suriname and at the coast.

As agriculture declined and many plantations closed in the 1930s, many inhabitants were given small-scale agricultural holdings in the districts of Commewijne and Wanica. Thus, many Hindustani and Javanese settled in these districts. During the Second World War, the demand for workers in the construction, bauxite and service sector increased, thus attracting many Hindustani and Javanese to the city for better occupational, and later educational opportunities (Hoefte 2014). The Maroons became a significant group in Paramaribo, after fleeing the civil war in the interior between 1986 and 1992. The Maroons settled in and around the former social housing projects, predominantly in the south of Paramaribo. As these newcomers arrived in the city, the previous rich inhabitants moved to the north and southwest of the city centre, towards the newly built suburbs (de Brujine and Namdar 2013).

According to the census of 2012, the ressorts are generally ethnically mixed. However, we can see that Creoles are still dominant in the centre, while Hindustani dominate west Paramaribo and Wanica (see Fig. 25.3). District Commewijne has a higher concentration of Javanese people. As certain ethnic groups arrived in the city later than others, they lagged behind in educational and occupational opportunities. Over time, a more equal distribution of ethnicities was achieved. As such, educational and occupational opportunities were also more equally distributed among the different ethnicities. Nevertheless, as stated by Verrest (2010) and Hoefte (2014), some occupational groups are still dominated by specific ethnic groups. Therefore, ethnic and socio-economic segregation can be linked (Reardon and Bischoff 2011). Such a link was also found in, for example, Belgium, where poorer neighbourhoods had a higher concentration of non-European migrants (Costa and de Valk 2018).

25.2 Methods

25.2.1 Socio-economic Segregation

The dissimilarity index (DI) was used to measure segregation between the socio-economic groups within the GPR. The DI describes the overall evenness of the distribution between two groups. It also provides the ability to evaluate each group and each area separately (Sakoda 1981). DI values range from zero to one, with values below 0.3 indicating a low level of segregation, and values above 0.6 pointing at a high level of segregation. However, the DI is scale dependent and thus can be influenced by size of the areas analysed (Quillian and Lagrange 2016; Andersson et al. 2018). In order to compare regions or countries, we also consider the change in DI (Ismail 2013). The DI and the change in DI were calculated between each

occupational group and between the aggregated socio-economic groups Top, Middle and Bottom.

In addition to the DI, the location quotient (LQ) was calculated, to evaluate the concentration of the Top and Bottom socio-economic groups in the neighbourhoods, compared to the GPR as a whole. Location quotient values of less than one or more than one mean that a socio-economic group is under- or overrepresented in a neighbourhood, respectively. A value equal to one means that the neighbourhood's share of a group is equal to the share of the group within the GPR (Miller et al. 1991). Moreover, the neighbourhoods were classified by socio-economic composition, based on the Top, Middle and Bottom groups. The classification was applied according to Marcińczak et al. (2015), which indicates the level of income inequality within a neighbourhood. The three socio-economic groups were merged into different neighbourhood types based on the typology provided by Marcińczak et al. (2015). Finally, the location of the Top occupational group in Paramaribo was analysed. Both the location quotients and the DI were calculated with the Geo-Segregation Analyzer software (Apparicio et al. 2013). Further methodological details regarding the calculations of the DI, LQ and other maps are described in the Introduction of this Book.

25.2.2 Ethnic Segregation

We also investigated ethnic segregation. This was done at ressort level, as ethnicity data was only available at this level. The proportion of each ethnic group within a ressort was calculated. In addition, the multi-group DI was calculated per ethnic group, to assess the overall level of evenness of distribution between the different ethnic groups within the GPR. Finally, the link between socio-economic segregation and ethnic segregation was analysed. To determine the correlation between ethnic and socio-economic segregation, we examined the overlap of the results of the socio-economic and ethnic segregation analysis (Leetmaa et al. 2015; Harris et al. 2017). The correlation between ethnicity and socio-economic group was calculated for both census years.

25.3 Results and Discussion

25.3.1 Socio-economic Segregation

In recent years, the average Gini index has decreased for the Latin America and the Caribbean region (from 54 to 47.5 between 2002 and 2014), suggesting a decreasing income inequality (Tornarolli et al. 2018). However, in Suriname income inequality has increased between 1980 and 2004, with Gini indices increasing from 41 to 55

(Menke et al. 2013). For the census year 2012, no Gini index was calculated due to low response rates. As such, Suriname is considered to be one of the most unequal countries of the Caribbean. In 2004, the poorest quintile received 3.9% of the total income, while the richest quintile received 53.6% (PAHO Suriname 2012).

To analyse if the increasing income inequality is linked with an increasing spatial segregation, the DI was calculated to quantify the level of segregation between the different occupational groups (Table 25.1). For both years 2004 and 2012, Elementary occupations (ELE) were the most segregated when compared to the other occupational groups. The DIs > 0.50 between the Top and Bottom groups for 2004 and 2012, indicate a high level of segregation between these two groups. An increase of 0.7% per year in the DI is also noted, indicating an increasing segregation. When analysing all socio-economic groups, a multi-group DI of 0.48 (in 2004) and 0.51 (in 2012) also indicate an increasing level of segregation.

As the DIs between the Top and Bottom groups indicate, these two groups are highly residentially separated from each other. This can also be seen through the location quotients for the Top and Bottom socio-economic groups in 2004 and 2012 (Fig. 25.4). In 2004, there was a higher concentration of the Top group in district Paramaribo in ressort Blauwgrond (BD on the map). The ressorts on the fringe of the city, especially ressorts Latour (LR) and Pontbuiten (PN), and district Commewijne, are more associated with the Bottom socio-economic group.

As can be seen in Fig. 25.5, the Top socio-economic status (SES) neighbourhoods were concentrated in north Paramaribo, mainly in ressort Blauwgrond (BD). The Bottom group was largely concentrated in south Paramaribo, in Latour (LR) and Pontbuiten (PN). Districts Wanica and Commewijne consisted mostly of Middle and Bottom to Middle SES neighbourhoods. There were no Polarized neighbourhoods in the Greater Paramaribo Region.

The Bottom and Bottom to Middle SES neighbourhoods were dominant and located in central and southern Paramaribo and in the less urban districts Commewijne and Wanica in both years. The Top and Middle to Top SES neighbourhoods were mostly found in Paramaribo itself. This follows the trend mentioned

Table 25.1 Dissimilarity indices (multiplied by 100) between all occupational groups, as well as the Top, Middle and Bottom groups in 2004 and 2012

	LEG	PRO	TEC	CLE	SER	SKI	CRA	PLA	ELE	TOP	MID	BOT
LEG		45	30	31	29	42	30	48	52			
PRO	43		33	34	31	43	32	48	52			
TEC	31	32		21	22	26	21	34	42			
CLE	30	30	21		23	27	23	35	42			
SER	28	29	21	21		26	23	31	38		2012	
SKI	41	41	28	26	25		26	47	52			
CRA	29	29	21	21	21	26		33	40			
PLA	46	45	33	31	30	43	30		55			
ELE	50	49	41	39	37	48	37	51				
TOP											46	56
MID					2004					42		52
BOT										53	47	

Fig. 25.4 Location quotient maps at neighbourhood level for Top and Bottom occupational groups

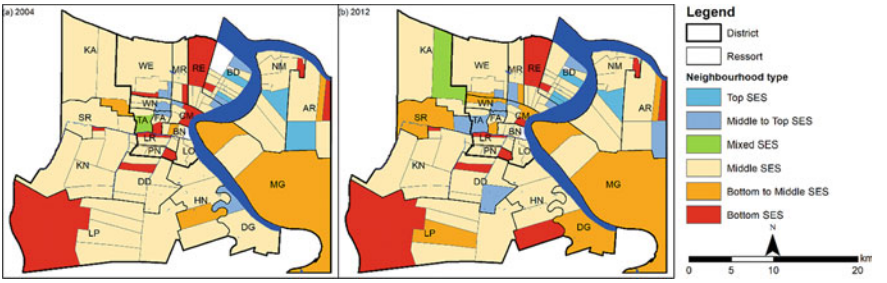


Fig. 25.5 Classification of neighbourhoods by socio-economic composition

in the introduction, where the rich, who formerly concentrated in the old city centre, moved towards the suburbs of north and west Paramaribo, leaving behind the working class in the city centre. A large elite neighbourhood emerged in Commewijne, namely Palm Village. This area did not follow the historic pattern of socio-economic segregation; it was a relatively new private real estate development, which turned a former plantation into a high-end gated community. Overall, there was a fairly stable pattern of socio-economic composition of the neighbourhoods in Paramaribo between 2004 and 2012. Of the 106 neighbourhoods, eight downgraded to a lower socio-economic status and 13 upgraded.

To assess in which neighbourhoods the Top socio-economic group was concentrated, quintiles were calculated. Figure 25.6 shows that the neighbourhoods with the highest 20% of Top (Q1) were mainly located within Paramaribo itself. Some were the established suburban neighbourhoods in the 1950s, while the rest were newly

Fig. 25.6 Location of the Top occupational group

established neighbourhoods, consisting mainly of gated communities targeted to the very rich. Neighbourhoods with the lowest 20% of Top (Q5) were located predominantly in district Wanica and in the centre of Paramaribo. Overall, Paramaribo had the largest proportion of Top SES neighbourhoods, a remnant of the colonial past.

25.3.2 Ethnic Segregation

To assess the level of ethnic segregation in Paramaribo, first the proportion of each ethnic group within a ressort was assessed for both census years. When comparing 2004 and 2012 (Fig. 25.3), one change which stands out, is the increase of the proportion of Maroons concentrating mainly in and around social housing projects in the ressorts Latour (LR) and Pontbuiten (PN) in Paramaribo. In 2012, the proportion of Maroons also increased in ressorts Saramaccapolder (SR) and De Nieuwe Grond (DD) in Wanica and Meerzorg (MG) in Commewijne 2012. This ethic group has experienced the largest increase in the GPR, growing by 43% between 2004 and 2012. As mentioned, the migration of Maroons to the urban area started largely after 1986 (later than the other groups) and as the results show, this is still continuing. Between 2004 and 2012, the Mixed group experienced the second largest growth, 18%. Interestingly, there is also a slight increase of the proportion of Chinese in districts Wanica and Commewijne. As population increased in these districts, so did the commercial activities, which are dominated by Chinese merchants. Nevertheless, Wanica and Commewijne were still dominated by Hindustani and Javanese, following the historical pattern.

The level of ethnic segregation was also assessed via the DI. It was calculated for each ethnic group per district and for the GPR as a whole. In addition, the overall multi-group DI was measured (Table 25.2). In 2004, the Maroons and the Javanese were the most segregated within the GPR. In Paramaribo, Maroons were mainly concentrated in ressorts LR and PN, while Javanese were concentrated in BD and RE (see Fig. 25.3). In Wanica, the Javanese were also the most segregated, concentrating in ressort LP and DG. In 2012, Maroons and Javanese were still the

Table 25.2 Dissimilarity indices (multiplied by 100) per ethnic group, per ressort and the GPR as a whole

	$D_{Amerindian}$		D_{Maroon}		D_{Creole}		$D_{Hindustani}$		$D_{Javanese}$		$D_{Chinese}$		$D_{Caucasian}$		D_{Mixed}		$D_{all\ ethnic\ groups}$	
Year	2004	2012	2004	2012	2004	2012	2004	2012	2004	2012	2004	2012	2004	2012	2004	2012	2004	2012
Paramaribo	13	16	48	52	25	26	26	25	41	48	31	45	22	44	14	19	28	32
Wanica	20	19	29	30	26	22	22	18	42	39	14	17	30	18	15	12	27	24
Commewijne	30	8	20	13	10	3	16	7	13	8	9	24	26	21	8	5	13	7
GPR	16	14	44	48	35	29	33	28	44	43	37	29	30	36	22	23	34	33
Paramaribo	3%		1%		1%		0%		2%		5%		12%		5%		2%	
Wanica	-1%		1%		-2%		-2%		-1%		3%		-5%		-2%		-1%	
Commewijne	-9%		-4%		-9%		-7%		-5%		20%		-2%		-4%		-6%	
GPR	-1%		1%		-2%		-2%		0%		-3%		2%		1%		-1%	

most segregated ethnicities within the GPR. In Paramaribo, next to higher levels of segregation for Maroons and Javanese, we also see an increasing segregation of Chinese and Caucasians. These two groups were mainly concentrated in the city centre and the northern ressorts of Paramaribo. For both years, Maroons were the most segregated ethnic group within the GPR.

Overall, all districts and the GPR as a whole have a low DI (<0.35), indicating a low level of segregation among the different ethnic groups. In other words, overall the GPR generally has a heterogeneous population with regards to ethnicity at district level.

25.3.3 Link Between Socio-economic and Ethnic Segregation

In order to quantify these visually perceived relationships between the different ethnicities and socio-economic groups, correlation coefficients were calculated based on the absolute number of population in the different groups (Fig. 25.7). Results show that indeed Maroons were primarily negatively correlated with the Top socio-economic group. Where in 2004, Amerindians were the most correlated with the Bottom group, in 2012 the Maroons became the most correlated with the Bottom occupational group. This indicates that as the proportion of Maroons grows, they are mostly accessing occupations associated with the Bottom socio-economic group. As they are the last ethnic group to arrive in the urban area, they have an educational and thus occupational disadvantage. In 2012, Javanese were moderately correlated with all socio-economic groups, while Hindustani were slightly more correlated with the Bottom group and Creoles were more correlated with the Middle and Top groups. The ethnicities most correlated with the Top socio-economic group were Mixed, Caucasian and Chinese. Caucasians and Chinese were historically concentrated in Paramaribo, allowing them better educational and occupational opportunities; thus, they are strongly correlated with the Top socio-economic group. The same can be said for the Mixed group; they were concentrated in Paramaribo, affording them better development opportunities.

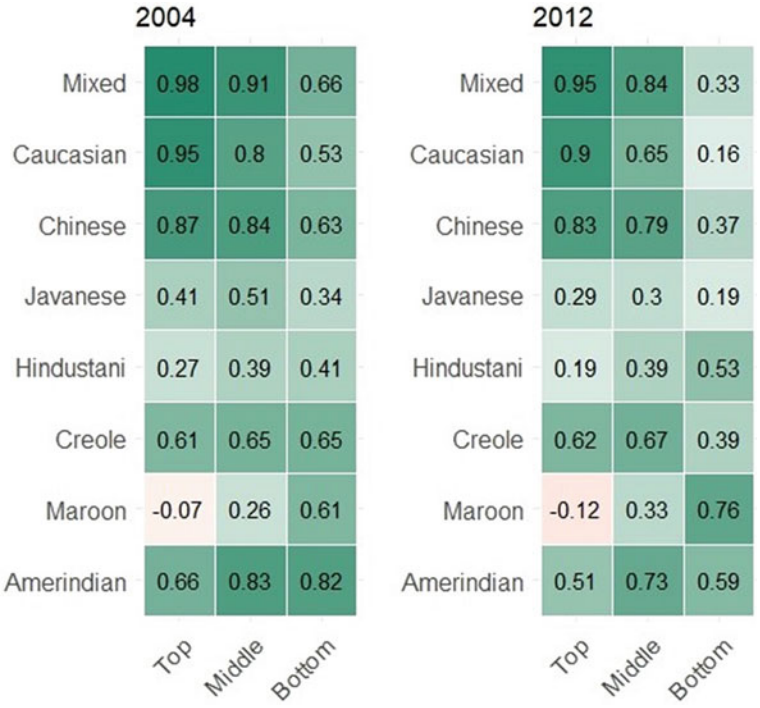


Fig. 25.7 Correlation between ethnicity and socio-economic group

25.4 Conclusions

In this study, socio-economic segregation in the Greater Paramaribo Region in Suriname was examined. ISCO categories were used as a proxy for socio-economic status. Results show that overall, there is a high level of socio-economic segregation in the GPR. The segregation has also increased between 2004 and 2012. The level of segregation is especially high between the Top and the Bottom groups ($DI_{2012} \approx 0.56$). European cities seem to be following this trend also (Musterd et al. 2016). The rich and poor segregate in separate areas within the GPR, with the poor (Bottom) being the most segregated socio-economic group. In addition, the overall multi-group DI calculated in this study ($DI_{2012} = 0.51$) was higher than those found by Fung-Loy et al. (2019) ($DI_{2015} \approx 0.3$, which was based on the distribution of house type). This indicates that there is some correspondence between socio-economic status and housing type in this region. However, there can be a mismatch between the residential characteristics and the socio-economic group, for example, in neighbourhoods in transition.

Furthermore, ethnic segregation in the GPR was also assessed. Overall, the DI for ethnic segregation is relatively low in the GPR ($DI_{2012} = 0.33$). However, there are some ressorts where certain ethic groups concentrate, such as ressorts LR and

PN where Maroons concentrate; they experience segregation in district Paramaribo according to a DI > 0.40. When comparing the multi-group DI for socio-economic segregation ($DI_{2012} = 0.51$) with the multi-group DI for ethnic segregation ($DI_{2012} = 0.33$), we see that the GPR is less segregated by ethnicity, but more segregated by socio-economic status. This was also found in other studies for Suriname and other Latin American and Caribbean countries such as Brazil and Trinidad and Tobago (Brathwaite 1980; Lichter et al. 2012; Verrest 2010). For the United States, it was found that while ethnic segregation is still larger than socio-economic segregation, ethnic segregation has decreased, while socio-economic segregation has increased (Brady et al. 2017).

Assessing the link between ethnic and socio-economic segregation, we see that for certain ethnicities there exists a high correlation with a specific socio-economic statuses. Maroons are increasingly correlated with the Bottom, while Mixed and Caucasians are highly correlated with the Top socio-economic group. This reflects the history of Suriname; Caucasians were traditionally the rich colonists and, similar to the Mixed, were concentrated in the urban centre while the Maroons fled into the interior to escape slavery. Only after the mid-twentieth century Maroons migrated to the city, experiencing a significant lag in education and consequently occupational opportunities. As such, Maroons are far behind Mixed and Caucasians on the socio-economic ladder.

In this research, the socio-economic and ethnic segregation, and the link between the two was analysed. As certain ethnic groups are more strongly correlated with certain socio-economic statuses, increasing socio-economic segregation can limit the upward socio-economic mobility opportunities for specific marginalised ethnic groups. As income inequality continues to increase, it is likely that socio-economic segregation will increase as well.

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Chapter 26
Measuring Changes in Residential Segregation in São Paulo in the 2000s

Flávia Feitosa, Joana Barros, Eduardo Marques, and Mariana Giannotti

Abstract Residential segregation is known as one of the most prevalent problems of Latin American and Brazilian cities. This chapter looks into the changes in segregation levels in the Metropolitan Region of São Paulo between 2000 and 2010. This period was marked by economic growth and decreasing social inequalities in Brazil with consequent improvement to the quality of life of lower income classes. Despite those improvements, general patterns of urban segregation in Brazilian cities showed remarkable stability, albeit with important changes in the details of segregation patterns. This chapter explores the spatial relationship between socio-occupational groups using global and local segregation indices. The analysis confirmed a highly segregated distribution of social groups in the Metropolitan Region and revealed increased levels of segregation, with global indices figures for 2010 higher than for 2000. Analysis demonstrated that peripheral areas of the Metropolitan Region became more fragmented and heterogeneous in that period, and revealed that their increased heterogeneity is mainly composed of classes with close social proximity, rather than polarised ones. Results showed that while middle classes became more integrated amongst themselves and with lower classes, the separation between lower and upper classes was not only maintained but also increased during the period. All these findings suggest a reconfiguration of the concentric pattern of segregation that

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M. van Ham et al. (eds.), *Urban Socio-Economic Segregation and Income Inequality*,
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maintained a spatial structure of strong social isolation during the period, although with greater complexity.

Keywords Residential segregation patterns · Metropolitan region of São Paulo · Global and local indices of segregation · Dissimilarity index · Isolation and exposure indices

26.1 Introduction

Residential segregation is known as one of the most prevalent problems of Latin American and Brazilian cities, together with poverty and precarious housing conditions. It is also known that residential segregation is an urban feature that reduces opportunities for the poor and contributes substantially to poverty reproduction (Wilson 1987; Massey and Denton 1993; Briggs 2005).

Although the spatial pattern of Latin American cities often has roots in their colonial formation, the case of São Paulo is peculiar since the city had no demographic nor economic importance by the mid-nineteenth century. It was after the boom of coffee plantations at the end of that century and the industrialisation of the first decades of the twentieth century that São Paulo gradually became the most important city in the country. São Paulo is rivalled with Rio de Janeiro, which was, for centuries, the colonial and later imperial capital of Brazil. The largest proportion of the territories of metropolitan São Paulo were formed during the decades of intense migration and fast urbanisation from the 1950s to the 1980s (Caldeira 2016). At that time, the city became the primary metropolis of a highly urbanised Brazil, even though it has never been the capital city. Since the 1930s, housing policies were mostly focused on the construction of new units, although slum upgrading programmes were started as well in the last 20 years. However, this double emphasis on property and on unit construction left most of the population with no housing solutions except squatting or buying an irregular plot, since buying or renting from the private sector was beyond the reach of most urban dwellers. This historical process produced metropolitan structures with clear core-periphery segregation patterns, with high-income groups located in central and well-serviced areas and lower income groups in more distant and less serviced areas intensely populated by precarious self-constructed houses in favelas (squatted areas) and irregular settlements. Such patterns have been resilient to long periods of fast urban growth and societal changes (Kowarick 1979; Bonduki and Rolnik 1982).

Although most cities in Latin America have a similar concentric spatial pattern of segregation, recent studies of Brazilian cities have highlighted changes to this macro-segregation structure. While the overall spatial structure remains radial and concentric, the spatial structure of segregation now also presents a number of sub-centralities and peripheral areas that are increasingly more heterogeneous (Marques 2016; Preteceille and Cardoso 2008), echoing classical statements of territorial heterogeneity in

Brazilian cities (Valladares and Preteceille 2000). Such fragmentation in the core-periphery spatial pattern is understood to be a consequence of the combination of changes in residential preferences of higher income groups for gated communities (Caldeira 2000) and transformations in lower income residential regions caused by the political and economic dynamics in the country since the return to democracy in the 1980s (Arretche 2019).

In general terms, the recent democratic period that started in 1980s brought social improvements as a product of a cycle of increasing political activism and electoral accountability (since the 1980s), economic stability (since the 1990s) and better and broader social policies (also in the 1990s but especially in the 2000s), integrated in national federalist systems (Arretche 2019; Marques et al. 2012). In cities, this involved a slow but continuous expansion of public policies and services in traditionally under-serviced areas. Even areas of precarious housing conditions such as favelas and irregular settlements have experienced substantial and systematic improvements in recent decades with slum upgrading and infrastructure policies, although maintaining levels of inequalities (Marques and Saraiva 2017). The presence of precarious housing decreased relatively in the Metropolitan Region of São Paulo from 15% in 2000 to 14.5% in 2010, reaching around 800,000 precarious households in favelas and irregular settlements amongst a total of 6 million households in the region (CEM 2014). It is important to add that from 2009 to 2015, a federal housing programme has built approximately 100,000 housing units in the Metropolitan Region of São Paulo, possibly reducing the stock of precarious housing, but there are no recent statistics yet that can measure this effect (Marques 2016).

In economic terms, the average income rose from R$630 to R$1283 between 1991 and 2014 (Jannuzzi 2016), although it has decreased more recently due to a continuous economic and political crisis since 2016. Income inequality, as measured by Gini Index, also declined from 0.606 in 1992 to 0.517 in 2014, while poverty rates reduced from 31.1% in 1991 to 7% in 2014 due to the combination of economic growth, strong social policies and the continuous increase of the minimum salary during the 2000s (Jannuzzi 2016). Since 2014, however, Brazil has suffered from increasing economic and political instability, which has strongly affected the social conditions of the country. The Gini Index increased from 0.517 in 2014 to 0.533 in 2017, while poverty rates increased from 7% in 2014 to 10% in 2017 (IBGE 2019) and unemployment jumped from 5.5 in 2014 to 13% in 2017 (Góes and Karpowicz 2017). Although the impacts of the country's deteriorating social situation are visible in our cities, they have not yet been systematically analysed.

Despite these improvements, general patterns of urban segregation in Brazilian cities showed remarkable stability, as will be demonstrated throughout this chapter, albeit with important changes in the details of segregation patterns. Compared with other socio-economic changes, however, urban inequalities associated with spatial segregation have changed little, highlighting the need for better financed and bolder urban policies, especially concerning urban planning and land-use control.

The subject of this chapter—São Paulo—is the most important Metropolitan Region of South America, with around 20 million inhabitants in an area of 7,946km^2. It encompasses 39 municipalities across a continuous urban area, approximately

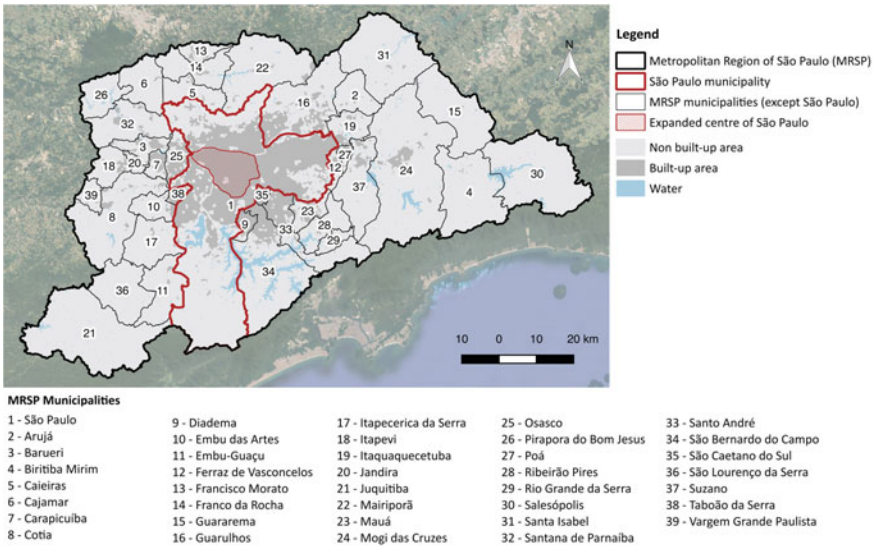

Fig. 26.1 Map of the metropolitan region of São Paulo

2,200 km^2, as shown in the map in Fig. 26.1. São Paulo Municipality, with about 12 million inhabitants, is the most populous Brazilian city and covers most of the occupied area of the Metropolitan Region of São Paulo (MRSP). Its central area concentrates most of the jobs and amenities in the region. The municipality of Guarulhos, located northeast of São Paulo (number 16 in Fig. 26.1), is the second most populous city in the MRSP, with about 1.3 million inhabitants. It is notable because this is where the busiest airport in Brazil can be found. Santo André, São Bernardo do Campo and São Caetano do Sul (numbers 33 to 35 in Fig. 26.1) are the most developed municipalities of a region known as the 'ABC'[1], which is traditionally known for its industrial economic base and represents an important sub-centre of the region.

While São Paulo concentrates a significant portion of the wealth of the country, with 17.7% of the Brazilian GDP in 2013, it also has a large working-class population and high levels of poverty, precarious housing conditions and inequality. The low-income population, mostly residents on the fringes of the metropolitan area, tend to suffer from low-quality services, long-journeys to work, and low accessibility to amenities and opportunities, all exacerbated by segregation.

Due to its importance in the country, there is a long tradition of segregation studies on São Paulo (Kowarick 1979; Bonduki and Rolnik 1982; Caldeira 2000; Marques 2016). The present chapter builds on a series of studies developed by Marques and colleagues which measured segregation using socio-occupational groups in the

[1]ABC stands for the initials of the three main municipalities of the region: Santo **A**ndré, São **B**ernardo do Campo and São **C**aetano do Sul. The region is composed by 7 municipalities: in addition to the above-mentioned three, it includes Diadema (number 9 on the map in Fig. 26.1), Maua (number 23), Ribeirão Pires (number 28) and Rio Grande da Serra (number 29).

Metropolitan Region of São Paulo (MRSP) for the period of 1991–2000 (Marques et al. 2012) and 2000–2010, each regarding class (Marques 2016) and race (França 2016). Their findings confirm that the greater the social distance between classes, the greater the segregation. They also highlight that São Paulo is extremely hierarchical in its socio-spatial structure. The results of previous studies make clear that the top occupational groups are the most segregated, but also indicate changes in the structure of the middle and lower classes which have become more integrated between 2000 and 2010.

This chapter revisits the results from previous studies and expands on their analysis by further exploring the spatial relationships between socio-occupational groups during the period between 2000 and 2010. In addition to analysing group relationships using the evenness/clustering dimension of segregation (Dissimilarity Index), this chapter explores the exposure/isolation spatial dimension complementing previous analyses. Using global exposure and isolation indices, changes in relationships between socio-occupational groups during this period are revealed, contributing to an in-depth understanding of the known changes in segregation patterns in the MRSP. The spatial patterns of such changes are presented by maps of local exposure and isolation indices, which allow for a detailed understanding of the effect of changes in those relationships in the spatial dynamics of the metropolis.

The next section discusses the MRSP's socio-occupational composition in 2000 and 2010 and introduces the occupational classification used in the following analysis. It also discusses the residential distribution of socio-occupational groups with maps describing neighbourhood types by socio-occupation composition and the location quotient of top and bottom socio-occupational groups. The following section discusses the methodology employed and introduces the isolation and exposure indices used to complement the analysis using the Dissimilarity Index. Results are then presented and discussed, followed by the overall discussion and conclusions.

26.2 Socio-occupational Classes in the Metropolitan Region of São Paulo

In the present study, occupational groups are used as a proxy to socio-economic groups. This allows for consistency in the approach of analysis across different census periods which would not be possible using income groups. As data for occupational groups is not available in the Brazilian Census, the classification adopted here was produced by the Centre for Metropolitan Studies (CEM) and was used in previous studies (Marques 2016; França 2016). The classification is based on a social stratification methodology called EGP classification, following the initials of its proponents (Erikson et al. 1979), and adapted to the Brazilian social structure by researchers since the 1980s (Silva 1999). This classification differentiates employment types as rural or urban; manual or non-manual; and routine or non-routine—where the second term in

Table 26.1 EGP classes, abbreviations and social groups

EGP classes	Abbreviation	Social group
Owners and employers	OE	Top
High-level professionals	HLP	
Low-level professionals	LLP	Middle
High-level routine non-manual	HL-RNM	
Technicians and supervisors	TS	
Low-level routine non-manual	LL-RNM	
Skilled manual workers	SMW	Bottom
Unskilled manual workers	UMW	

each pair represents a higher socio-economic and occupational status. The classification also includes information on occupational position and hierarchy, distinguishing between employed workers, supervisors, the self-employed and employers. For the present analysis, rural classes (employers, subsistence farmers and farmworkers) will not be included due to their low representation within the MRSP. Table 26.1 lists 8 EGP classes used in this study, their abbreviations and the categorisation into the top, middle and bottom.

The dataset provided by the Centre for Metropolitan Studies was built using data from the sample questionnaire of the Brazilian National Census, distributed by 'weighting areas' (*áreas de ponderação* in Portuguese). Although there have been changes in the boundaries of the MRSP's weighting areas between 2000 and 2010, the dataset used here is a consolidated dataset comprising 633 spatial units. Weighting areas in the MRSP have an average population of 32,000 inhabitants, although there is significant variation between them.

Figure 26.2 shows the distribution of EGP classes in the MRSP in 2000 and 2010, respectively. It can be said that changes in the composition of EGP groups

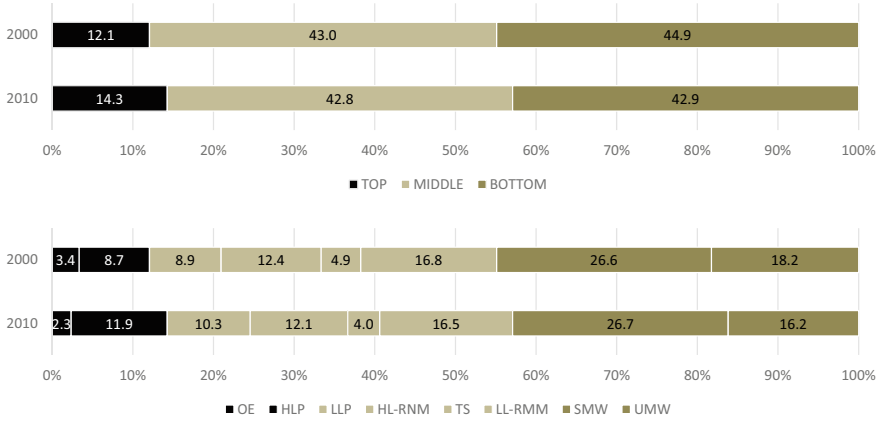

Fig. 26.2 Distribution of occupational (EGP) classes and change over time

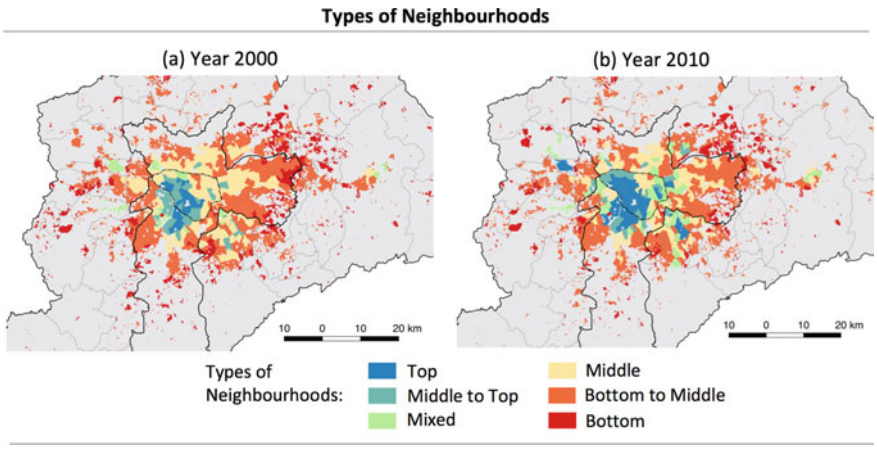

Fig. 26.3 Neighbourhood types distribution in the MRSP (years 2000 and 2010) according to socio-occupational composition

are consistent with the social, political and economic changes in Brazil over this period. The graph clearly shows that manual workers (skilled and unskilled) are the largest EGP class, followed by low and high-level routine non-manual workers. The third-largest class is the high- and low-level professionals. In terms of change over the period, the graph shows that the proportion of professionals increased while the proportion of unskilled manual workers decreased. Owners and employers seem to have declined, but this might be due to sample variation since this is a small class. It is interesting to note that while there has been an increase in the proportion of the top group (12–14%) and a decrease in the bottom group (45–43%), the middle group has remained stable during the period.

The maps in Fig. 26.3 show the distribution of neighbourhood types for both 2000 and 2010, using the following classes of neighbourhoods: *top* (proportion of top group—*ptop* > 0.4), *middle* (proportion of middle group—*pmiddle* > 0.5), *bottom* (proportion of bottom group—*pbottom* > 0.5), *middle to top* (0.2 < *ptop* < 0.4 and 0.2 < *pmiddle* < 0.5 and *pbottom* < 0.2), *mixed* (0.2 < *ptop* < 0.4 and 0.2 < *pmiddle* < 0.5 and 0.2 < *pbottom* < 0.5) and *bottom to middle* (*ptop* < 0.2 and 0.3 < *pmiddle* < 0.5 and 0.3 < *pbottom* < 0.5). Maps from both 2000 and 2010 clearly show the concentric pattern of segregation, which is typical of Brazilian cities, with high-status neighbourhoods in the centre surrounded by rings of middle-status/mixed areas, and the lowest status neighbourhoods in the peripheral ring. Confirming the known changes during this period, the map for 2010 shows a more fragmented and heterogeneous spatial pattern in the peripheral areas, but a clearer predominance of top groups at the centre. Despite the small increase in the overall proportion of the top occupational groups in the MRSP, a significant expansion of high-status neighbourhoods can be seen in the central area of the MRSP—known as the expanded centre of São Paulo. Figure 26.3 also illustrates the emergence of top neighbourhood types in more peripheral areas, which can be attributed to the gated communities

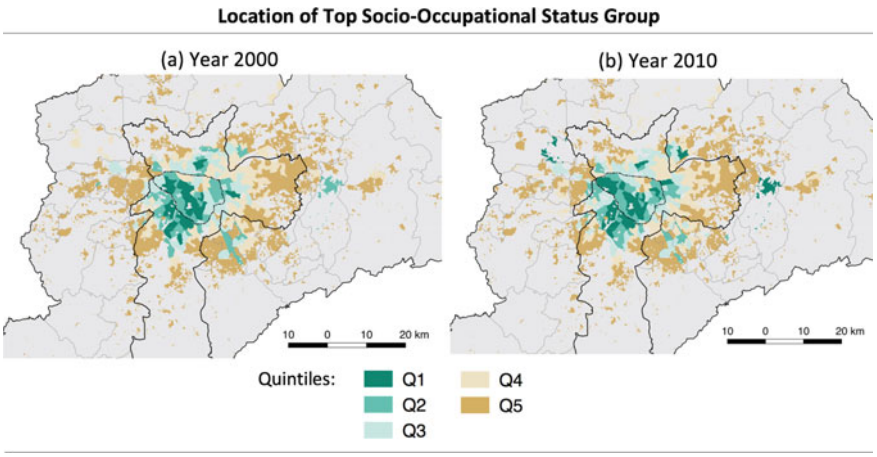

Fig. 26.4 Location of top socio-occupational status group in the MRSP (years 2000 and 2010)

in those areas. In addition, the maps show a reduction of bottom neighbourhoods, which are replaced by bottom to middle in 2010, and an apparent reduction of middle neighbourhoods in 2010, mainly replaced by mixed or higher status neighbourhoods.

Figure 26.4 shows the location of the top socio-economic status groups, which remained stable between 2000 and 2010. In 2000, 27 areal units (or 4%) housed 20% of the top group (Q1), while in 2010 there was only a small increase in this number (29 areal units). Amongst the new areas classified as Q1, there are a few located outside the central region, corroborating the pattern of neighbourhood types distribution in Fig. 26.3.

Figure 26.5 presents location quotient (LQ) maps for top and bottom occupational groups, which also shows relatively stable patterns during the period 2000–2010. Yet, the LQ of top group shows interesting aspects, such as the fact that the share of top groups in the dark green areas is more than four times higher than in the rest of the MRSP. Figure 26.5b also shows an increase in the dark green areas (highest LQ-top) outside of the expanded centre of São Paulo. Figure 26.5c, d show an increase in the dark brown areas (lowest LQ-bottom) in the centre, which indicates that the concentration of the low-status population has decreased in the central areas from 2000 to 2010.

26.3 Measuring Spatial Segregation in the Metropolitan Region of São Paulo

The analysis presented here builds on previous studies measuring segregation in the MRSP (Marques et al. 2012; Marques 2016; França 2016), which used Moran I and the Dissimilarity Index (D). It partially replicates Marques and França's analyses of

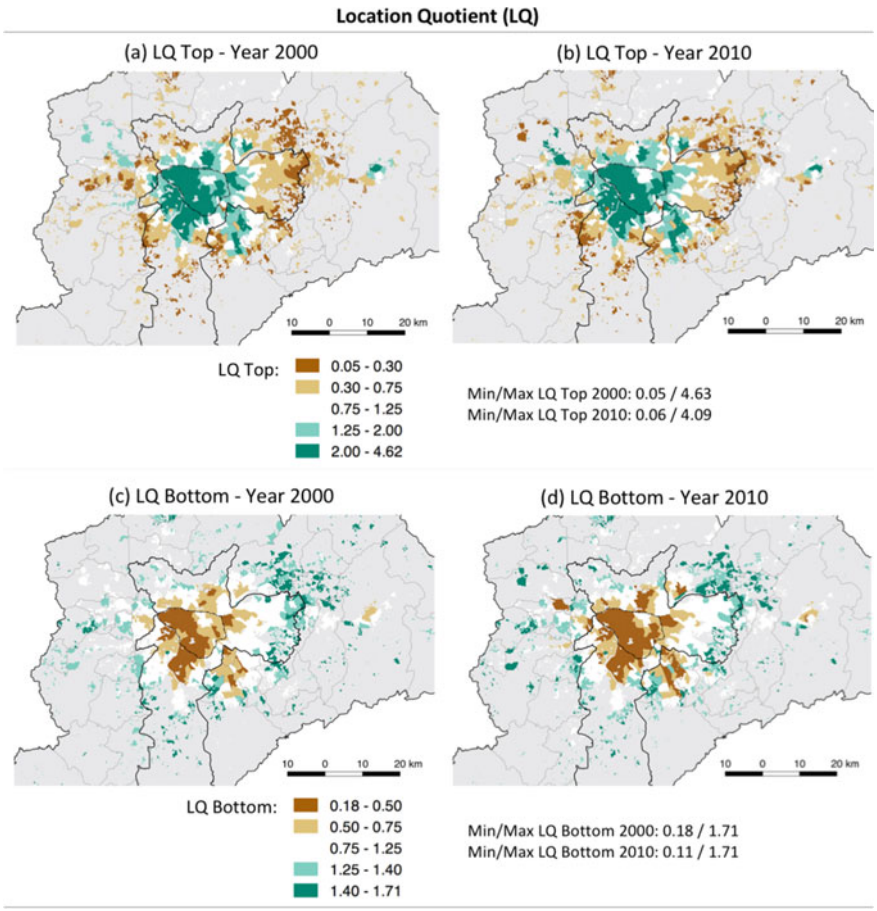

Fig. 26.5 Location quotient maps for the years 2000 and 2010: top groups (**a**, **b**) and bottom (**c**, **d**)

occupational groups using D and complements it by exploring another spatial dimension of segregation using global and local Exposure and Isolation Indices (Feitosa et al. 2007; Lieberson 1980). The use of complementary segregation indices depicting different spatial dimensions of segregation is based on the understanding that distinct segregation indices portray different aspects of segregation. Those dimensions are directly linked with the conceptual definition of spatial segregation and the appropriateness of each concept for the case study in hand. The Dissimilarity Index (D), which is the most popular segregation index, and its generalised (multi-group) version captures the degree that social groups are evenly distributed within a region (Duncan and Duncan 1955; Sakoda 1981). It assumes that a region is not segregated when all socio-economic groups are evenly distributed across space. The index measures the extent to which the distribution of social groups in the different spatial units of the region replicates the overall population composition of the region, which can

range from 1 (complete segregation) to 0 (complete integration). The index can be computed for each pair of groups (D Index proposed by Duncan and Duncan in 1951), which can include the evenness of each group in relation to all other groups, or for all groups taken together (Generalised D Index proposed by Sakoda in 1981). The global dissimilarity figure indicates the proportion of the population (of the relevant group) that would have to relocate to a different neighbourhood in order to match the distribution of reference groups (all others or paired group).

Following Reardon and O'Sullivan's (2004) proposal for the two axes of spatial segregation (the first axis measuring evenness to clustering dimension and the second exposure to isolation dimension), this chapter employs Exposure and Isolation indices (Lieberson 1980) to complement the analysis using D. Unlike D, which focus on the distribution of different groups across space, the Exposure Index measures the potential interaction between groups or, in other words, the extent of which one group is exposed to another based on spatial proximity. The Isolation Index is a special case of the Exposure Index, which measures the exposure of a social group to itself. Those indices range from 0 to 1 and are highly dependent on the city-wide proportion of groups: the more people of class *m*, the more likely the exposure/isolation. This dependency causes problems for comparative studies both across different geographical areas and same areas across different time periods. Thus, to aid interpretation of the results across different time periods, this study uses *normalised* isolation and exposure indices, where the original figures were divided by the city-wide percentage of class *m* in MRSP. In this case, values closer to 1 indicate less segregation and values higher and lower than 1 indicate an exposure superior and inferior, respectively, than the one expected in an integrated region. The latter is understood as a region where all exposure/isolation indices regarding one class are equal to its proportion in the whole region. It should also be noted that while the traditional Exposure Index of group *m* to *n* differs from the exposure of *n* to *m*, their normalised versions do not.

The spatial pattern of the exposure/isolation dimension is explored in this chapter by maps of the local version of Exposure and Isolation indices, which indicate the contribution of each area to the composition of the global index (Feitosa et al. 2007). These local indices indicate the areas where exposure between groups (or from a group to itself) is higher, allowing for areas of high and low segregation between specific groups to be spatially identified. The advantage of the Exposure Index over the Dissimilarity Index is that it directly measures the spatial relationship between groups. While D compares levels of spatial distribution between two groups, the Exposure Index allows for a detailed account of how those two groups potentially interact based on their spatial locations. In the case of the MRSP, where residential segregation has been extensively studied and measured over the years and its overall pattern is well-known, the Exposure Index provides the opportunity to unfold the spatial relationships between groups and investigate the increasing heterogeneity in peripheral areas highlighted by previous studies.

26.4 Dissimilarity and Exposure/Isolation Results in the Metropolitan Region of São Paulo

Table 26.2 presents the results for Dissimilarity (D) for MRSP in 2000 and 2010. Results show an increase in segregation over the period, indicating that the distribution of EGP classes became less even in the region, with an increase of Generalised D from 0.19 to 0.21. By calculating D not only in its generalised form (considering all groups together) but also for each class (in relation to each other and to all other EGP classes together), the analysis reveals the changes in segregation levels per class. Results confirm findings of previous studies (Marques 2016; França 2016) that segregation between EGP classes increases along with the social status distance between groups—a trend that is more accentuated in 2010 than in 2000. Also consistent with other studies that demonstrate that elites tend to be the most segregated (Maloutas and Fujita 2012), the classes with highest segregation (and highest increase in D levels from 2000 to 2010) belong to the top social group—owners and employers (OE) and high-level professionals (HLP). D levels between top and bottom groups increased from 0.48 in 2000 to 0.50 in 2010, mainly due to the increasing segregation of OE. The classes with lowest segregation levels are those belonging to the middle group—routine non-manual (RNM) and technicians and supervisors (TS). These classes presented relative stability in the period 2000–2010, with the exception of the low-level routine non-manual (LL-RNM) class which presented increasing levels of dissimilarity towards OE and professionals (HLP and LLP).

While the OE and LL-RNM classes have shown the highest increase in D levels in relation to all other classes (differences of 0.06 and 0.04, respectively, from 2000 to 2010), all other classes have presented stability or a slight increase in the index. Such figures tend to change, however, when indices are computed for each pair of classes. To further explore such changes, the spatial relationship between groups is analysed using exposure and isolation indices.

Table 26.2 Dissimilarity indices (multiplied by 100), MRSP. Years 2000 (bottom-left) and 2010 (top-right)

	OE	HLP	LLP	HL-RNM	TS	LL-RNM	SMW	UMW	ALL	TOP	MID	BOT
OE		18	27	41	48	51	56	57	44			
HLP	13		16	32	39	43	49	50	39			
LLP	21	17		19	28	30	38	39	25			
HL-RNM	33	31	16		15	16	22	25	12			
TS	40	38	23	12		16	17	21	14			
LL-RNM	41	39	24	12	13		13	15	13			
SMW	50	50	36	24	17	15		10	20			
UMW	48	46	34	23	19	14	9		21			
ALL	38	38	23	12	13	9	21	19				
TOP											32	50
MID										32		21
BOT										48	20	
Generalized D (multi-group) 2010: 21												
Generalized D (multi-group) 2000: 19												

Table 26.3 Normalised exposure/isolation indices, MRSP. Years 2000 (bottom-left) and 2010 (top-right)

	OE	HLP	LLP	HL-RNM	TS	LL-RNM	SMW	UMW	TOP	MID	BOT
OE	2.39 1.93	1.91	1.47	1.01	0.87	0.79	0.63	0.67			
HLP	1.81	1.79 1.85	1.43	1.04	0.9	0.84	0.69	0.7			
LLP	1.41	1.43	1.29 1.26	1.06	0.96	0.92	0.81	0.8			
HL-RNM	1.06	1.07	1.07	1.06 1.07	1.01	1	0.97	0.94			
TS	0.93	0.93	0.98	1.03	1.12 1.08	1.01	1.03	1.01			
LL-RNM	0.88	0.92	0.9	1.01	1	1.07 1.04	1.05	1.04			
SMW	0.69	0.68	0.82	0.95	1.02	1.03	1.14 1.14	1.13			
UMW	0.78	0.78	0.86	0.94	0.98	1.02	1.1	1.18 1.11			
TOP									1.84 1.84	1.04	0.68
MID									1.05	1.03 1.03	0.96
BOT									0.72	0.96	1.14 1.11

Table 26.3 shows the results for the normalised Exposure and Isolation indices. Exposure was calculated for each pair of classes, with exposure of one class to itself presented as the Isolation Index. As previously mentioned, in the case of *normalised* Isolation and Exposure, values closer to 1 indicate less segregation and values higher and lower than 1 indicate an exposure superior and inferior, respectively, than the one expected in an integrated region. As expected, the normalised Exposure Index values are lower than 1 for groups with greater social distance, and higher than 1 for those with lower social distance. For instance, the normalised Exposure of HLP to OE in 2010 is 1.91, which means that it is almost 2 times higher than the expected in an integrated arrangement. Also, the highest normalised Isolation Index values (exposure of a group to itself) were observed for top classes (OE and HLP, with values from 1.79 to 2.39), while the lowest were observed for middle classes (RNM, with values that are closer to 1, from 1.04 to 1.07), confirming that if the city is highly segregated, it is the elite social groups who are really isolated. Furthermore, we must add that previous studies such as the one by França (2016) showed that data of self-classified skin colour (the Brazilian census category for race) demonstrates that it is the white elite who are the most segregated.

By looking into how normalised Exposure and Isolation indices changed from 2000 and 2010, it is possible to establish how the spatial relationship between classes has changed. Regarding broader groups—top, middle and bottom, results show stability in most global indices. Nevertheless, a detailed analysis of the exposure between EGP classes confirms that the avoidance between classes with greater

social distance, which was already high, increased during the analysed period. The analysis also shows a tendency of increase in integration between classes with lower social distance. Such results lead to the conclusion that, although it is possible to observe an increase in heterogeneity in certain areas of the MRSP, this is mainly promoted by a higher exposure of classes with similar levels of status. To illustrate such trends, some classes deserve special attention. The first is the OE, confirming results from previous studies as well as analysis with D. The second is the lowest status class (unskilled manual workers—UMW), which has also shown interesting changes in this period.

OE have confirmed their position as the most segregated EGP class. It is also the one with the highest increase in segregation levels from 2000 to 2010 (in both Dissimilarity and Exposure/Isolation Indices), showing an increase in normalised isolation from 1.93 to 2.39. OE's levels of isolation are followed closely by HLP. Results for 2000 and 2010 show an increase in exposure between occupational classes with higher status (OE, HLP and LLP) and a decrease in their exposure to middle and bottom groups, in particular to UMW. UMW presented a slight increase in isolation levels from 2000 to 2010. Meanwhile, results show a decrease in its exposure levels to the three highest status occupational classes (OE, HLP and LLP), denoting an increase in segregation between UMW and those classes. Nevertheless, UMW's exposure to bottom- and middle-status classes (except LLP) showed an increase, indicating further integration between groups with lower social distance and, therefore, a higher heterogeneity of peripheral areas.

The least segregated classes, with normalised isolation and exposure figures closer to 1, are the middle ones, with the exception of low-level professionals (LLP), which presented high levels of isolation. The LLP also became more exposed to OE and less exposed to bottom classes (especially UMW).

Despite the relative stability of global indices computed for the broader groups (top, middle and bottom), maps of the local exposure of the bottom group to others (top, middle and bottom—the latter is an isolation map) for 2000 and 2010 (Fig. 26.6) indicates some changes in residential patterns. The maps show evidence of a decrease in exposure of top and middle groups to the bottom group in the central areas of the MRSP, reinforcing the conclusion that bottom classes have decreased their presence in central areas. Figure 26.6a, b show the local exposure of bottom to top group. While the overall spatial pattern remains essentially the same, these maps show an increase in exposure of bottom to top group in some peripheral areas of the map (circled). In addition, the normalised global exposure value has decreased by 0.04 (Exposure 2000 = 0.72/2010 = 0.68) and the maps show a decrease in exposure in the expanded centre of São Paulo. This suggests that although the top group has clearly expanded residentially, this process did not promote further exposure with the bottom group. This is mainly because the top group's areas of expansion are not characterised by the presence of the bottom group.

Figure 26.6c, d show the local exposure of bottom to middle group. Similarly to Fig. 26.6a, b, the overall structure remains the same but it is possible to observe a decrease in exposure in the central area (expanded centre) and new peripheral areas of high exposure in the outskirts. It is important to note that the normalised

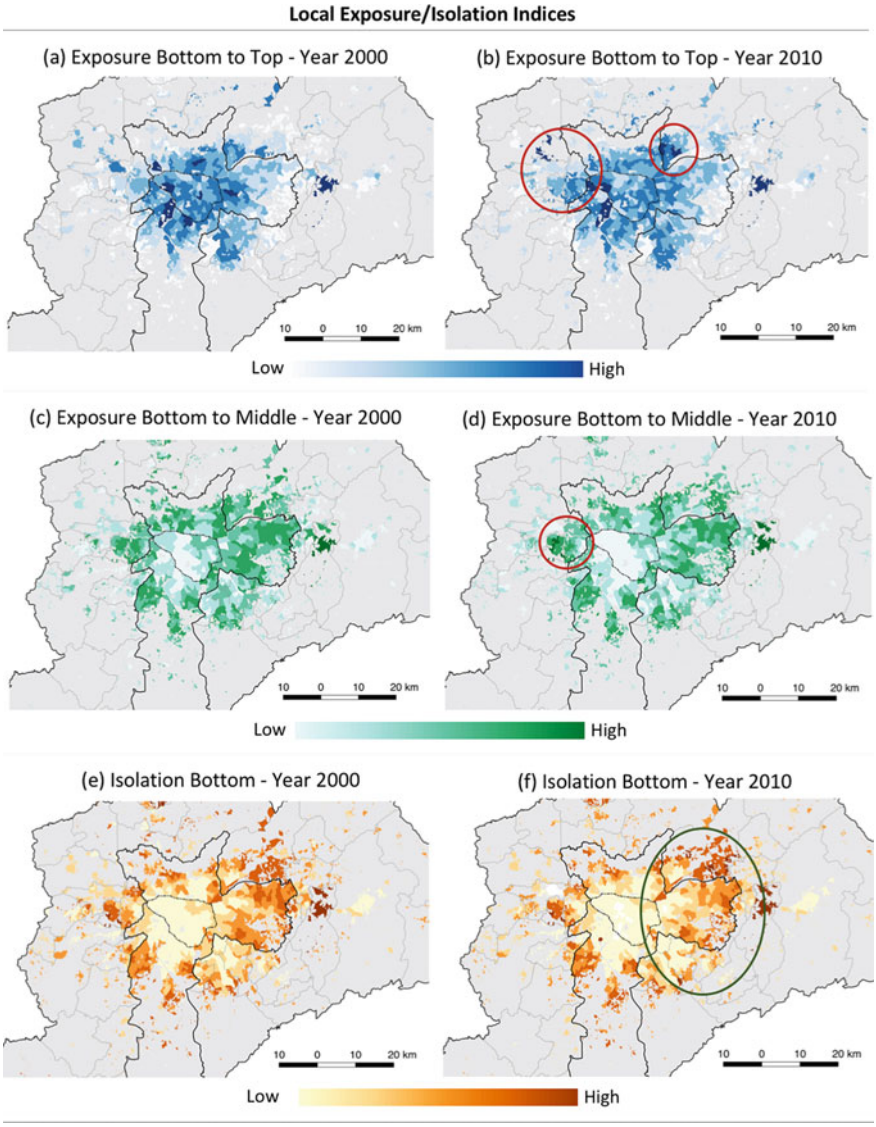

Fig. 26.6 Local exposure maps of bottom to top (**a**, **b**), bottom to middle (**c**, **d**), and bottom to bottom (Isolation—**e**, **f**)

exposure levels of bottom to middle group have remained stable (at 0.96) in the period. Figure 26.6e, f show the isolation of bottom group (exposure to itself). While global values increased by 0.03 in the period (from 1.11 to 1.14), changes in the residential pattern can be observed in the eastern and south-eastern regions (circled),

where the most peripheral areas presented an increase in the levels of isolation, while the opposite was observed in the areas located closer to the centre.

26.5 Discussion and Conclusions

This chapter is built on findings from previous studies regarding segregation in the Metropolitan Region of São Paulo. It explores the spatial relationship between socio-occupational groups using isolation and exposure indices. The analysis confirmed a highly segregated distribution of social groups in the Metropolitan Region and revealed increased levels of segregation, with global indices figures for 2010 higher than for 2000. Following previous studies, higher status classes presented the highest levels of segregation amongst all EGP classes. Spatially, there is evidence that the expanded centre of São Paulo has become further appropriated by the elite, with a reduced presence of bottom classes. The study also demonstrated that the highest status classes are the most segregated in both 2000 and 2010 (OE, HLP and LLP, with OE in the leading position) and revealed the following most segregated group is the lowest status class (UMW).

It is clear from the results that the MRSP peripheral areas have become more fragmented and heterogeneous in this period, confirming findings of previous studies. The analysis revealed that the increased heterogeneity of MRSP's peripheral areas is mainly composed by classes with close social proximity, rather than polarised ones. While there is evidence of an increase in exposure areas of bottom to top classes in specific locations, those are not significant. This points to another important finding that high-income gated communities located side by side of low-income informal settlements are the exception, rather than the rule, in the peripheral areas of the MRSP. In fact, results showed that while middle classes got more integrated amongst themselves and with bottom classes, the separation between bottom and top classes was not only maintained but also increased during the period. All these findings suggest a reconfiguration of the concentric pattern of segregation that maintained a spatial structure of strong social isolation during the period, although with greater complexity.

It is important to reflect on the meaning of those findings and the fact that top classes are more segregated than bottom classes, which is coincident with findings in other cities. Results showed that the top groups have, indeed, a clear dynamic of avoidance to the bottom group, although they are more segregated from other social groups, but not from amenities and opportunities (an aspect not addressed by the analysis). The bottom groups, in addition to being significantly segregated to other groups, are also located in areas with poor services and at great distances of amenities, services and opportunities. This fact is at the heart of the segregation problem in the MRSP, as well as Brazil and Latin America. While the lack of integration between social groups is concerning, in more pragmatic terms the issue is how residential segregation matches the spatial pattern of urban opportunities; the locking-in processes of the bottom groups into certain areas and their poor access to services

reproduce urban inequality. As such, for the increasingly segregated elite, segregation means monopolizing opportunities, with important consequences to inequality reproduction.

It is important to highlight that the period studied coincided with a phase of economic growth and decreasing inequalities in Brazil, which since 2014 has been substantially reverted. The heterogeneity of the peripheral areas is likely a product of such economic growth with possible links to social mobility, but the structure of segregation tends to remain the same. There have been no studies on segregation measurements looking beyond 2010, mainly due to lack of data availability. Nevertheless, considering that residential location choices are deeply influenced by economic power, it is expected that segregation will increase in the future.

This chapter has demonstrated that economic growth and decreasing inequalities did not translate into the alleviation of segregation problems in the MRSP. As such, further action is required to tackle residential segregation in Brazil. Segregation is often understood as a mere spatial expression of social inequalities, but it is actually produced by several processes related to space production, in which public policies play an important role. There is a strong need for better financed and bolder urban policies, particularly concerning housing policies and land-use regulation. As demonstrated by this study, those are also required in periods of growth and increasing equality. The effects of the current and future instability of the country on segregation remain to be measured. It is clear that without active and continuous policies, segregation will not only remain as one of the larger trends in Brazilian cities, but might be further aggravated.

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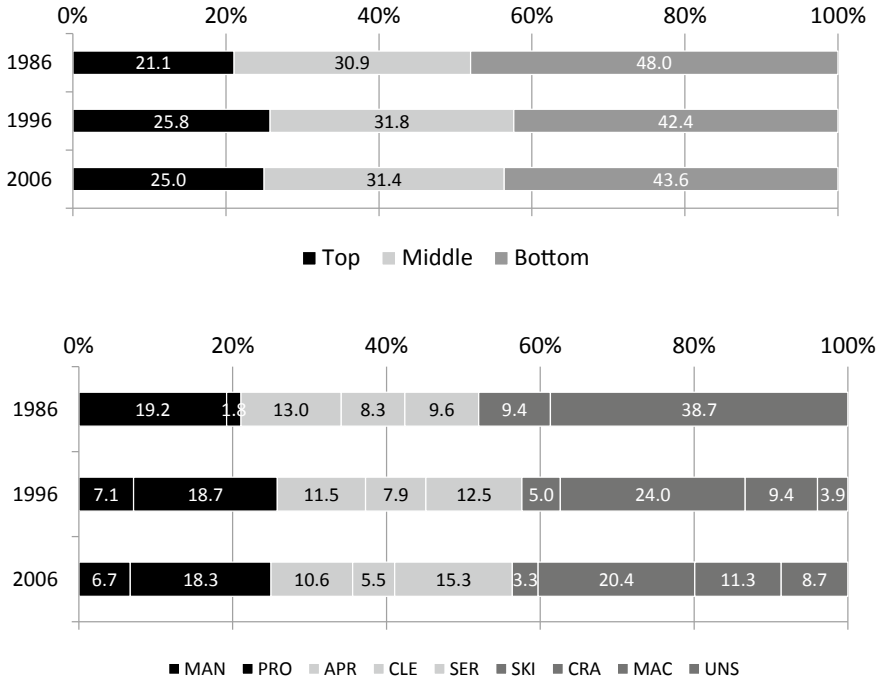

Fig. 3.3 Distribution of occupational groups and change over time