The effects of individual and regional factors on adolescent fertility rates: The case of Lithuania

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The authors have examined the large variation in adolescent fertility rates between and within countries to better understand the regional and individual factors underlying early childbearing. Using low spatial level data from the Lithuanian Census, they found that there is a high degree of regional differentiation within Lithuania, with differences of up to 20-fold between rates in different regions. Therefore, they investigated whether the regional differentiation in adolescent fertility rates is determined by different regional contexts or by the individual characteristics of teenage mothers. Surprisingly, the results of their regression models showed that the regional context did not have a large effect on adolescent fertility – the large differences between regions appeared due to the unequal spatial distribution of socio-economically disadvantaged teenagers. Their results also showed that women who had their first child during adolescence were statistically significantly different from those who postponed motherhood: those who gave birth during adolescence were more likely to belong to ethnic minorities (1.4 times more likely), receive government benefits (10 times), live in large households (10 times), and reside in rural areas (1.4 times). They were also more likely to terminate their education early, acquiring only a primary (7 times more likely) or lower-secondary (8 times) education. The study's findings suggest that public strategies and policies should address individual factors to reduce adolescent fertility rates and regional disparities. Teenage mothers should be supported to return to the education system as early as possible, thus preventing a further widening of the gap between their socio-economic status and that of their childless peers.

Keywords:
adolescent fertility,
teenage mothers,
regional differentiation,
individual characteristics,
Lithuania

Introduction

Adolescent fertility, a phenomenon in which teenage girls become mothers, is considered a social problem because it entails multiple negative consequences for both the young mothers and their infants. Among the most severe are the medical consequences: pregnant teenagers are more likely than older women to experience miscarriages, neonatal foetus deaths, and stillbirths (Rizzo 2014, Planned Parenthood Federation of America 2013). Compared to other infants, the children of teenage mothers typically have lower birthweights and higher morbidity rates (UNFPA 2013, Gilbert et al. 2004). There are also social and economic consequences; teenage mothers usually drop out of the education system without attaining higher (or even secondary) education, often leading them to face economic deprivation and poverty later in life (Olausson et al. 2001). There is no doubt that, in these conditions, it is difficult to ensure the well-being of their children. Thus, research on adolescent fertility is important in many respects: it can help to minimise demographic differences and improve public health as well as social welfare.

Adolescent fertility rates (AFRs)[1] differ greatly around the globe. Because the AFR is linked to the level of development of a country, studies (Santelli et al. 2017, United Nations 2013) tend to emphasise that the (economically) weak regions of Africa, South and Central America, and Asia are those with the highest AFRs, a phenomenon which is generally accompanied by high total fertility. Western and Northern Europe (except for the UK) and other high-income countries such as Canada, Australia, and Japan are highlighted as the countries with the lowest AFRs in the world. In the European Union (EU) context, there is a gap between the countries of Western and Northern Europe, on one side, and Central and Eastern Europe (CEE),[2] on the other, although the differences between them have been gradually decreasing (Tretjakova et al. 2018). In Lithuania, the AFR is above the EU average and is three-four times higher than AFR in Western and Northern Europe.

Even though the AFR in CEE countries, including Lithuania, is relatively high, research on this topic in the CEE region is scarce, which can be explained by the fact that this region has been experiencing a major decline in fertility since the 1990s (Daugirdas–Pociūtė-Sereikienė 2018, Frejka–Gietel-Basten 2016). Thus, the demographic research has been focused on the determinants of low fertility and possible family-related policy measures that can be taken to increase the birth rate. With this paper, while focusing on Lithuania, we seek to begin filling the gap in research on adolescent fertility in CEE countries, as many of them have experienced similar trajectories during recent decades (Part et al. 2013).

[1] The United Nations (2013) defines the AFR as the number of births per 1,000 women aged 15–19 years.

[2] The term CEE is used here to refer to the countries that were part of the Soviet communist block from 1945/1950 to 1989/1991 and are now EU member states: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

The aim of this research is twofold, coinciding with how the results are organised in the paper. First, in the descriptive part, we analyse the trends in adolescent births and the regional differentiation of adolescent fertility rates. Second, in the empirical part, we use regression models to explore how adolescent fertility rates are related to individual and regional characteristics. Thereby, we address the research question of this study, which is whether the regional differentiation of adolescent fertility rates is determined by specific regional contexts or whether it depends on the individual characteristics of teenage mothers. This is the first study on adolescent fertility to use individual-level and aggregated data in an examination of the low spatial-level regions of the Lithuanian censuses.

Literature review

When it comes to analysing the determinants of adolescent fertility rates, there are two major research streams. The first involves analysing adolescent fertility within the framework of reproductive rights and focusing on providing reproductive health services to teenagers and enhancing sexuality education policies. The second involves examining the role of social and economic inequalities in the phenomenon. This distinction is somewhat relative, as, in practice, various factors intertwine in shaping adolescent fertility rates. The studies that aim to explain the existence of AFR differentiation among or within countries tend to either be focused on explaining the differences in the provision of reproductive health services or the social and economic disparities involved, but researchers rarely explore both factors.

Contraceptive practices, access to abortion, and the availability of sexuality education directly influence adolescent fertility rates. The AFR is lower in countries where access to abortion services and contraceptives is broader. For instance, there are countries where teenagers do not need to get their parents' permission to undergo abortions, and contraceptives are subsidised (Part et al. 2013). The recent decline in the teenage pregnancy and birth rates in the US has also been attributed to improved use of contraceptives (Lindberg et al. 2018). In addition, the AFR is lower in countries where comprehensive sexuality education is common in schools (European Parliament 2013). All these factors greatly contribute to the spatial differentiation of adolescent fertility rates in Europe and a situation in which the CEE countries have much higher AFRs than the countries in Western and Northern Europe.

The research on structural inequalities at the macro level warns that, to curb adolescent fertility rates, it is important to implement social policy measures aimed at lowering poverty and rectifying other social inequalities instead of focusing exclusively on providing reproductive health services (Santelli et al. 2017). Santelli et al. (2017) analysed the associations between national socio-economic indicators and the AFRs in 142 countries. They found that from 1990–2012, the AFRs decreased

by 40%, and the largest changes were observed in the regions with the lowest levels of income inequality (as measured by the Gini index) – South Asia, Europe, Central Asia, and the Middle East/North Africa. Santelli et al. (2017) also noted that the AFRs remained high in high-income societies that were characterised by high levels of income inequality. One such example is the US, where the AFR is considerably higher than in most of the European countries (where the levels of income inequality are lower).

On a sub-national level, the socio-economic environment has been found to be a significant factor in explaining teenage fertility patterns (Gold et al. 2001, McCulloch 2001, Shoff–Yang 2012). Studies show that teenage girls who live in poor neighbourhoods have a higher probability of giving birth as teens than girls living in affluent communities (Bell et al. 2004, Brooks-Gunn et al. 1993, Crane 1991, Gold et al. 2001, South–Crowder 1999, Malmberg–Andersson 2019, Penman-Aguilar et al. 2013) because those from socially and economically underprivileged neighbourhoods have fewer opportunities to obtain an adequate education and well-paid jobs. Since peripheral, rural territories usually have higher levels of poverty and social deprivation, such locations tend to have higher AFRs. There are a few reasons for this phenomenon. First, it can be difficult to access health services due to the distance from healthcare facilities and possible issues with public transportation (Bell et al. 2004, Shoff–Yang 2012). An additional barrier keeping teenage girls from visiting healthcare facilities in such areas is the phenomenon of 'everyone knowing everyone else's business' which prevails in small towns (Bell et al. 2004), as such girls might not want to become a topic of local gossip. Previous research has also shown that higher AFRs in rural areas are associated with a lower quality of education and a lack (or inaccessibility) of information (Bell et al. 2004, Shoff–Yang 2012, Viner et al. 2012).

At the individual and family level, low socio-economic status is another important risk factor for teenage motherhood. Studies in the US and elsewhere show that there is a significant association between becoming a mother in adolescence and low socio-economic status, underemployment, low-income status, and low educational levels (Penman-Aguilar et al. 2013, Väisänen–Murphy 2014). Girls from otherwise underprivileged backgrounds (in terms of ethnicity or race) also have a higher probability of giving birth as teens (Berry et al. 2000, Driscoll et al. 2005, Blake–Bentov 2001, McCulloch 2001, Santelli et al. 2000). It has been suggested that girls from affluent family backgrounds might possess higher aspirations for the future in terms of educational attainment and career satisfaction; therefore, they may be more likely to seek abortions when unwanted pregnancies occur than their less-privileged counterparts (Smith 1993). However, it is also possible that it may be more difficult for young women in less-privileged socio-economic positions to access abortion services (Font-Ribera et al. 2008).

To sum up, the literature on the determinants of adolescent fertility seems to be conclusive in suggesting that the presence of both inadequate reproductive health

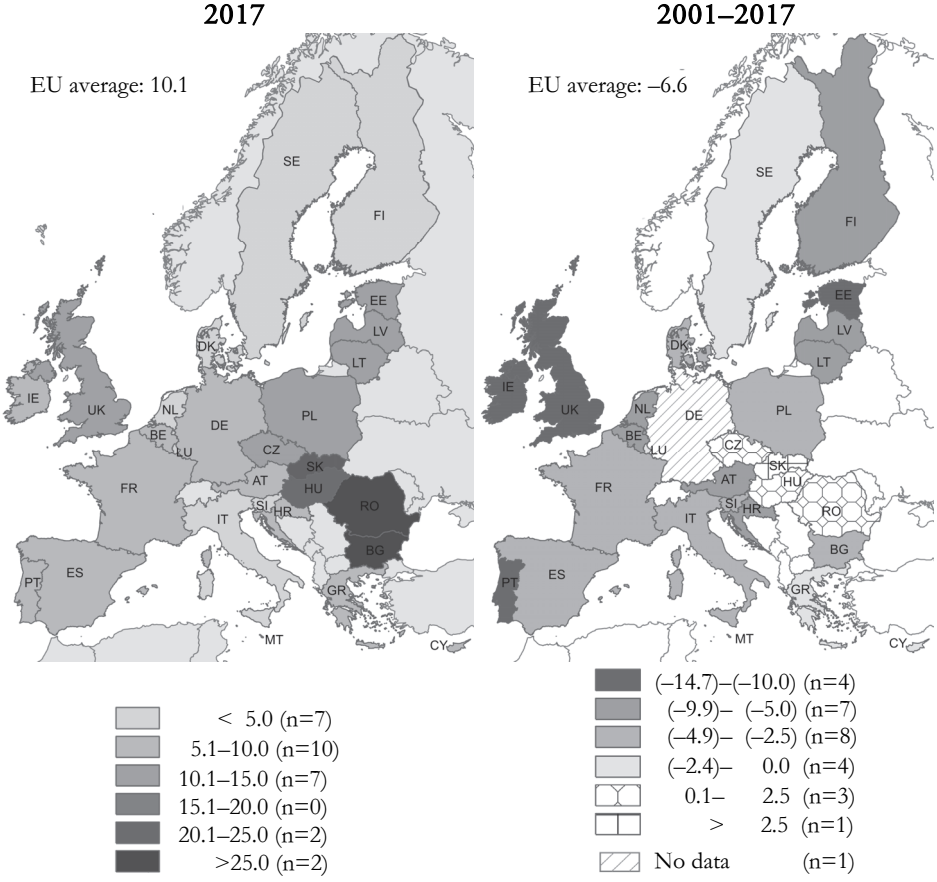
services and social and economic deprivation are important predictors of high adolescent fertility rates.

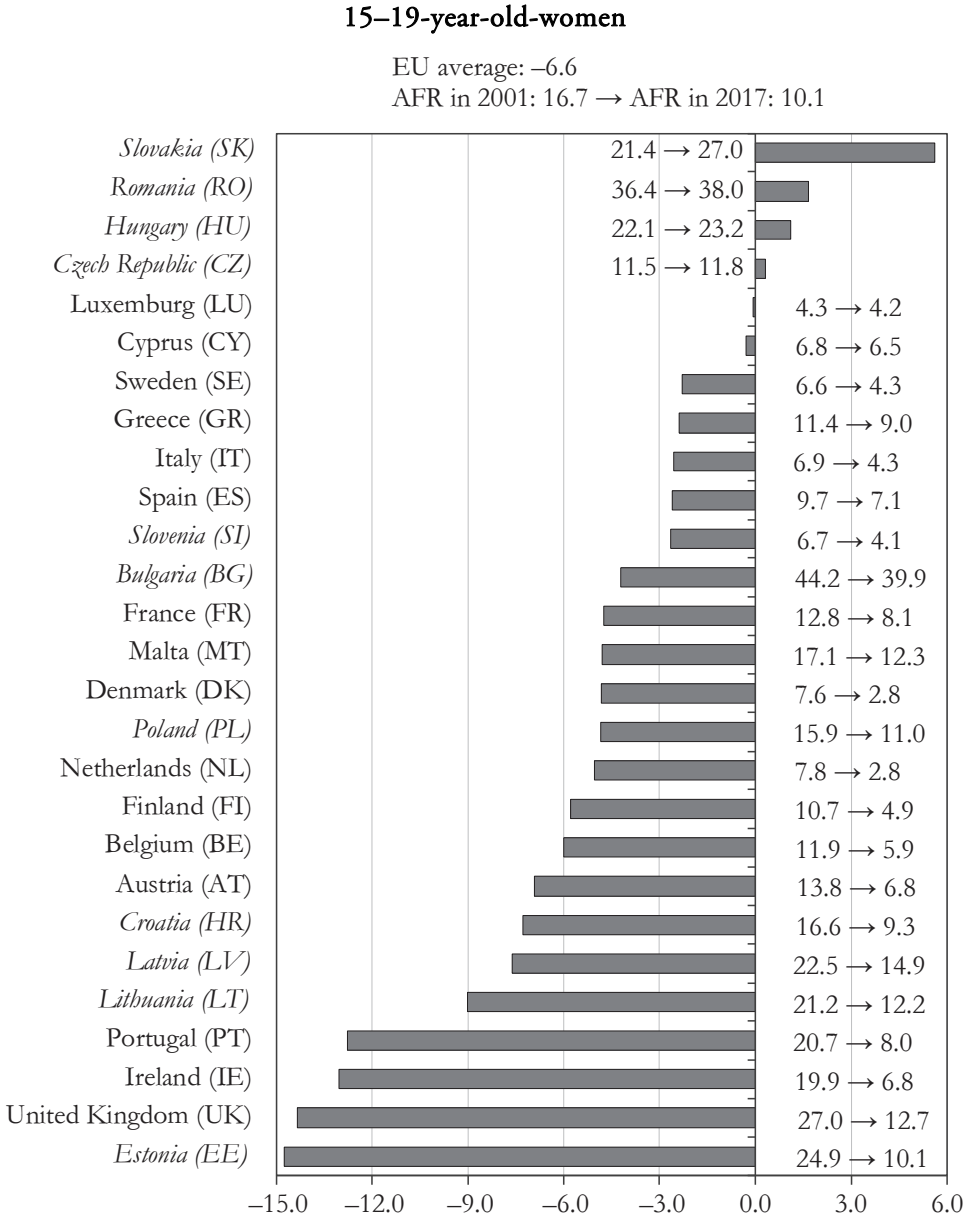
Demographic context

Figure 1 illustrates that, in the context of the EU countries, the entire CEE region has a relatively high AFR. In some CEE countries (Slovakia, Romania, Hungary, and the Czech Republic) the AFR increased from 2001–2017. One of the reasons that such differences exist in Europe is related to the ways in which various societies deal with unwanted teenage pregnancies. Pregnant teenagers in CEE countries usually give birth, whereas, in Western and Northern Europe, they are more likely to undergo abortions (Part et al. 2013, Sedgh et al. 2015).

Figure 1

Adolescent fertility rates in EU countries in 2017 and the change that occurred from 2001–2017 (based on Eurostat data)





Note: in the chart, the countries in italic font belong to the CEE group according to the OECD.

The adolescent fertility rate in Lithuania underwent major changes from 1992–2010, when the AFR dropped by 3.6 times (from 49 to 13.3 births per thousand 15–19-year-old women); the rate remained stable thereafter (based on the authors' calculations). The decline was mostly influenced by a decrease in fertility rates among 18–19-year-old women, reflecting a major shift in fertility trends and coinciding with the onset of the second demographic transition in Lithuania. The second demographic transition, which marks a major transformation in fertility rates and family structure, is characterised, among other things, by falling birth rates and the 'aging' of the fertility calendar, meaning that a woman's first childbirth is delayed and occurs later in life. In Lithuania, fertility rates have begun to decline, and women have been postponing their first childbirth since the 1990s (Stankūnienė et al. 2013). Consequently, the mean age at first birth increased from 23 in 1992 to 26.5 in 2010. From 1990–1995, it was common to have children soon after graduating from secondary school at the age of 18 or 19, and the fertility rates were highest among 21–22-year-old women (Stankūnienė 2006). Therefore, the decline of fertility rates among 18–19-year-old women signifies that a change in the model of procreative behaviour in the country has occurred rather than indicating a decline in adolescent fertility rates, as the situation is currently conceptualised. From 2010–2016, the AFR remained the same (13.3); meanwhile over the last two years, it dropped slightly (11.3 in 2018). It is difficult to predict whether the data indicate the emergence of a new long-term trend of further decline in the country's AFR.

In addition to examining the decline of the AFR in Lithuania, previous studies on adolescent fertility rates have showed that there is a high degree of regional differentiation in it. The rate in rural areas has been found to be almost twice as high as in urban ones, and there are rural municipalities where the rate is six times higher than in the major cities (Tretjakova 2016, Tretjakova et al. 2018). These earlier studies emphasised that further research is needed to investigate the factors behind the regional differentiation of adolescent fertility rates in Lithuania.

Hypotheses

In this study, we expect to find that a higher degree of regional differentiation in AFRs can be detected in Lithuania if measured at a level lower than that of municipalities (Hypothesis 1). We will explore how adolescent fertility rates are related to individual and regional characteristics and the extent to which these characteristics contribute to the regional differentiation of adolescent fertility rates in Lithuania. Using individual-level data, we expect to find that girls who have given birth in adolescence are more likely to be socially and economically disadvantaged than their childless peers (Hypothesis 2). Finally, by using aggregate-level data, we expect to find that specific regional characteristics increase the likelihood of girls having children in adolescence (Hypothesis 3).

Data and methods

This study is based on 2001 and 2011 data from the Lithuanian census, which is the most reliable source of demographic data currently available in the country. While some may raise concerns about the data being relatively old, the AFR hardly changed from 2011–2018 in Lithuania; thus, we can assume that the data describe the current situation reasonably well. This is the first study on adolescent fertility in Lithuania to use aggregated data on low spatial-level (LAU-2) regions[3] and individual-level data from Lithuanian censuses. The study is based on anonymised data, which makes it impossible to discern the identities of those in the research population. Previous studies, although scarce, are based on aggregate-level data from municipality-level (LAU-1) regions, and researchers could thus only analyse general trends in adolescent fertility rates but not the causal relationships underlying them.

Measurement

The main indicator of teenage fertility is the AFR (in the literature, it is also referred to as the 'adolescent birth rate' or the 'teenage fertility/birth rate'). It is an age-specific fertility rate that indicates the number of births per 1,000 women aged 15–19[4] (United Nations 2013) and is calculated using the following formula:

$$ {}_5f_{15}(t) = \frac{{}_5B_{15}(t)}{{}_5\bar{P}_{15}(t)} \times 1000 $$

where ${}_5f_{15}(t)$ = adolescent fertility rate, t = year, ${}_5B_{15}(t)$ = number of live births to women aged 19 and younger in year t, and ${}_5\bar{P}_{15}(t)$ = midyear population of 15–19-year-old women in year t.

We use this formula when analysing the regional differentiation of the AFR in Lithuania in LAU-2 regions. To estimate the potential annual fluctuations in the AFR (when the rate is unusually high or low in a specific calendar year) and to avoid inaccuracies caused by a low number of cases, the AFR was calculated for the five-year periods from 1997–2001 and 2007–2011. As the formula indicates, to calculate the AFR, we needed data from the population of 15–19-year-old women for each year of analysis. Because we used census data (updated every ten years), we had to assume that there had not been any changes in the population during the five-year

[3] According to the European statistical system (Eurostat), Lithuania is divided into 60 LAU-1 regions (municipalities, LT – *savivaldybės*; avg. pop. size: 50,000) and around 600 LAU-2 regions (wards, LT – *seniūnijos*; avg. pop. size: 2,000 in rural areas and 25,000 in urban ones). When we mention 'regions', we are referring to those at the LAU-1 or LAU-2 level depending on the context. For more about the European statistical system, please see Brandmueller et al. (2017).

[4] The World Health Organization defines 'adolescence' as the age range between 10–19.

periods.[5] Although this data limitation contributed to some estimation errors, the overall trajectories of change and the regional differentiation of the AFR could still be assessed.

It is important to note that the AFR typically includes all births to teenagers, regardless of birth order. However, the Lithuanian population censuses recorded only the year of birth of a subject's first-born child. Although most children born to adolescent girls are first-borns, according to the vital statistics, around 11% of the recorded births to 15–19-year-olds in Lithuania in 2011 were second- and higher-order ones (authors' calculations). Second and higher-order teen births are considered more problematic than first-order births, as they indicate a repeated inability to postpone unwanted pregnancies. Therefore, the census data do not account for possibly the most sensitive and complicated cases of adolescent fertility.

Sample

The statistical modelling was performed using Lithuanian census data from 2011. The study covers women born between 1990 and 1997 who experienced their first births while they were teenagers (14–19-years-old) and whose first children were born from 2009–2011 (a total of 2,347 women). We compared them to their counterparts who did not have children in adolescence (a total of 157,516 women). The study's sample was selected based on several factors related to the data's constraints. First, an important shortcoming of the census data (and thus of this study) is that information related to individual characteristics was only available on the date of the census. Thus, the effects of time-varying variables, such as education, occupation, household status, etc., should be interpreted with caution. Since we analysed adolescents who experienced their first births from 2009–2011, and the census was conducted in 2011, the data were collected from subjects who had already given birth. Therefore, we do not know what the social and economic situations of the teenage mothers were prior to the births of their children. To analyse the determinants of childbirth in adolescence, we need longitudinal data, which are currently not available in Lithuania.

[5] The population of Lithuania gradually declined during the analysed periods. Thus, prior to both censuses, the population was higher than when the census data were collected. As a result, the AFR values reported here are slightly reduced due to this calculation error.

Analysis

First, using binary logistic regression, we explored the relationship between individual characteristics and adolescent fertility.[6] In other words, we estimated the probability of becoming a mother in adolescence through a comparison between young women who experienced their first births in adolescence and their childless peers. The models included the following independent variables: socio-demographic characteristics (ethnicity, educational attainment, marital status, household size), socio-economic characteristics (employment, government benefits as their main source of income), and living conditions (whether they resided in an urban or rural area, whether they lived in owned or rented dwellings).

Second, using linear regression, we evaluated the effect of the regional context on adolescent fertility rates. In the models, the dependent variable was the AFR, and several independent variables corresponded to ethnic composition, labour status, and geographical location; all were measured at the LAU-2 level. We additionally added a variable measured at the LAU-1 level, which integrated various socio-economic indicators and thus reflected the overall socio-economic situation at a higher spatial level.[7]

We tested the models with more detailed information on the subjects' ethnicity, source of income, occupation, type of dwelling, etc.; however, the additional variables were insignificant, and they did not improve the predictive power of the models. All the variables which were included in the final models were checked for multicollinearity, and there was no risk found. The models were also checked for collinearity statistics (tolerance, VIF), and there were no violations detected. Statistical modelling was performed using SPSS software, and cartographic analyses were performed using ArcGIS.

[6] In principle, our data are characterised by a hierarchical structure; individuals are nested within neighbourhoods, which belong to municipalities. Initially, we attempted to use a multi-level (generalised linear mixed model) approach. Unfortunately, the results of the statistical models produced by this method did not prove successful. All the variables included (at all levels) acquired weak values, and most of them became statistically insignificant. This can be explained by the relatively small research sample (N = 2,347) and detailed territorial division (593 spatial units). We, therefore, decided to carry out this study using binary logistic regression and linear regression techniques. The multi-level model is an extension of the regression model, and both apply the same assumptions; the difference is that the multi-level model considers the relationships between cases (individuals) caused by higher-level variables (Field 2009). Meanwhile, the regression model assumes that individuals (and their associated data) are independent of each other. In the case of adolescent fertility research, the latter assumption is more logically sound.

[7] The estimation of the derivative variable (in Table 2, called the 'integrated indicator of socio-economic situation') includes several socio-economic indicators: the added value created by an employed population, unemployment rate, operating economic entities, recipients of government benefits as a percentage of the total population, external mortality, relative number of children in families with social risk factors, average education level, degree of religiosity, relative number of physicians, and accessibility of administrative centres. This variable was constructed as part of the research project conducted by the authors (see the acknowledgements).

Descriptive results

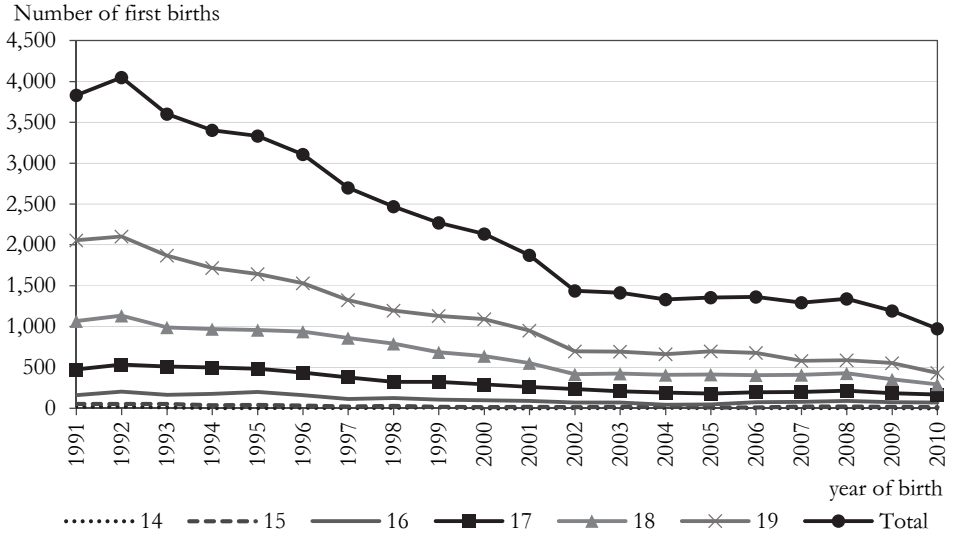
Trends in first births among adolescents

From 1991–2001, 31,139 first births were registered to adolescents (aged 14–19) in Lithuania; this number dropped to 13,316 (i.e., by 2.3 times) over the following decade (based on 2001 and 2011 Lithuanian census data). Similar tendencies can be observed throughout the two decades – about half of the children were born to 19-year-olds, one-third to 18-year-olds, and one-fifth to younger subjects. The decline in births can be explained by an overall decline in the number of adolescent girls, but this is true only in the case of the youngest girls. The number of 18- and 19-year-olds remained almost the same, while the number of children born to women of these ages declined by 2.3–2.5 times. Therefore, we can assume that the existence of fewer births in this age category represents a change in fertility patterns in which women's first births are postponed until later in life.

Figure 2 shows the number of first births to teenagers from 1991–2010. The number of adolescent births declined considerably, especially from 1991–2002. This decline is especially visible among older teenagers; for example, in 1991 there were 2,058 births to 19-year-olds; in 2000, there were 1,092; and, in 2010, there were only 432. The decline in births to 14–17-year-olds has been less prominent overall, and, since 2002, the change has been minimal.

Figure 2

First births by mother's age from 1991–2010
(based on 2001 and 2011 Lithuanian census data)



Regional differentiation of adolescent fertility rates

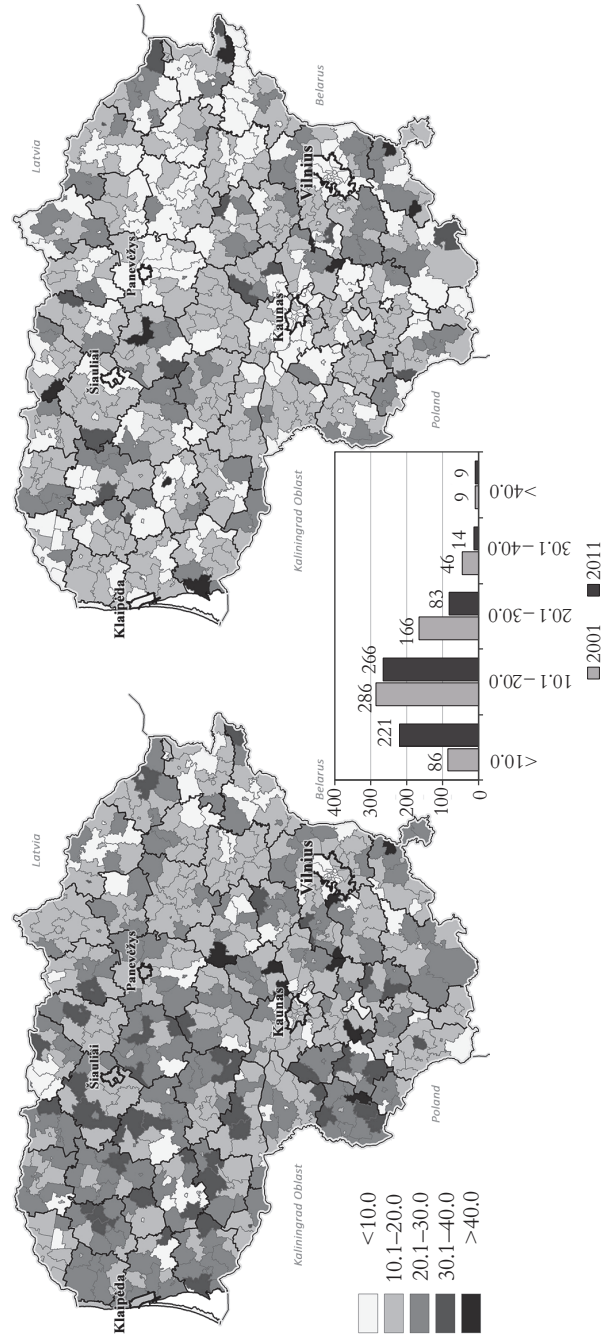
The previous studies on adolescent fertility in Lithuania were based on aggregate-level data at the municipality level (LAU-1 regions) and showed that the differences between municipalities with the lowest and highest AFRs reached six times. In this study, we hypothesised that higher levels of regional differentiation in the AFR would be detected when measured at a lower spatial level.

Figure 3 illustrates the regional differentiation of the AFR in Lithuania at a low spatial level (in LAU-2 regions) during two periods: 1997–2001 and 2007–2011. According to the census data, 10,014 and 4,978 infants were born during these periods, respectively. The spatial pattern seen in both maps highlights the urban-rural distinction; the lowest AFRs can be seen in the largest cities and their surrounding regions, and they increase with distance from the cities, reaching their highest values in the peripheral rural regions. This urban-rural distinction became more profound during the later period. However, there were some exceptions to the trend, such as the existence of relatively high AFRs in the region surrounding Vilnius (especially in the later period); as the results of our models show, this is related to the population's ethnic composition. Although there were no large or exclusively problematic areas in Lithuania, and the regions with the highest and lowest values were randomly distributed throughout the country, the wide range in AFR values indicates a large amount of regional differentiation within the country. In fact, the differences in the AFR reached 20 times at the LAU-2 level from 2007–2011. This supports Hypothesis 1, which holds that higher levels of regional differentiation in AFRs can be detected in Lithuania when measured at a lower spatial level. We can also argue that, not only is regional differentiation higher at the LAU-2 level than in LAU-1 regions, but the increase in regional differentiation has become more pronounced at the LAU-2 level over time. Indeed, growing spatial inequality is noticeable in many social and economic spheres in Lithuania and other CEE countries (Ubarevičienė 2017).

Our results suggest that there are problematic regions where the AFR is considerably higher than the country-wide average. To better understand the causes of regional differentiation, it is necessary to gain more insight into the factors that contribute to high levels of adolescent fertility.

Figure 3

First births per thousand 15–19-year-olds in LAU-2 level regions
(based on 2001 and 2011 Lithuanian census data)



Modelling results

The 'picture' of a teenage mother

Table 1 presents the results of binary logistic regression models that estimate someone's probability of becoming a mother in adolescence. In these models, those who had their first child in adolescence (1) are compared with their counterparts who did not have children during that period in their lives (0). These models help to determine the relationship between the risk of having a baby at an early age and various individual characteristics. They also provide a better understanding of the impact that early motherhood has on female adolescents' well-being.

Model 1 includes the socio-demographic characteristics of the subjects: ethnicity, education, marital status, and household size. The results show that ethnicity did not have a statistically significant effect on the likelihood of giving birth as a teen in Lithuania. However, the effect of ethnicity becomes evident after controlling for other characteristics. The education variable indicates that women who had children in adolescence, compared to their childless peers, were significantly more likely to have completed only a primary (22 times more likely), lower-secondary (23 times), or secondary (three times) education (the reference group was 'school student' and the category 'university/college student' referred to those who were studying at the time of the census). The results showed that experiencing childbirth at an early age was often accompanied by early marriage: the odds of getting married in adolescence were 34 times higher for girls who had babies during that period in their lives (unfortunately, based on the data, we were unable to determine the sequence of these events). As the data revealed, one-third of the teenage mothers in our sample were married, while 1% of those who did not have children in adolescence were married as teenagers. Getting married at a young age is uncommon in Lithuania – the average age at first marriage for women was 26.6 years in 2011 (Statistics Lithuania 2020). Thus, it can be assumed that, in the case of adolescent marriages, the subjects were prompted to marry by (unplanned) pregnancies. However, according to the country's vital statistics, most of the children born to 15–19-year-old women were born outside of wedlock – 74% in 2011. This stands in stark contrast to the general trend in non-marital fertility in Lithuania, as less than 30% of births occur outside of wedlock (Maslauskaitė 2014). As non-marital fertility in Lithuania has become associated with social inequality (Maslauskaitė 2014), high rates of out-of-wedlock teenage births might be considered another indication of the underprivileged status of those who become teenage mothers. The results of Model 1 also showed that women who had children as adolescents were more likely to live in large households; this probability increased with household size. Given that only four variables were included, the combined socio-demographic characteristics show that the model exhibits good fitness (Nagelkerke's pseudo-$R^2 = 0.299$).

In Model 2, we added two socio-economic variables: employment status, which indicated whether the young mother was employed (reference category), registered as unemployed, or inactive (note that the category 'student' was included with the education variable), and a variable that indicated whether the subject was receiving government benefits at the time of the census. The results show that the subjects who had children in adolescence were 1.7 times less likely to be registered as unemployed, but they were four times more likely to be economically inactive (when controlling for 'student' status). In the first case, one of the issues facing the subjects may have been that they had many family-related responsibilities and, therefore, made more effort to find a job. In the second case, the young mothers had to take care of their children, so they could not work or study. The results also showed that teenage mothers were 11.5 times more likely to receive government benefits than their peers without children. Including the socio-economic variables in Model 2 appeared to influence the effects of the other variables when compared to Model 1. First, the effect of ethnicity became significant. The results showed that those who belonged to ethnic minorities had higher odds of having children in adolescence than ethnic Lithuanians. In fact, this outcome can be linked to the spatial patterns seen in Figure 3, which show higher AFR values around Vilnius; these areas are dominated by ethnic minorities (Stanaitis–Česnavičius 2010). Second, after controlling for the socio-economic variables, the effects of marital status, household size, and, especially, educational attainment diminished, although the differences between the analysed groups remained robust.

In Model 3, we added two additional variables describing living conditions, which indicated whether a subject's place of residence as a teenager was in an urban or rural area and whether the members of her household lived in owned or rented accommodations. The results show that those who had children in adolescence were 1.4 times more likely to live in rural areas and 2.7 times more likely to live in rented dwellings. This situation is consistent with the overall fertility trends in Lithuania. Other studies have shown that rural women are characterised by a 'younger' timeline of procreative behaviour; in other words, they have children earlier than their urban counterparts (Jasilionis et al. 2015). Studies conducted in other countries have also indicated differences in urban and rural fertility rates, and higher rates have been found to be associated with a delay in the onset of the second demographic transition and a less intense effect of the transition in rural areas (Walford–Kurek 2015). It has been argued that various features of the second demographic transition, such as the postponement of childbearing, begin to manifest themselves first in urban regions, which later become 'triggers' for altered demographic behaviour in rural areas (Walford–Kurek 2015). Including the characteristics of living conditions in Model 3 appeared to reduce some of the effects of the other variables when compared with Model 2, but their addition improved the fitness of the final model (Nagelkerke's pseudo-R^2 = 0.430 in Model 3).

It should be noted that the research population in our sample consisted of subjects who had already given birth, and the ages of their children ranged from zero-three years. The individual characteristics included in the models were likely to change, especially around the time of childbirth. In our models, we intentionally analysed data aggregated over a three-year period, but we ran three additional sets of tests: one with the first-year data (i.e., when no more than a year had passed since the birth of the child) and ones with the second- and third-year data. This allowed us to gain insights into the consequences of adolescent fertility over time. Although the fitness of these models became much poorer due to the smaller sample sizes, it is important to note that the effects of many of the variables increased in the subsequent years, indicating that the socio-economic situations of adolescent mothers tend to deteriorate over time. For example, compared to their childless peers, the lag in the educational attainment of teenage mothers appeared to increase sharply in the first and second years after childbirth. The probability of teenage mothers getting married also increased over time; in the first year of motherhood, a subject's chances of getting married were five times greater than those of their peers, and, in the second and third years following childbirth, they became nine times higher. There were no significant differences between the two groups of women regarding their household size during the first-year period; however, such differences emerged later, showing that teenage mothers were more likely to live in large households. Over time, the teenage mothers also became more dependent on government benefits as their main source of income. The effects of the other variables remained similar over time.

Summarizing the results of the models, the teenage mothers statistically significantly differed from their peers. The results showed that women who had given birth in adolescence were characterised by socially disadvantaged backgrounds, confirming Hypothesis 2. These results suggest that early motherhood poses major challenges to the well-being of adolescents and their offspring. Especially serious challenges are posed by their low educational attainment, which has long-term consequences for both the mothers and their children. Unfortunately, due to time-varying variables, we were unable to determine causal relationships (whether the children were born to adolescents who were already living in deprivation or whether a decline in their circumstances occurred after the birth of their child). In any case, the outcome is the same – having a child in adolescence is a threat to both the mothers' and their children's social well-being.

Table 1

Binary logistic regression model of becoming an adolescent mother in Lithuania ($N_{adolescent\ mother}$ = 2,347, $N_{childless\ peer}$ = 157,516, based on 2011 Lithuanian census data)

	Model 1		Model 2		Model 3	
	Exp (B)	Sig.	Exp (B)	Sig.	Exp (B)	Sig.
Individual-level variables						
Socio-demographic characteristics						
Ethnicity (ref = non-Lithuanian)						
Lithuanian	0.986	0.833	0.778	0.001	0.738	0.000
Education (ref = school student)						
Primary (attained)	21.738	0.000	7.032	0.000	6.613	0.000
Lower-secondary (attained)	23.357	0.000	7.832	0.000	7.541	0.000
Secondary (attained)	3.387	0.000	1.752	0.000	1.825	0.000
University/college student	0.841	0.020	0.779	0.001	0.827	0.000
Marital status (ref = not married)[a)]						
Married	33.879	0.000	25.741	0.000	21.172	0.000
Household size (ref = one member)						
2 members	5.224	0.000	3.962	0.000	4.993	0.000
3 or 4 members	6.204	0.000	4.715	0.000	6.960	0.000
5 and more members	9.022	0.000	6.467	0.000	9.691	0.000
Socio-economic characteristics						
Employment (ref = employed)						
Registered unemployed			0.600	0.000	0.581	0.000
Inactive or not indicated[b)]			3.980	0.000	3.603	0.000
Social benefits (ref = not receiving)						
Receiving			11.525	0.000	10.401	0.000
Living conditions						
Residence (ref = rural)						
Urban					0.699	0.000
Ownership (ref = renting)						
Owning					0.371	0.000
CONSTANT	0.001		0.001		0.003	
R square (Nagelkerke)	0.299		0.414		0.430	

a) Including widows and divorced; the census does not provide information on cohabitation without marriage.
b) Inactive: housewife, disabled.

Regional characteristics and adolescent fertility

Next, we used linear regression to explore whether specific regional characteristics increased the likelihood of having children in adolescence. The dependent variable was AFR, which was estimated at the LAU-2 level (N = 593) and covered the period from 2007–2011. According to the census data, 4,978 infants[8] were born to adolescents during this period.

[8] Only the first births to adolescents were included; see the 'Data and Methods' section.

Table 2

Linear regression model of adolescent fertility rates in Lithuania (N = 593, average AFR value in the region=13.7, the min/max values ranged from 0–66.7, based on 2011 Lithuanian census data)

	MODEL 1		MODEL 2	
	beta	Sig.	beta	Sig.
Aggregated LAU-2 level variables				
Share of ethnic minorities, %	0.096	0.012	0.096	0.012
Share of unemployed, % (from total employed)	0.161	0.000	0.160	0.001
Share of low occupational status[a)], % (from total employed)	0.270	0.000	0.269	0.000
Distance (km) from the regional center[b)]	0.060	0.165	0.058	0.229
Aggregated LAU-1 level variable				
Integrated indicator of socio-economic situation			–0.005	0.919
Adjusted R square	0.160		0.166	

a) Skilled agricultural, forestry, and fishery workers; skilled laborers and craftsmen; plant and machine operators and assemblers; unskilled laborers.

b) 12 largest cities in Lithuania.

Table 2 presents the results of two models. In Model 1, we included four independent variables that pertained to ethnic composition, labour status, and the geographical location of the LAU-2 regions. The results showed that, the higher the share of ethnic minorities, unemployed persons, and those with low occupational status, the higher the AFR would be in a region. However, although all these variables had a statistically significant effect on the AFR, their effect was weak. An unexpected finding was that the distance to the nearest regional centre (as well as the distances to municipal centres or major cities) had no significant effect on the AFR, which contradicted the implications of our literature review (see Bell et al. 2004, Shoff–Yang 2012). In the case of Lithuania, this may be the case because the country is small and its urban network is evenly distributed, thus the locations of the regions do not have a significant impact on the AFRs in the regions within the country. Moreover, this result is in line with our above-mentioned analysis of regional differentiation, in which we found that the highest and lowest AFRs were randomly distributed throughout the country.

In Model 2, we added an additional variable measured at the LAU-1 level, which integrated the various socio-economic indicators and thus reflected the overall socio-economic situation at a higher spatial level. The effect of this variable on the AFR was also marginal. Our final regression model explained only 16.6% of the variations in the AFRs between the LAU-2 regions. Although the number of variables included was limited, further elaboration of the model did not result in increased predictive power. Overall, our results suggested that, although the AFR tends to be higher in socio-economically disadvantaged regions, the regional context

does not have much influence on adolescent fertility rates. Moreover, we also found that the higher the regional level used, the less influence it had on the interpretation of the territorial patterns of AFRs. Thus, Hypothesis 3 was supported only partially. Our research and its findings are based on objective measures of regional socio-economic deprivation, but there is research indicating that perceived environmental risks (e.g., a teenager's perception of her neighbourhood) may be a better predictor of adolescent fertility than actual regional socio-economic indicators (Johns 2011).

Conclusion and discussion

In this paper, we investigated the effects of individual and regional characteristics on adolescent fertility rates and the extent to which these characteristics contribute to the regional differentiation of adolescent fertility rates in Lithuania. Our results revealed extreme differentiation in adolescent fertility rates at a low spatial level, confirming our first hypothesis. Contrary to our expectations, the results show that the socio-economic context of the region does not have much influence on adolescent fertility rates. This finding only partially supported our third hypothesis, and it is inconsistent with those of many other studies (see Bell et al. 2004, Shoff–Yang 2012). Our results imply that large differences between the regions mostly emerged due to the spatially uneven distribution of socially and economically underprivileged teenagers. Such a finding invites us to reexamine the importance of regional and individual factors and raises questions for future research about whether this is a distinctive characteristic of Central and Eastern European countries. In terms of individual-level characteristics, the results confirmed our second hypothesis, which held that women who have given birth in adolescence are more likely to be socially and economically disadvantaged than those who had postponed motherhood. Our results implied that early motherhood has long-term consequences for both mothers and their children and can threaten their social well-being.

The behavioural ecological perspective on fertility suggests that, under some ecological conditions, such as those involving poverty, risky environments, unstable family backgrounds, etc., early motherhood may constitute an adaptive strategy (Dickins et al. 2012). Thus, to reduce adolescent fertility, measures should be aimed at improving the lives of girls and young women living in such circumstances. This could be accomplished at the neighbourhood level, but the results of this study indicated that state-implemented strategies and policies targeted to individuals may be more effective in reducing regional disparities in adolescent fertility. Investments in the education system could also have a preventive effect because girls with better cognitive skills and greater academic performance have a lower probability of becoming teenage mothers (Lou–Thomas 2015). It would be especially beneficial to focus on improving the quality of education in peripheral regions, where the levels of teenage motherhood tend to be higher.

Alongside such efforts to reduce teen births, it is important to provide appropriate social and financial support to young mothers and their families, especially since our results showed that their socio-economic situations tend to worsen over time. As early motherhood significantly increases someone's likelihood of dropping out of the educational system, thereby triggering a vicious circle of poverty, it is especially important to create favourable conditions for teenage mothers to return to school as early as possible, preventing a further widening of the gap between their socio-economic status and that of their childless peers. The current judicial practice in Lithuania emphasises parental responsibility (irrespective of a parent's age) for providing for a child, thus encouraging young parents to seek paid employment instead of continuing their education. Policies focused on enabling young parents to combine work and study are also non-existent.

It has been proven that making resources, especially those related to childcare, available has a greater impact on adolescent parents' educational attainment than parenthood itself (Mollborn 2007); therefore, we propose three possible solutions. First, most teenager mothers live in extended families, thus it is likely that someone else in such households could take care of their children for a few hours a day; this could be supplemented by public financial support. Alternatively, the state and municipalities could subsidise babysitters for young parents attending school. Second, regarding enrolment queues in kindergartens, the children of teenage mothers should be prioritised. Third, a network of nurseries, where children are admitted not from the age of two – which is the current standard in Lithuania[9] – but, for example, from 18 weeks (the OECD countries' average) could be developed. Inter alia, it would be generally beneficial to Lithuania and many Central and Eastern European countries, where the duration of maternity leave is very 'generous' (may last up to three years), which undermines women's careers and the opportunities they can enjoy.

Although our study has limitations related to constraints on the data and its age, it contributes to the extremely limited body of knowledge related to adolescent fertility in Lithuania. Since Central and Eastern European countries have experienced similar trajectories in terms of population changes during recent decades, and many of them are characterised by relatively high adolescent fertility rates, the results of this study on Lithuania could be useful to those seeking to understand the overall situation within the post-socialist region. Moreover, because both individual and regional factors are analysed, and such studies are rare, our study advances the knowledge of adolescent fertility beyond its focus area of Central and Eastern European countries. To gain a better understanding of the causes and consequences of high adolescent fertility rates, future research should be based on up-to-date longitudinal data.

[9] In Lithuania, there are very few kindergartens that accept children as young as a year old.

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Declaration of interests

The authors have no conflicts of interest to declare.

REFERENCES

BERRY, E. H.–SHILLINGTON, A. M.–PEAK, T.–HOHMAN, M. M. (2000): Multi-ethnic comparison of risk and predictive factors for adolescent pregnancy *Child and Adolescent Social Work Journal* 17 (2): 79–96. https://doi.org/10.1023/A:1007554122283

BLAKE, B. J.–BENTOV, L. (2001): Geographical mapping of unmarried teen births and selected sociodemographic variables *Public Health Nursing* 18 (1): 33–39. https://doi.org/10.1046/j.1525-1446.2001.00033.x

BRANDMUELLER, T.–SCHÄFER, G.–EKKEHARD, P.–MÜLLER, O.–ANGELOVA-TOSHEVA, V. (2017): Territorial indicators for policy purposes: NUTS regions and beyond *Regional Statistics* 7 (1): 78–89. https://doi.org/10.15196/RS07105

BROOKS-GUNN, J.–DUNCAN, G.–KLEBANOV, P.–SEALAND, N. (1993): Do neighborhoods influence child and adolescent development? *American Journal of Sociology* 99 (2): 353–395. https://doi.org/10.1086/230268

CRANE, J. (1991): The epidemic theory of ghettos and area effects on dropping out and teenage childbearing *American Journal of Sociology* 96 (5): 1226–1259. https://doi.org/10.1086/229654

DAUGIRDAS, V.–POCIŪTĖ-SEREIKIENĖ, G. (2018): Depopulation tendencies and territorial development in Lithuania *Regional Statistics* 8 (2): 46–68. https://doi.org/10.15196/RS080203

DICKINS, T.–JOHNS, S.–CHIPMAN, A. (2012): Teenage pregnancy in the United Kingdom: A behavioral ecological perspective *Journal of Social, Evolutionary, and Cultural Psychology* 6 (3): 344–359. https://doi.apa.org/fulltext/2012-24858-006.html

DRISCOLL, A. K.–SUGLAND, B. W.–MANLOVE, J.–PAPILLO, A. R. (2005): Community opportunity, perceptions of opportunity, and the odds of an adolescent birth *Youth & Society* 37 (1): 33–61. https://doi.org/10.1177/0044118X04267493

FIELD, A. (2009): *Discovering statistics using SPSS (and sex and drugs and rock 'n' roll)* Sage Publications, London.

FONT-RIBERA, L.–PÉREZ, G.–SALVADOR, J.–BORRELL, C. (2008): Socioeconomic inequalities in unintended pregnancy and abortion decision *Journal of Urban Health* 85 (1): 125–135. https://doi.org/10.1007/s11524-007-9233-z

FREJKA, T.–GIETEL-BASTEN, S. (2016): Fertility and family policies in central and eastern Europe after 1990 *Comparative Population Studies* 41 (1): 3–56. https://doi.org/10.12765/CPoS-2016-03

GILBERT, W.–JANDIAL, D.–FIELD, N.–BIGELOW, P.–DANIELSEN, B. (2004): Birth outcomes in teenage pregnancies *The Journal of Maternal-Fetal & Neonatal Medicine* 16 (5): 265–270. https://doi.org/10.1080/14767050400018064

GOLD, R.–KAWACHI, I.–KENNEDY, B. P.–LYNCH, J. V.–CONNELL, F. A. (2001): Ecological analysis of teen birth rates: Association with community income and income inequality *Maternal and Child Health Journal* 5 (3): 161–167. https://doi.org/10.1023/a:1011343817153

JOHNS, S. E. (2011): Perceived environmental risk as a predictor of teenage motherhood in a British population *Health and Place* 17 (1): 122–131. https://doi.org/10.1016/j.healthplace.2010.09.006

LINDBERG, L.–SANTELLI, J. S.–DESAI, S. (2018): Changing patterns of contraceptive use and the decline in rates of pregnancy and birth among U.S. adolescents, 2007–2014 *Journal of Adolescent Health* 63 (2): 253–256. https://doi.org/10.1016/j.jadohealth.2018.05.017

LOU, C.–THOMAS, A. (2015): The relationship between academic achievement and nonmarital teenage childbearing: Evidence from the panel study of income dynamics *Perspectives on Sexual and Reproductive Health* 47 (2): 91–98. https://doi.org/10.1363/47e2115

MALMBERG, B.–ANDERSSON, E. K. (2019): Adolescent neighbourhood context and transition to parenthood: A longitudinal study *Population, Space and Place* 25 (5): e2228. https://doi.org/10.1002/psp.2228

MASLAUSKAITĖ, A. (2014): Nesantuokinis gimstamumas Lietuvoje: raida ir erdvinė diferenciacija. In: BURNEIKA, D.–POCIŪTĖ-SEREIKIENĖ, G. (eds.): *Lietuvos socialinė raida Nr. 3. Lietuvos gyventojai XXI a. pradžioje: sociodemografiniai aspektai* pp. 54–65., Lietuvos socialinių tyrimų centras, Vilnius.

MCCULLOCH, A. (2001): Teenage childbearing in Great Britain and the spatial concentration of poverty households *Journal of Epidemiology and Community Health* 55: 16–23. https://doi.org/10.1136/jech.55.1.16

MOLLBORN, S. (2007): Making the best of a bad situation: material resources and teenage parenthood *Journal of Marriage and Family* 69 (1): 92–104. https://doi.org/10.1111/j.1741-3737.2006.00347.x

OLAUSSON, P. O.–HAGLUND, B.–WEITOFT, G. R.–CNATTINGIUS, S. (2001): Teenage childbearing and long-term socioeconomic consequences: a case study in Sweden *Family Planning Perspectives* 33 (2): 70–74. https://doi.org/10.2307/2673752

PART, K.–MOREAU, C.–DONATI, S.–GISSLER, M.–FRONTEIRA, I.–KARRO, H.–THE REPROSTAT GROUP (2013): Teenage pregnancies in the European Union in the context of legislation and youth sexual and reproductive health services. *Nordic Federation of Societies of Obstetrics and Gynecology, Acta Obstetricia et Gynecologica Scandinavica* 92: 1395–1406. https://doi.org/10.1111/aogs.12253

PENMAN-AGUILAR, A.–CARTER, M.–SNEAD, M. C.–KOURTIS, A. P. (2013): Socioeconomic disadvantage as a social determinant of teen childbearing in the U.S *Public Health Reports* 128 (2_suppl1): 5–22. https://doi.org/10.1177/00333549131282S102

RIZZO, H. M. (2014): Adolescent fertility and early marriage. In: COCKERHAM, W. C.–DINGWALL, R.–QUAH, S. R. (eds.): *The Wiley Blackwell Encyclopedia of Health, Illness,*

Behavior, and Society pp. 15–18., 1st edition, Chicester: John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118410868.wbehibs080

SANTELLI, J. S.–LOWRY, R.–BRENER, N. D.–ROBIN, L. (2000): The association of sexual behaviors with socioeconomic status, family structure, and race/ethnicity among U.S. adolescents *American Journal of Public Health* 90 (10): 1582–1588. https://doi.org/10.2105/ajph.90.10.1582

SANTELLI, J. S.–SONG, X.–GARBERS, S.–SHARMA, V.–VINER, R. M. (2017): Global trends in adolescent fertility, 1990–2012, in relation to national wealth, income inequalities, and educational expenditures *Journal of Adolescent Health* 60 (2): 161–168. https://doi.org/10.1016/j.jadohealth.2016.08.026

SEDGH, G.–FINER, L. B.–BANKOLE, A.–EILERS, M. A.–SINGH, S. (2015): Adolescent pregnancy, birth, and abortion rates across countries: levels and recent trends *Journal of Adolescent Health* 56 (2): 223–230. https://doi.org/10.1016/j.jadohealth.2014.09.007

SHOFF, C.–YANG, T. C. (2012): Spatially varying predictors of teenage birth rates among counties in the United States. *Demographic Research* 27: 377–418. https://doi.org/10.4054/DemRes.2012.27.14

SMITH, T. (1993): Influence of socioeconomic factors on attaining targets for reducing teenage pregnancies *BMJ* 306 (6887): 1232–1235. https://doi.org/10.1136/bmj.306.6887.1232

SOUTH, S. J.–CROWDER, K. (1999): Neighborhood effects on family formation: Concentrated poverty and beyond *American Sociological Review* 64 (1): 113–132. https://doi.org/10.2307/2657281

STANAITIS, S.–ČESNAVIČIUS, D. (2010): Dynamics of national composition of Vilnius population in the 2nd half of the 20th century *Bulletin of Geography: Socio-Economic Series* 13 (13): 31–44. https://doi.org/10.2478/v10089-010-0003-4

STANKŪNIENĖ, V. (2006): Gimstamumas. In: STANKŪNIENĖ, V. (ed.): *Lietuvos gyventojai: struktūra ir demografinė raida* pp. 116–135., Statistikos departamentas prie Lietuvos Respublikos Vyriausybės & Socialinių tyrimų institutas, Vilnius.

STANKŪNIENĖ, V.–MASLAUSKAITĖ, A.–BAUBLYTĖ, M. (2013): *Ar Lietuvos šeimos bus gausesnės?* Lietuvos socialinių tyrimų centras, Vilnius.

TRETJAKOVA, V. (2016): Gimdymo paauglystėje raida ir teritorinė diferenciacija Lietuvoje *Geografijos Metraštis* 49: 17–30.

TRETJAKOVA, V.–POCIŪTĖ-SEREIKIENĖ, G.–UBAREVIČIENĖ, R. (2018): Paauglių kūdikių gimstamumo kaitos tendencijos: Europos sąjungos kontekstas ir regioninė diferenciacija Lietuvoje *Lietuvos statistikos darbai* 57 (1): 41–55. https://doi.org/10.15388/LJS.2018.4

UBAREVIČIENĖ, R. (2017): Socio-spatial change in Lithuania: Depopulation and increasing spatial inequalities *A + BE Architecture and the Built Environment* 9: 1–257. https://doi.org/10.7480/abe.2017.9

VÄISÄNEN, H.–MURPHY, M. (2014): Social inequalities in teenage fertility outcomes: childbearing and abortion trends of three birth cohorts in Finland *Perspectives on Sexual and Reproductive Health* 4 (2): 109–116. https://doi.org/10.1363/46e1314

VINER, R. M.–OZER E. M.–DENNY, S.–MARMOT, M.–RESNICK, M.–FATUSI, A.–CURRIE C. (2012): Adolescence and the social determinants of health. *The Lancet*, 379(9626), 1641–1652. https://doi.org/10.1016/S0140-6736(12)60149-4

WALFORD, N.–KUREK, S. (2016): Outworking of the second demographic transition: National trends and regional patterns of fertility change in Poland, England and Wales, 2002–2012 *Population, Space and Place* 22: 508–525. https://doi.org/10.1002/psp.1936

INTERNET SOURCES

BELL, J.–CLISBY, S.–CRAIG, G.–MEASOR, L.–PETRIE, S.–STANLEY, N. (2004*)*: *Living on the edge: Sexual behaviour and young parenthood in rural and seaside areas* (Working papers in social sciences and policy) University of Hull, Hull. https://www.education.gov.uk/publications/eOrderingDownload/RW8.pdf (downloaded: October 2020).

EUROPEAN PARLIAMENT, DIRECTORATE-GENERAL FOR INTERNAL POLICIES, POLICY DEPARTMENT C – CITIZENS' RIGHTS AND CONSTITUTIONAL AFFAIRS (2013): *Policies for sexuality education in the European Union* European Parliament, Brussels. https://op.europa.eu/en/publication-detail/-/publication/17522867-38aa-4ec5-b5b4-711d96f7b900 (downloaded: October 2020)

JASILIONIS, D.–STANKŪNIENĖ, V.–MASLAUSKAITĖ, A.–STUMBRYS, D. (2015): *Lietuvos demografinių procesų diferenciacija* Lietuvos socialinių tyrimų centras, Vilnius. http://demdiff.lt/wp-content/uploads/2015/10/maketas_leidyklai_pataisytas.pdf (downloaded: October 2020)

PLANNED PARENTHOOD FEDERATION OF AMERICA (2013): *Reducing teenage pregnancy* https://www.plannedparenthood.org/files/6813/9611/7632/Reducing_Teen_Pregnancy.pdf (downloaded: October 2020)

STATISTICS LITHUANIA (2020): *Database of indicators* https://osp.stat.gov.lt/statistiniu-rodikliu-analize#/

UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, POPULATION DIVISION (2013): *Adolescent fertility since the International Conference on Population and Development (ICPD) in Cairo* United Nations, New York. https://www.un.org/en/development/desa/population/publications/pdf/fertility/Report_Adolescent-Fertility-since-ICPD.pdf (downloaded: October 2020).