ORIGINAL RESEARCH

Development of Social Welfare Policies in the South Asian Association for Regional Cooperation (SAARC) Countries: Globalization and Democracy

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Abstract

The study extends the debate on social spending in the developing world by taking the South Asian Association for Regional Cooperation (SAARC) countries to examine the social policy reactions of democratic and non-democratic regimes to globalization which is one of the main social challenges of sustainable development. This article investigates the impact of globalization and democracy on the aggregate and disaggregates levels of social spending for the selected SAARC countries from the period 1996–2018. The investigation includes how governments react to the challenges of globalization with the welfare policy decisions that are located more toward reducing cost ("efficiency theory") otherwise ensuring individuals' government assistance ("compensation theory"). The results support both the efficiency and compensation thesis depending on which type of globalization indicator is taken under consideration, however, it would be misleading to assume that the efficiency thesis is valid for all developing countries. By using the TSCS data technique on SAARC countries we discovered the impact of globalization on social spending that was supposed to be conditional on regime type. However, the interactive variables reveal an important finding that trade openness tends to increase social spending (the coefficient indicates little systematic effect), and financial openness tends to cut social spending, while democracy of SAARC countries has no significant role or unrelated in counterbalancing these effects. Hence, social spending cannot automatically develop human capital through democratic regime, further SAARC governments are usually in fiscal insolvency that results in allocating most of the resources from budget on debt repayments, leaving a small portion for social-related expenditures.

Keywords SAARC · Globalization and democracy · Social welfare · Social spending · TSCS techniques · Efficiency theory · Compensation theory

JEL Classification F2 · O53 · P2

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1 Introduction

The economic openness of markets for goods, services, capital, and knowledge has been widespread in the last twenty-five years which is without historical similarity (Potrafke, 2018). In contradiction to a broader context of globalization, South Asian Association for Regional Cooperation (SAARC) countries (India, Pakistan, Bangladesh, Nepal, Sri Lanka, Afghanistan, Bhutan, and Maldives) have experienced the most melodramatic change in their economic policies since the 1990s. SAARC governments have founded a broad collection of reforms that were aimed at integrating their economic policies and economies into international markets (Mishra, 2019).

However, globalization has offered a cluster of a group in society new chances and openings, while it has also generated new ways of insecurity and inequality (Avelino et al., 2005). The relative studies have also given considerable importance to the crises of social spending, and the incapability of developing countries to maintain large welfare programs and also guarantee sustainable economic growth (Ha, 2015; Hicks & Zorn, 2005; Nooruddin & Simmons, 2009; Swank, 2005). Particularly with the decrease in trade restrictions since the 1980s, the pressure between globalization and social spending seemed more pronounced (Rhodes, 1996; Rodrik, 1998).

In this view, questions about how states accommodate government assistance to their citizens with globalization have gained new significance. This research attempts to explain a similar question: How has the globalization of goods, services, and capital influenced the social spending decisions of SAARC governments? In particular, have governments made more grounded security nets due to greater pressure of economic openness? Or have they generated new types of social aids which are being provided to address the new social difficulties of globalization? This study investigates how governments react to the challenges of globalization with welfare policy decisions that are located more towards reducing cost (efficiency) or else ensuring individuals' government assistance (compensation).

In brief, the efficiency approach hypothesizes economic openness limits welfare spending, leaving the government to prefer efficiency over social expenditures (Avelino et al., 2005) while the compensation hypothesis asserts that policymakers supporting integration will give government assistance as side payments to displaced laborers in return for their support for integration (Štreimikienė et al., 2020; Huber & Stephens, 2002).

Figure 1 below shows a contrary to the situation to these questions in the selected SAARC countries (Pakistan, Bangladesh, India, Nepal, and Sri Lanka), the welfare states (social spending measured as education, health, and social security) have shown a quite gradual and slow growth over the last 24 years. Trade openness increased by approximately 5.3% between the time period of 1996–2006, while it declined by 7.3% in 2018 compared to 2006. The overall economic globalization is indicated by the KOF index which reveals that economic globalization has improved by approximately 15% over the time period of 1996–2018 in the selected South-Asian countries. Foreign investments and FDI can be the best choice for developing countries like SAARC to boost their economic growth, however, unfortunately, the SAARC countries have been unsuccessful to attract foreign investors the trend of FDI is quite unimpressive and slow in overall SAARC countries.

Since the welfare state of developing countries is one of the least studied areas in the political economy, this research focuses on selected SAARC countries from the period of 1996–2018 and investigates potential differences between democratic and authoritarian regimes in a particular part, "social spending". Our analysis is diverse, first, it covers two kinds of literature, one on democracy and the other on globalization, which has been mostly studied
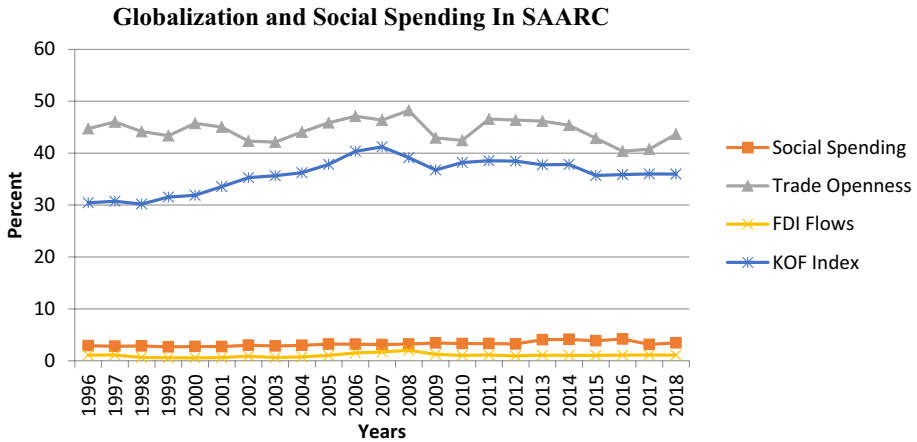
Globalization and Social Spending In SAARC

Fig. 1 Social spending, Trade openness, FDI flows, and KOF index of SAARC countries

in mutual isolation and otherwise generally studies focused on OECD and Latin American countries. Second and finally, the previous literature has neglected the SAARC region or merely covers two or three countries of SAARC while undertaking developing countries, however, we present a case study of SAARC by demonstrating the weakness of their welfare state and exposure of globalization and democracy.

The democracy literature gives well-built arguments for redistribution in democratic regimes than the authoritarian counterpart. Simultaneously, opponents of globalization argue that global market integration can counterbalance these effects and make domestic politics powerless. This study tries to accommodate these conflicting views through an exploration structure that considers the joint impact of regime type and globalization.

The main research objective of this study is to examine the effects of economic globalization (through trade, financial openness or the KOF Index) and democratization on social spending (education, health and social security) in SAARC countries from 1996 to 2018. Furthermore, we provide compositional analysis by decomposing social spending data into Health, Education and Social security expenditures pioneered by Avelino et al. (2005) and Kaufman and Segura-Ubiergo (2001) to analyze which indicator of social spending is more sensitive to globalization. Finally, this study examines do governments (any regime-type) respond to the challenges of globalization (economic openness) with their social policy selection by interacting with globalization and regime-type indicators.

The next sections explain the literature review on the welfare state and related theories, globalization and democracy and how they all interact with each other. Section 3 explains the measurement of variables in the study while Sect. 4 explains the econometric analysis and methodology of Panel-ARDL followed by a discussion of the results and findings of the study. Lastly, Sect. 5 concludes the research and provides useful findings for policymakers.

2 Literature on the Welfare State

Founding a theoretical basis for examining welfare spending in developing countries like SAARC in the age of globalization involves building numerous schools of thought since there is not ample research available on the ground that most of the studies are on the OECD (Yoon, 2009). There is a lack of empirical studies on welfare spending, especially in developing countries, it's quite tough to explain why social spending has increased in some developing countries just similar to OECD countries and why social spending has been the lowest in other countries with greater economic openness in the world.

We begin with the explanation of the two confronting theories; the efficiency hypothesis and compensation hypothesis as each suggests a different proposal about the interest of economic and political factors that any government regime type may confront. Furthermore, we proceed with the literature on globalization and social spending focusing on possible economic openness variables that impact the developed world and developing world differently. Finally, we incorporated the democracy factor which explains how the two main (democratic or authoritarian) regime type affects the decision of welfare spending in the era of globalization.

2.1 Efficiency and Compensation Hypothesis

The efficiency hypothesis assumes that high social spending makes international markets less competitive. This effect can transmit through different channels. High social spending can be connected, for example, to higher taxation that results in high labor costs and decreases the efficiency of both exports and domestic production which are exposed to international competition (Kaufman & Segura-Ubiergo, 2001). Second, high fiscal expenditures can decline competitiveness by increasing interest rates, hence leading to crowding-out effects on private investors and increasing the values of the exchange rate (Avelino et al., 2005). As a result, businesses are progressively more exposed to international competition; they can push governments to decrease social expenditures. Therefore, the efficiency hypothesis assumes that there is a zero-sum quality of the relationship between the welfare state and trade openness.

We might also expect a decrease in labor capacity to resist reducing welfare spending. The Heckscher-Ohlin theorem (1933) can be considered to infer the opposite: that in labor-abundant developing countries the growth and development of trade would lead to higher returns to labor and also an increase in its bargaining power (Rogowski, 1989). However, for several reasons, this has not been the case in SAARC. First, Rodrik (1998) gives an argument with respect to LDCs in general, that capitalists have greater exit choices than workers, as their positions are better to decide when to close or move their plants as the labor cost increases. Contrary to theoretical expectations, liberalization of trade in several parts of South Asia has come up with increased demand for skilled workers, rather than for low-skill. Even in some countries where this is not the case, a large number of primary and informal sector laborers create a slack that cannot be easily reduced in the labor market (Rudra & Haggard, 2005). During 2000–2008 the proceed to privatization was highest in South Asia, however, the bulk was realized by India, and Pakistan, followed by Nepal, Sri Lanka, and Bangladesh (Estrin & Pelletier 2018). As economies expose themselves to more international competition, therefore, the incentives for the state to restrain social spending growth become more powerful, while the political cost has been declining.

The compensation hypothesis explains that the welfare state counterbalances the risk of globalization by investing more in the human capital (Kaufman & Segura-Ubiergo, 2001). This hypothesis is supported by several studies that make a robust empirical relation between globalization, large public sectors, and social safety net programs (Cameron, 1978). The quantitative research has generated more empirical work in support of the compensation thesis as far as developed countries are concerned. Increased economic openness also reinforces welfare spending to strengthen human capital. This is also evident because developed countries usually have large welfare spending budgets to enhance the competitiveness and productivity of the economy in local and international markets. This hypothesis needs to be reconsidered we should not expect a similar pattern in developing countries like SAARC, where both factors of production and political history are definitely different from the advanced countries.

All in all, the efficiency hypothesis asserts that welfare spending and taxation should have been a clear goal for globalization persuading reduction of cost in recent years. While the compensation hypothesis suggests the reverse effect of the efficiency hypothesis. It emphasizes social spending as an instrument for offsetting the social costs of globalization and for the development of human capital. According to the literature, in developing countries the efficiency hypothesis seems more fit (Avelino et al., 2005; Kaufman & Segura-Ubiergo, 2001; Yoon, 2009) In developed states particularly OECD countries compensation hypothesis has shown a strong association between globalization, public spending, and high social spending (Cameron, 1978; Dreher, Sturm, & Ursprung, 2008; Gozgor & Ranjan, 2017; Gründler & Köllner, 2017; Herwartz & Theilen, 2014; Meinhard & Potrafke, 2012; Potrafke, 2009, 2015; Schulze & Ursprung, 1999; Walter, 2010; Yay & Aksoy, 2018).

2.2 Globalization and Social Spending

The discussion on the connection between globalization and social spending produces contrasting expectations as far as advanced and developing countries are concerned. However, the literature on social spending does not adequately describe why the trend of welfare spending in LDCs differs from that of developed countries.

Garrett and Mitchell (2001) analyzed OECD countries, which is considered one of the most convincing studies for developed countries. He explained that globalization, in reality, encouraged public spending on welfare programs to compensate for the risk associated with international market integration through effective negotiation between labor and governments. Various researchers have given other foundation clarification and de-emphasize the labor group's influence on government spending in advanced countries.

Schuknecht and Zemanek, (2018) explain the development of rising social expenses and its ultimate consequences as "social dominance". However, there is heterogeneity across OECD countries with respect to globalization effects. As, social spending increased in West European countries (high-income) and decreased in East European countries (low-income) when there was a high growth of globalization (Leibrecht et al., 2011). The effects of globalization are also varying across state regimes type such as democracy, conservative and Mediterranean welfare type (Yay & Aksoy, 2018).

Grauwe and Polan, (2005) presented evidence in OECD countries that a well-developed social sector does not face trade-offs between globalization, competitiveness and social spending. A study by Ha (2015) also found a positive impact of globalization on education and healthcare, on the other hand, a negative impact of external debt on

social security. The recent work of Hedberg, Karlsson, & Häggqvist, (2017) conducted for European countries explained that social spending is mainly determined by higher economic growth, as the trade openness influenced these economies greatly and consequently they are able to create ample wealth for the redistribution (compensation) policies.

Few studies directly look at social spending and globalization in LDCs and these studies concluded globalization constraints welfare spending (Avelino et al., 2001; Potrafke, 2018; Rudra & Haggard, 2005; Wibbels, 2006; Yoon, 2009). The literature on the LDCs recommends that globalization and the extent of social spending assurance appear to be negatively correlated (Kaufman & Segura-Ubiergo, 2001; Rudra, 2004). The studies on developing countries argue that increased trade openness and investment constrain public spending, including welfare spending (Dreher et al., 2008). Large capital mobility can stress the control of tax movable assets. Further, the economy which is more dependent on export may have a similar consequence if export-oriented firms perceive tax as a constraint on competitiveness (Rudra & Haggard, 2005). Unless, if governments are able to compensate for the loss with other resources (Swank, 1998). Scholars also explained that social spending in LDCs not only tends to be declining, but the openness strongly affects labor power and deteriorates their capacity to ask for more redistributive spending (Rudra, 2004).

There are several reasons for developed countries to compensate for risks and threats of greater economic openness which developing countries' governments do not have. Rudra (2002) explained one reason that the bargaining power of labor in developing countries is weaker than in industrialized countries as their trade unions need highly skilled workers and these highly skilled workers and strong trade unions have been there in industrialized countries. However, in developing countries workers are relatively unskilled and trade unions are generally weaker. Wibbels (2006) pointed out that governments in LDCs face greater complications to borrow from capital markets to spend counter-cyclically on social programs than governments in developed countries.

Researchers also explore the impact of social expenditures on different variables of economic globalization. For example, Rudra (2002, 2005) uses social spending as a dependent variable while she measured globalization by trade openness and gross capital flows. The sample was taken for 57 LDCs over the period 1972–1995, the results reveal that both trade openness and gross capital flows are positively associated however, both interactive terms were negatively correlated with social spending. Wong (2016) investigated 16 Asian and Pacific countries from the time period 1960–2012, the globalization was measured by trade openness and FDI. The results show that trade openness negatively affects health spending while FDI has positive effects on overall social expenditures.

(Potrafke, 2018) took the data from selected Asian high-income and low-income countries, the KOF Index is taken as a globalization variable, and the results suggest that globalization does not influence social spending in Asia, neither Asian citizens demand high social support with greater openness as they get mostly assistance from their family and other private sources. Yay and Aksoy (2018) investigated the efficiency and compensation hypothesis to check the impact of globalization on the welfare state in 32 countries data from the period 1980 to 2010. They employ social security transfer as % of GDP as a measure of the welfare state while for globalization they employ all indices (economic, social and political) of the KOF index. Their results support the compensation hypothesis under social democratic and conservative regimes while the efficiency hypothesis is supported under liberal welfare states.

2.3 Democracy and Social Spending

One of the unique characteristics of elected governments is the capability of its citizen to make them accountable consistently. This induces governments to follow policies that settle with their citizen's interests. In developing countries like SAARC where most of the voters are living in rural areas and have low income, it trails that governments should pursue social programs which are based on health, education, and other social-security-related programs. The association between democracy and social spending has been discussed in various studies, but mostly they are cross-sectional in nature (Huber & Stephens, 2009). However, these studies are deficient for two reasons. First of all, most studies are concentrated on Latin American countries(Avelino et al., 2005; Kaufman & Segura-Ubiergo, 2001), selected countries in Asia (Potrafke, 2018) The debate regarding democracy and social programs have been negligible in SAARC, in spite of its geostrategic and economic importance (Giunchi, 2011).

The second issue on democracy and social spending is that their results vary significantly. Most of the quantitative studies analyzed that democracies generate better collective incentives, and establish wider social programs and redistribution policies in favor of lower quintile groups. While many hold the arguments, in particular, that democratic governments tend to be devoted more to education and health or at least one of these sectors than non-democratic regimes (Avelino et al., 2005; Brown & Hunter, 1999; Hecock, 2006; Kaufman & Segura-ubiergo, 2001).

The relationship between democracy and social spending has also got challenged. Wintrobe (1998) argued in his book *Political Economy of Dictatorship/autocracy,* authoritarian leaders are more unconfident therefore, they have to focus more on redistribution. The authoritarian regime uses controlled elections; this persuades authoritarian leaders to employ welfare spending policy as a "survival strategy" (Ames, 1990). However, some researchers found no connection between democracy and social spending (Mulligan et al., 2004), while some argue that as the size of government expenditures rises this automatically translates into greater education and health spending outcomes (Nelson, 2007). All in all, most of the literature support democracy as far as the welfare state is concerned.

The scholars also emphasize on the measurement of democracy[1] that it should be taken as a continuous variable. Alvarez et al. (1996) explained the dichotomous measure of democracy by clarifying the democratic and authoritarian regimes based on clear functional rules and claimed that the continuous scale of democracy leads to very small measurement errors especially when the country's cases are symmetric. Brown and Hunter (1999) investigated the impact of democracy on social spending by taking 17 Latin American countries; they used both dichotomous and continuous democratic regime measures and found only minor or negligible differences in their results. Therefore, for graphical analysis, we use a continuous democratic variable which is taken from Polity index IV (Fig. 2), and for econometric analysis, we used the dichotomous measure of democracy which is in general deemed as less controversial.

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[1] The democratic or non-democratic regime is considered in terms of three elements: i) chief executive selection ii) legislative selection iii) partisanship or political party (Alvarez et al., 199 and Avelino et al., 2005).
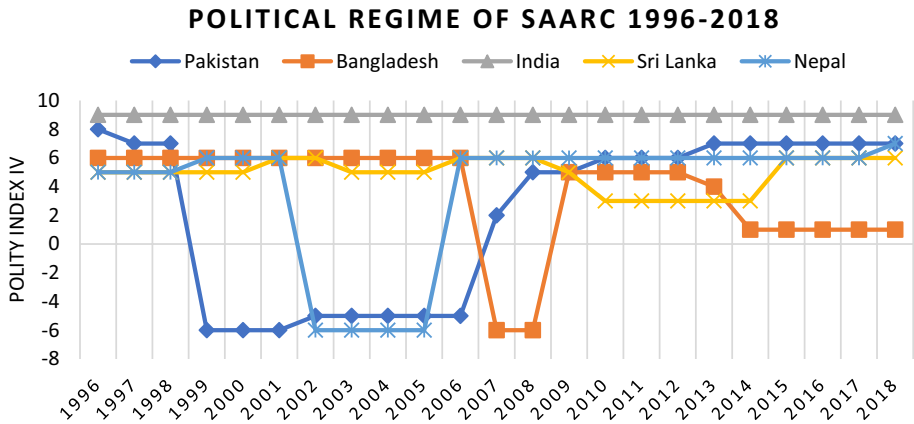
POLITICAL REGIME OF SAARC 1996-2018

Fig. 2 Polity Index IV of SAARC Countries (1996–2018)

2.4 Democracy, Globalization and Social Spending

The literature on developed countries implies that welfare spending under globaliza-tion relies more on liberal democratic governments and their organizations. Debatably, this view cannot be obtainable for the citizens of developing countries. Several studies have investigated the political regime's response towards social spending and claim that government regime type plays an important role in social welfare policies under the increasing globalization (Benedetto et al., 2020; Jensen & Skaaning, 2015; Shin, 2020). There is a common consensus that in a democracy the policymakers tend to face pres-sures from elections, they are supposed to allocate larger budgets for social spending than those in non-democratic regimes.

A number of empirical studies advocate the argument that governments under a dem-ocratic system tend to spend more on social spending. By taking 17 Latin American countries Avelino et al. (2005) show that democratic governments are likely to spend more on welfare-related programs comparatively non-democratic governments while social spending tends to decline with increased economic globalization. Adserà and Boix (2002) investigated sixty-five countries from 1950 to 1990, they reveal that the interactive term between globalization and democracy has a positive influence on social spending. (Ha, 2015) examines the sixty-seven less developed countries from 1975 to 2005, their empirical results reveal that the highly democratic countries tend to spend more on social security spending while the non-democratic spend more on education, their results also revealed that the external debt causes a reduction in welfare programs as it imposes direct cost and burden on businesses.

In the case of SAARC, we expect social spending does not automatically develop human capital through democracy but requires some pre-conditions. It is also observed that political leaders adopt those developmental policies which are more beneficial in the short run in the case of SAARC (Giunchi, 2011). However, democratic governments have more benefits to compensate for the risk associated with globalization through Keynesian policies or by increasing social security nets (Rudra & Haggard, 2005).

3 Research Design and Methodology

3.1 Measurement of Variables

3.1.1 The Dependent Variable

The previous studies have taken social spending either as a percentage of countries' GDP or GDP per capita (Hicks and Swank, 1992; Rudra, 2002, 2005). Several studies which examined globalization and social spending have also used central government spending or total government revenues as the dependent variable (Cameron, 1978; Garrett, 2001; Iversen and Cusack, 2000; Quinn, 1997; Rodrik, 1998). Although, gauging the dependent variable as total government revenues or central government spending can create measurement errors because the items including in these variables are not directly related to social spending. Further, the aggregate government spending or revenue can increase even without growing of social expenditures. In response to larger economic openness, some governments may provide subsidies to domestic industries (Grunberg, 1998), while other may increase their expenses on national security to avoid public protests against global economic integration (Looney, 1993) Thus, taking the aggregate government spending or revenues would incorrectly present the social spending with other spending components which are in greater priority of the government (Rudra, 2005).

3.1.2 Aggregate Social Spending

In order to take correct measurement of social spending in this study we take the dependent variable (summation of education, health and social security) measured as a percentage of real GDP (Avelino et al., 2005). We also analyze in detail the effects of globalization and democracy at disaggregate level of social spending pioneered by Kaufman and Segura (2001) and also followed by Rudra and Haggard (2005).

3.1.3 Social Security, Education and Health

We have taken education, health and social security spending as disaggregate social spending followed by Kaufman and Segura-Ubiergo (2001). Social security depicts the different kind of social insurance provided by government. However, in the developing countries like SAARC social security is aimed to provide narrower category of public and therefore, it can be more exposed to the "efficiency" pressure of economic openness.[2]

In comparison, education and health spending reflects the significance and priority governments give to investment in human capital. It is assumed to remain competitive; an economy which is more open to trade may invest more on human capital comparatively an economy which is less open to trade.

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[2] See Nita Rudra (2005)

3.2 Primary Explanatory Variable

Globalization can be represented by several globalization indicators. For the robustness of the results in this study we also take alternative measures of economic globalization. With respect to measures of economic openness, an important distinction has been observed between financial openness and trade openness. These are two different aspects, as trade openness has usually a much stronger impact on policy outcomes because it regulates the magnitude to which the economic agents are supposed to expose in economic internationalization, while in comparison financial openness may have a limited impact (Garrett, 1998). We have incorporated trade openness (Avelino et al., 2005; Garrett and Mitchell, 2001; Eunyoung Ha, 2015; Ha & Cain, 2017; Islam, 2004; Shahbaz, Rehman, and Amir, 2010; Rudra, 2005) and FDI percentage of GDP (Ha & Cain, 2017; Shahbaz, Rehman, and Amir, 2010) separately. The indicator of trade openness is a typical one, exports plus imports as a share of GDP, whereas FDI percentage share of GDP is taken as financial openness proxy; however, this measure is not a direct indicator to measure capital control but is considered as a good proxy.

Alternative Measures of Globalization For the robustness of the results, we have taken the direct measure of economic globalization "KOF index", which is now considered a relatively more comprehensive measure in the globalization literature such as Potrafke, (2018), Busemeyer and Garritzmann (2019), and Dreher et al. (2008) emphasized on the use of KOF Index instead of traditional economic globalization measures. However, it is worth mentioning that the variables of economic globalization taken in our original model (trade openness and FDI flows) are a more accurate and precise predictor of any changes in social spending in SAARC than the more comprehensive KOF economic globalization index. The index is based on IMF Annual reports, it contains the trade and capital flows as well as information related to domestic capital mobility controls.

Democracy shows government type and is measured with a dummy variable for the political regime, as zero represents non-democratic years and one in democratic years (Avelino et al., 2001). This measure is taken from Alvarez et al. (1996). According to previous studies democratic governments are likely to be more generous in social spending as political leaders under democracy seem more eager to spend on social safety nets to gain electoral support.

Control Variables:

Economic Growth and GDP per Capita are among the control variables. It is experiential that social spending increases when income per capita increases. In developed countries social expenditures are countercyclical. For example; unemployment allowances and transfers rise during recessions and decrease when the economy is expanding. Therefore, it can be assumed that in developing countries like SAARC, the social policy is pro-cyclical and social commitments increases merely when economic growth is sound and contract during economic crises (Haggard and Kaufman, 1992; Wibbels, 2006).

Debt is the total debt service measured as a percentage of GNI (pioneered by Yoon, 2009). A high ratio indicates most of the resources of government allocates to debt repayment. Kaufman and Segura-Ubiergo (2001) stated that the higher debt service ratio limits government spending. Therefore, the higher debt service ratio to GNI may negatively relate to social spending.

Population over 65 is a demographic variable, is described as the population over 65 years or above as a percentage of the total population. There can be an important impact of the elderly population on social security and health spending. However, interpreting this variable for developing countries is quite difficult. On the one hand, the pure demographic factor may work, for example, pension and healthcare facilities result in higher social spending as this elderly part of the population proportion expands (Avelino et al., 2001; Rudra, 2005; Wibbels, 2006; Iversen and Cuseck, 2000).

Unemployment Rate, Despite the high unemployment and few unemployment programs in SAARC countries the coefficient is likely to be positively associated with social spending as if there are more unemployed workforce, it is likely that government may compensate through social policies such as unemployment allowances etc.

Inflation rate, there is often pressure for the government to reduce spending, indirect effect.

We selected five SAARC countries for three main reasons. First, as we have already mentioned above, the social sector and welfare state of developing countries especially the SAARC region has not been considered by scholars and no systematic study has been explained to deal with the social spending in South Asian developing countries except only a few studies such as Rudra and Haggard (2005) and Potrafke (2018). Second, an incredible form of globalization has occurred even in developing countries like SAARC over the last 25 years. Since the 1980s, most South Asian countries have been integrated into the world markets. Hence, trade openness and capital flows have been growing tremendously in this region since the 1990s. Third and final, developing countries like SAARC also have joined the wave of democratization. There is also a fact that this wave of democratization is also parallel with the course of globalization which highlights the statement of how regime type with the effects of globalization can impact (positive or negative) social spending.

3.3 The Data Sources

To investigate the impact of economic openness and democracy on social spending, we examine the annual data of five selected SAARC countries from 1996 to 2018, including Pakistan, Bangladesh, India, Sri Lanka, and Nepal. We have excluded Afghanistan, Bhutan and Maldives as the data of these countries are scattered and missing for the social spending variables. We gathered annual data on social spending for the selected five SAARC countries from Government Finance Statistics (GFS) Book. The full data matrix includes 5 countries × 23 years and thus, the maximum number of observations is 115. The data on economic and demographic variables are taken from World Development Indicators (WDI) and the data on democracy is extracted through the Center for systematic Peace (CFSP) and converted into dummy variable (1 = democracy and 0 = non-democracy) by adopting the methodology of Alvarez et al., (1996) and Avelino et al., (2005) The complete explanation of the data is given in Table 1.

3.4 Panel-ARDL Model

Our panel sample contains 5 countries and 23 years. Since our sample has more time periods than cross-sample units, the variables might be non-stationary and may integrate at I(1). In this context, the use of the panel ARDL model as proposed by Pesaran and Smith (1995) and Pesaran et al. (1999) seems more appropriate. These authors

Table 1 Data source and management variables

Variables	Measurement	Data Source	Expected Sign
Social Spending	Measured as a % of GDP	IMF, Government Finance Statistics	Dependent Variable
Trade Openness	Exports plus Imports % of GDP	World Bank, World Development Indicator (WDI)	-ve or +ve
Financial Openness	FDI % of GDP	World Bank, World Development Indicator (WDI)	-ve or +ve
KOF Economic Globalization Index	KOF Index	KOF Swiss Economic Institute (ETH Zurich)	-ve or +ve
Democracy	Measured as a dichotomous variable with a value of 1 in democratic years and 0 in non-democratic years	Alvarez et al. data set (Polity IV Index)	+ve
GDP per capita	2011 constant in PPP	World Bank, World Development Indicator (WDI)	+ve
Economic Growth	Annual % of growth rate of GDP	World Bank, World Development Indicator (WDI)	+ve
Debt	Total debt service % of GNI	World Bank, World Development Indicator (WDI)	-ve
Inflation Rate	Consumer prices (annual %)	World Bank, World Development Indicator (WDI)	-ve
Unemployment Rate	Unemployment, % of total labor force	World Bank, World Development Indicator (WDI)	+ve
Population over 65	Population ages 65 and above as a % of total population	World Bank, World Development Indicator (WDI)	+ve

Source: Authors' Estimation

explained that there are more advantages of using the Panel-ARDL model over the dynamic panel methods, for example, the fixed effect instrument variables or the GMM estimators, as these methods usually produce inconsistent estimates of the mean value of the parameters except the coefficients are same across countries.

The generic version of the Panel-ARDL model:

$$y_{i,t} = \sum_{j=1}^{p} \delta_i y_{i,t-j} + \sum_{j=0}^{q} \beta_{ij} X'_{i,t-j} + \varphi_i + \varepsilon_{i,t} \dots \dots \dots . \tag{1}$$

where $y_{i,t}$ is the dependent variable and is kxl vector that is allowed to be purely I(0) or I(1) or co-integrated. While δ_i is the coefficient of lagged dependent variable which is also called scalars; β_{ij} are kx1 coefficient vectors; φ_i is the unit specific fixed effects and i = 1,2 …N; t = 1,2 …..N; p,q are optimal lag orders and $\varepsilon_{i,t}$ is the error term.

The re-parameterized ARDL (p,q,q, ….q) error correction model is specified as:

$$\Delta y_{i,t} = \theta \left[y_{i,t-1} - \lambda_i X'_{i,t} \right] \sum_{j=1}^{p-1} \in_{i,j} \Delta y_{i,t-j} + \sum_{j=1}^{p-1} \beta'_{i,j} \Delta X_{i,t-j} + \varphi_i + \varepsilon_{i,t} \tag{2}$$

where λ_i measure the long-run impact of explanatory variables. θ is the impact of error correction mechanism. While the remaining parameters are the short-run coefficient. $\varepsilon_{i,t}$ is error term independently distributed across time and units.

Where the λ_i is our vector of interest, which measures the long-run impact of the explanatory βi variables on the share of renewables and is the error corrector mechanism impact. The remaining φi parameters are the short-run coefficients. The disturbances are independently distributed across ε *it* time and units, with zero mean and variance constant within each unit. $\in_{i,j}$, $\beta'_{i,j}$ are the short run dynamic coefficient.

The model of Eq. 1 shows the parameters to vary between units. Pesaran and Smith (1995) and Pesaran et al. (1999) explained that the model can consistently estimate using the Mean Group (MG) estimator that estimates the parameters of each country and averages out for the group. While the Pooled Mean Group (PMG) varies from country to country in the short-run but forces the long-run ones to be homogenous. To apply this methodology the variables have to be a combination of I(1) and I(0) and to read a model as an error correction mechanism, the variables have to be co-integrated. Therefore, in the next section, we demonstrate the unit root test of the variables, then the existence of cointegration and finally the results of panel estimators.

3.5 Models for the Analyses

In the following models, SSpend represents aggregate social spending (education, health and social security). The globalization variables are Trade Openness (TO), Foreign Direct Investment (FO), and the KOF index represents economic globalization. Democracy(demo) is a political variable. The economic control variables are Economic Development (ED), Economic Growth (EG), debt, inflation rate (inf) and unemployment rate (UR). While education spending (eduspend), health spending(healSpend) and social security spending (SocsecSpend) are the disaggregate level of social spending and i,t represents the years and countries of observation respectively.

3.5.1 Aggregate research model for Trade openness and Financial Openness (Model 1 and 2)

$$SSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt)$$

and with interaction term

$$SSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt, TO * Demo, FO * Demo)$$

3.5.2 Aggregate research model for KOF Index of Globalization (Model 3 and 4)

$$SSpend_{i,t} = f(KOF, Demo, GR, ED, UR, Inf, Debt)$$

and with interaction term

$$SSpend_{i,t} = f(KOF, Demo, GR, ED, UR, Inf, Debt, KOF * Demo)$$

3.5.3 Disaggregated Social Spending

Education (Model 5 and 6)

$$EduSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt)$$

and with interaction term

$$EduSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt, TO * Demo, FO * Demo)$$

3.5.4 Health (Model 7 and 8)

$$HealSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt)$$

and with interaction term $HealSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt, TO * Demo, FO * Demo)$

3.5.5 Social Security and Welfare (Model 9 and 10)

$$SocsecuSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt)$$

and with interaction term, $SocsecuSpend_{i,t} = f(TO, FO, Demo, GR, ED, UR, Inf, Debt, TO * Demo, FO * Demo)$

4 Estimation and Results

4.1 Descriptive Statistics

Table 2 gives the descriptive statistics of the variables involved in this study. Overall average of all countries included in panel for all variables are in single digit only two variables TO & KOF are in double digit. The variation captured by standard deviation is also high in these variables. Skewness & Kurtosis which is the indicator of normality of the variables, from the table none of the variable has skewness close to zero, depicts the non-normality

Table 2 Descriptive statistics

Variables	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
SS	3.2383	2.3048	0.3000	9.2300	0.6397	2.5204
FO	1.0423	0.7455	−0.1000	3.6700	1.1974	4.9838
TO	44.4603	15.0106	21.9295	88.6364	0.8913	3.3881
Debt	2.4039	1.4872	0.7585	8.5493	1.6013	6.2938
LED	6.9178	0.5772	6.0191	8.2780	0.6119	2.6449
EG	5.2312	1.9617	−1.5454	9.1446	−0.4543	3.4806
Inf	7.2731	3.6611	2.0072	22.5645	1.2140	5.6180
UR	3.2156	2.2374	0.3980	11.3500	1.4089	5.0764
KOF	35.8713	9.2781	20.0000	55.5000	0.2655	2.2370
SS_S	1.0096	1.1976	0.0000	6.4000	2.3216	9.0905
ES	1.5255	1.1250	0.1600	4.1200	0.5725	2.5358
HS	0.7099	0.5197	0.0400	1.7500	0.4686	1.8263

Table 3 Squared correlation analysis

	SS	FO	TO	Debt	LED	EG	Inf	UR	KOF	SS_S	ES	HS
SS	1.00											
FO	0.03	1.00										
TO	0.46	0.03	1.00									
Debt	0.00	0.04	0.07	1.00								
LED	0.09	0.25	0.18	0.30	1.00							
EG	0.00	0.05	0.00	0.03	0.04	1.00						
Inf	0.02	0.10	0.09	0.01	0.01	0.01	1.00					
UR	0.24	0.04	0.42	0.06	0.27	0.02	0.01	1.00				
KOF	0.05	0.35	0.39	0.23	**0.69**	0.02	0.09	0.28	1.00			
SS_S	0.59	0.03	0.34	0.14	0.38	0.00	0.01	0.36	0.28	1.00		
ES	0.64	0.18	0.20	0.08	0.04	0.01	0.01	0.03	0.04	0.06	1.00	

of the variables and out of 12 variables only 4 variables has kurtosis less than 3 means follows platykurtic shape, whereas 8 variables the value of kurtosis is greater than 3 shows leptokurtic shape. Which also shows the non-normality of the variables involved in this study.

4.2 Correlation Analysis

In order to check the existence of multicollinearity between independent variables matrix of squared correlation is showed in Table 3. Form the above squared correlation matrix, R^2 of all the independent variables are less than the benchmark of 0.65 shows no multicollinearity in the variables involved in this study (R^2 between KOF & LED is 0.69 may be ignored).

Table 4 Stationarity Test: Im-Pesaran-Shin unit-root test at Level & 1st Difference by using lag(1)

Variables	At level		At 1st difference		Decision about stationarity
	statistic	*P*-value	Statistic	*P*-value	
SS	1.5418	0.9384	−3.1812	0.0007	Stationary: I(1)
FO	−2.7916	0.0026			Stationary: I(0)
TO	−0.8481	0.1982	−4.6063	0.0000	Stationary: I(1)
Debt	−0.7837	0.2166	−5.9736	0.0000	Stationary: I(1)
LED	7.8815	0.9998	−2.1868	0.0144	Stationary: I(1)
EG	−3.9602	0.0000			Stationary: I(0)
Inf	−1.5175	0.0646	−7.5645	0.0000	Stationary: I(1)
UR	−0.1255	0.4501	−3.8774	0.0001	Stationary: I(1)
KOF	−0.2137	0.4154	−3.5012	0.0002	Stationary: I(1)
SS_S	−0.7251	0.2342	−4.8845	0.0000	Stationary: I(1)
ES	1.6223	0.9476	−3.4680	0.0003	Stationary: I(1)
HS	1.2573	0.8957	−1.8283	0.0337	Stationary: I(1)

Table 5 Selected ARDL Models from Model 1 to 10

ARDL(1,0,1,0,1,0,1,0,0) regression (Model 1)	ARDL(1,0,1,1,1,1,1,1,1,0) regression (Model 6)
ARDL(1,1,0,0,1,1,1,1,1) regression (Model 2)	ARDL(1,0,0,0,0,0,0,0,1) regression (Model 7)
ARDL(1,0,0,0,0,0,1,0) regression (Model 3)	ARDL(1,1,1,1,1,1,0,1,1,1) regression (Model 8)
ARDL(1,0,0,1,0,1,0,0,0) regression (Model 4)	ARDL(1,0,0,1,1,1,1,0,1) regression (Model 9)
ARDL(1,0,1,0,1,0,1,0,1) regression (Model 5)	ARDL(1,1,1,1,1,1,1,0,1,1) regression (Model 10)

By using the above stated STAT Code, above table shows the optimal lag selected ARDL models from model 1 to 10

4.3 Unit Root Test

To check the stationarity, we use a variety of tests in panel datasets. By considering the sample size, the Im-Pesaran-Shin test (Im et al., 2003) has been used, which have the null hypothesis that all panel data series contain a unit root. Table 4 presents the results of unit root test for the levels and for the first differences of the series. Out of 12 variables 10 are stationary at 1st difference, whereas two variables are stationary at level by using IPS panel unit root test. Since the order of the integration are different i.e. I(0) and I(1) so we have to use panel ARDL model. One of the variable Population over 65 is stationary at 2nd difference i.e. I(2), so we drop that specific variable from our analysis.

4.4 Optimal Lag Selection

In Panel ARDL lag selection is very important, we use the STAT code written by *Anat Tchetchik from Genghurion University, Telabib and taken from CrunhEconometrix website*. The optimal lags for our models are as follows:

4.5 Hausman Test

Table 5 demonstrates the long-run coefficients of the explanatory variables of social spending by the SAARC countries considered. We did not choose to transcribe the short-run variables, rather we use the PMG estimator that ensures the homogeneity in the long-run estimators. Hence, the short-run coefficients can differ from country to country and the mean group does not give accuracy on the differentiation between countries. Whereas, the Pool Mean Group estimator is sufficient. We used the Hausman test to check it in contrast of the Mean Group (MG) estimator (which permits the heterogeneity both in the short-run and long-run) that is consistent. The Hausman test did not reject the null hypothesis that provides the evidence that Pooled Mean Group (PMG) is consistent and more efficient.

According to the result of Hausman test (comparison between MG and PMG) for all Models from 1 to 10, the p-values for models 1 to 10 are 0.4288, 0.3125, 0.6255, 0.5139, 0.2548, 0.3689, 0.8139, 0.7254, 0.1925, & 0.7234 respectively. Which mean PMG is more efficient model compare to MG. Same result are obtained by comparing DEF and PMG. Overall for all models 1 to 10 we are estimating Panel ARDL Model with PMG specification. The results are discussed in the next section.

4.6 Panel-ARDL Long-Run and Short-Run ARDL Estimation

4.6.1 Aggregate Measures

From the result of Model 1 (Table 6—Annexure I), the error correction term (ECT) has a negative sign and statistically significant as the p-value is 0.03, which explains the long-run relationship exists between the variables. Almost all variables in the long-run are statistically significant except TO which is statistically insignificant. In contrast, in short-run part only first lag of TO is statistically significant but all other variables are statistically insignificant in the short run. Depicting social spending has long-run relationship between all variables except trade openness, however, in the short run trade openness has little significant effect on social spending.

From the result of Model 2 (Table 7—Annexure I), the error correction term (ECT) has a negative sign and is statistically significant as the p-value is 0.055, which explains the long-run relationship exist between the variables. Almost all variables are statistically significant in the long-run except democracy (Demo) which is statistically insignificant. In addition, the interactive terms of Trade Openness (TO) and Financial Openness (FO) with Democracy (Demo) are also statistically significant. In contrast, in the short run trade openness (TO), Financial openness (FO), Economic Growth (EG), Economic Development (ED) and Debt are statistically while democracy (Demo), Unemployment Rate (UR), Inflation rate (IR) including the two interaction terms are statistically insignificant. This means social spending has a long-run relationship between variables except for democracy and even in the short-run first lag of democracy does not have a significant effect on social spending.

From the result of Model 3 (Table 8—Annexure I), the error correction term (ECT) has a negative sign and statistically significant as p-value is 0.041, which explains the long-run relationship exist between the variables. Table 8 encloses model variables by using an alternative measure of economic globalization "KOF index" which is considered as more comprehensive measure of economic internationalization. This KOF economic globalization

index contains trade and capital flows as well as information related domestic restrictions to capital mobility. All variables in the long run are statistically significant. In contrast, in the short run only first lag of Log of Economic Development (Led) is statistically significant but all other variables are statistically insignificant in the short run. The results reveal in the long run there is a positive and statistically significant relationship between social spending and KOF Index without interactive term with democracy.

From the result of Model 4 (Table 9—Annexure I), the error correction term (ECT) has a negative sign and statistically significant as the p-value is 0.005, which explains the long-run relationship exist between the variables. The results reveal that the KOF index is positively associated with social spending however the level of statistical significance is not up to the benchmark and quite lower than the trade openness and FDI flows when including the interactive terms. On the other hand, in the short run part, only two variables (the first difference of Led & Inf) are statistically significant and the remaining six other variables are statistically insignificant including the interaction term. This means social spending has an insignificant long-run relationship with KOF economic globalization index when an interactive term is included in the model.

4.6.2 Education, Health and Social Security

From the result of Model 5 (Table 10—Annexure I), the error correction term (ECT) has a negative sign but is statistically insignificant as the p-value is 0.236, which explains no long-run relationship exist between the variables. Out of eight variables, four variables, in the long run, are statistically significant including the democratic dummy variable which is negative and statistically significant while the remaining four are statistically insignificant. In contrast, in the short run part, none of the variables is statistically significant. This means education spending has neither a long-run nor shot-run relationship with the variables undertaken in the model.

From the result of Model 8 (Table 13—Annexure I), the error correction term (ECT) has sign negative and is statistically insignificant as the p-value is 0.204, which explains no long-run relationship exists between the variables. All variables in long-run as well as in the short run are statistically insignificant. This means health spending has neither in the long-run nor short-run relationship between variables undertaken in the mode.

From the result of Model 9 (Table 14—Annexure I), the error correction term (ECT) has sign negative but is statistically insignificant as the p-value is 0.187, which explains no long-run relationship exists between the variables. Out of eight variables, seven variables in long-run pate are statistically significant and only one variable first lag of Debt is statistically insignificant. In contrast, in the short-run part, none of the variables are statistically significant. This means social security and welfare spending have neither long run nor shot run relationship exist between variables.

From the result of Model 10 (Table 15—Annexure I), the error correction term (ECT) has sign negative and statistically significant as p-value is 0.001, which explains the long-run relationship exist between the variables. Out of 10 variables, 7 variables in long run part are statistically significant including one interaction term of TO with Demo, three variables first lag of EG, Led and interaction term of FO with Demo are statistically insignificant. On the other hand, in the short run part only three variables (first difference of TO, FO & Demo) are statistically significant and remaining seven other variables are statistically insignificant in short run including both interaction terms. Which means social security and welfare spending has long run relationship between variables and in short run

first difference of TO, FO & Demo have significant effect on social security and welfare spending.

5 Discussions, Conclusion and Implications

By using data on social spending for the selected SAARC countries between the time period of 1996–2018, We tested whether the compensation or efficiency thesis holds for the SAARC region. By reviewing the previous literature, the empirical results of this study reveal somewhat more complex than simply evidence of one hypothesis over another. The theoretical argument of this study is that each indicator of economic globalization, not by default creates downward pressure on social spending. The impact of globalization on social spending is supposed to be conditional on regime type, the interactive variables reveal an important finding for the policy makers that trade openness tends to increase social spending (the coefficient indicates little systematic effect), and financial openness tends to cut social spending, while democracy of SAARC countries has a significant role in counterbalancing these effects. While the alternative economic globalization variable KOF Index was also employed to cross-check which indicator of economic globalization is more efficient. The results reveal that in case of SAARC the traditional economic globalization indicators such as trade openness and financial openness are statistically significant and more efficient.

The results highlight some important findings, first democracy has positive impact on social spending which is channeled through social security and education spending. Though, trade openness has positive correlation with aggregate social spending, the disaggregate results reveal that its main positive impact found in education and social security spending. Whereas financial openness has a negative impact on aggregate social spending which comes from education and social security spending, therefore as financial openness increases it limits social spending under democracy. The interactive term reveals that trade openness under democracy increases education and social security spending. The financial openness under democracy only tends to increase education spending significantly while health and social security spending tend to decline, however, democracy has no significant role to counterbalance these effects. In the aggregate results, the coefficient of the debt service ratio indicates a negative and significant impact on social spending depicting that higher debt lowers the spending on social spending. As most SAARC countries rely on external debt to finance the budget deficit, therefore, they have to allocate most of their resources to pay debt service thereby leaving social spending mostly neglected. Finally, the impact of the inflation rate and the unemployment rate is positive and statistically significant in the aggregate model, depicting that the higher rate of inflation and unemployment compels democratic governments to spend more on social expenditures.

This study proposes support for both the efficiency and compensation hypothesis depending on which type of globalization indicator is taken under consideration, however, it would be misleading for the policymakers to assume that the efficiency hypothesis is valid for all developing countries. Several studies suggest that regional differences can modify the empirical results (Balcells Ventura, 2006; Busemeyer & Garritzmann, 2019; Hays et al., 2005). All we tried here is to investigate some thought-provoking empirical arrangements, however, more systematic empirical analysis is required to clarify this multifaceted phenomenon. At a minimum, we have tried to recognize the association between the variables undertaken, still, some unobserved patterns are worthy of further inspection.

The theoretical argument of this thesis is that each indicator of economic globalization, not necessarily creates downward pressure on social spending. The impact of globalization on social spending is supposed to be conditional on regime type however, the interactive variables reveal an important finding that trade openness tends to increase social spending (the coefficient indicates little systematic effect), and financial openness tends to cut social spending, while democracy of SAARC countries has no significant role or unrelated in counterbalancing these effects. This study proposes support for both the efficiency and compensation hypothesis depending on which type of globalization indicator is taken under consideration, however, it would be misleading to assume that the efficiency hypothesis is valid for all developing countries. Several studies suggest that regional differences can modify the empirical results (Busemeyer and Garritzmann, 2019; Hays et al., 2005; Balcells, 2006). Hays et al. (2005) observed that globalization and different government spending relationship is not just historically and theoretically dependent but also on geographical aspects. Similarly, Schuknecht and Zemanek (2018) have explored and analyzed the antecedents of social expenditures and their intervention with other factors. They concluded that the expansion of social expenditures is driven by ageing, and its multitudes of other preliminary expenses, which perpetuate unsustainability. They further argued that enhancing the trend of ageing especially, on the high political cost of restructuring social expenses suggested a significant and great jeopardy of social dominance.

All we tried here is to investigate some thought-provoking empirical arrangements, however, more systematic empirical analysis is required to clarify this multifaceted phenomenon. At a minimum, we have tried to recognize the association between the variables undertaken, still, some unobserved patterns are worthy of further inspection. Further research is also desirable to understand why specifically education spending tends to retrench with more exposure to trade. Besides, it is also important to appropriately specify a model that interrelates globalization variables with domestic political institutions. Following these questions in better depth opens a new pathway for future research to better understand the restraints and opportunities that globalization and democratization can afford regarding social spending.

Appendix

See Tables 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15.

From the result of Model 6 (Table 11—Annexure I), the error correction term (ECT) has a sign negative but is statistically insignificant as the p-value is 0.144, which explains no long-run relationship exists between the variables. Out of 10 variables, 8 variables in the long-run part are statistically significant including the interaction terms of Trade Openness (TO) and Financial Openness (FO) with Democracy (Demo) except lag of Inflation rate Inf and lag of debt which are statistically insignificant. On the other hand, in the short-run all variables are statistically insignificant including two interaction terms. This means education spending has a neither long-run nor short-run relationship between variables.

From the result of Model 7 (Table 12—Annexure I), the error correction term (ECT) has sign positive and is statistically insignificant as p-value is 0.806, which explains no long-run relationship exist between the variables. All variables in long-run as well as in short run are statistically insignificant. This means health spending has neither long-run, nor short-run relationship between variables.

Table 6 ARDL(1,0,1,0,1,0,1,0,0) regression (Model 1)

Pooled mean group regression

(Estimate results saved as pmg)

Panel variable (i): c_id	Number of obs	110
Time variable (t): years	No. of groups	5
Observation per group:	Minimum	22
	Average	22
	Maximum	22
	Log Likelihood	-5.0840

D.ss	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
TO	-0.0248	0.0232	-1.07	0.2860	-0.0702	0.0207
L1.FO	-3.1717	0.7458	-4.25	0.0000	-4.6335	-1.7098
Demo	0.3808	0.2230	1.71	0.0880	-0.0563	0.8178
L1.EG	0.9185	0.1977	4.65	0.0000	0.5311	1.3060
led	-3.6374	1.4302	-2.54	0.0110	-6.4405	-0.8343
L1.UR	4.0761	1.0156	4.01	0.0000	2.0855	6.0667
INF	0.5127	0.0822	6.23	0.0000	0.3515	0.6739
Debt	-8.4149	1.5428	-5.45	0.0000	-11.4387	-5.3912
Short run coefficients						
ECT	-0.2504	0.2418	-1.04	0.0300	-0.7243	0.2236
D1.TO	0.0429	0.0230	1.87	0.0620	-0.0022	0.0880
D1.FO	-0.9685	0.7424	-1.30	0.1920	-2.4236	0.4866
D1.Demo	-0.1472	0.5397	-0.27	0.7850	-1.2049	0.9106
D1.EG	0.2761	0.3265	0.85	0.3980	-0.3639	0.9161
D1.Led	-30.2459	35.8892	-0.84	0.3990	-100.5874	40.0956
D1.UR	1.3066	0.9982	1.31	0.1910	-0.6499	3.2631
D1.Inf	-0.0756	0.0729	-1.04	0.3000	-0.2186	0.0674

Table 6 (continued)

D.ss	Coef	SE	z	P>|z|	[95% Conf. Interval]	
D1.Debt	0.6692	0.5419	1.23	0.2170	−0.3929	1.7312
Constant	8.1215	7.7988	1.04	0.2980	−7.1639	23.4070

Table 7 ARDL(1,1,0,0,1,1,1,1,1) regression (Model 2)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id		Number of obs	110
Time variable (t): _years		No. of groups	5
Observation per group:		Minimum	22
		Average	22
		Maximum	22
		Log Likelihood	21.0057

D.ss	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
TO	0.0519	0.0083	6.27	0.0000	0.0357	0.0681
L1.FO	−0.4165	0.1226	−3.40	0.0010	−0.6569	−0.1762
Demo	0.1510	0.2856	0.53	0.5970	−0.4087	0.7107
L1.EG	2.0948	0.1926	10.87	0.0000	1.7172	2.4723
led	1.7722	0.1862	9.52	0.0000	1.4073	2.1371
L1.UR	0.3448	0.0592	5.82	0.0000	0.2287	0.4609
INF	0.0136	0.0078	1.76	0.0790	−0.0016	0.0288
Debt	−0.0822	0.0377	−2.18	0.0290	−0.1562	−0.0083
TO*Demo	−0.0258	0.0089	−2.89	0.0040	−0.0432	−0.0083
FO*Demo	0.5396	0.1320	4.09	0.0000	0.2810	0.7983
Short run coefficients						
ECT	−0.7196	0.3748	−1.92	0.0550	−1.4543	0.0151
D1.TO	0.0354	0.0177	2.00	0.0460	0.0006	0.0702
D1.FO	−0.7103	0.2602	−2.73	0.0060	−1.2202	−0.2004
D1.Demo	0.0238	1.4872	0.02	0.9870	−2.8911	2.9388
D1.EG	1.4833	0.8003	1.85	0.0640	−0.0853	3.0519
D1.Led	−153.5509	83.6950	−1.83	0.0670	−317.5901	10.4882

Table 7 (continued)

D.ss	Coef	SE	z	P>|z|	[95% Conf. Interval]	
D1.UR	0.4736	0.3006	1.58	0.1150	−0.1156	1.0629
D1.Inf	0.0122	0.0165	0.74	0.4610	−0.0202	0.0445
D1.Debt	0.0944	0.0485	1.95	0.0510	−0.0006	0.1895
TO*Demo	0.0125	0.0446	0.28	0.7790	−0.0748	0.0999
FO*Demo	−0.2790	0.9440	−0.30	0.7680	−2.1292	1.5712
Constant	−10.8041	5.5275	−1.95	0.0510	−21.6378	0.0295

Table 8 ARDL(1,0,0,0,0,1,0) regression (Model 3)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id	Number of obs	110
Time variable (t): _years	No. of groups	5
Observation per group:	Minimum	22
	Average	22
	Maximum	22
	Log Likelihood	−1.3902

D.ss	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
KOF	0.0308	0.0034	9.09	0.0000	0.0242	0.0375
Demo	−0.6902	0.1164	−5.93	0.0000	−0.9183	−0.4622
EG	2.0379	0.2523	8.08	0.0000	1.5433	2.5324
Led	1.7809	0.2411	7.39	0.0000	1.3083	2.2534
UR	0.1325	0.0650	2.04	0.0420	0.0051	0.2599
Inf	0.0501	0.0101	4.95	0.0000	0.0303	0.0699
Debt	−0.0988	0.0361	−2.74	0.0060	−0.1695	−0.0281
Short run coefficients						
ECT	−0.7036	0.3438	−2.0500	0.0410	−1.3773	−0.0298
D1.KOF	0.0149	0.0511	0.2900	0.7710	−0.0853	0.1151
D1.Demo	0.3229	0.3381	0.9600	0.3400	−0.3397	0.9856
D1.EG	−0.0080	0.0473	−0.1700	0.8660	−0.1007	0.0847
D1.Led	−148.9643	73.7579	−2.0200	0.0430	−293.5272	−4.4014
D1.UR	0.3065	0.2471	1.2400	0.2150	−0.1778	0.7908
D1.Inf	0.0147	0.0145	1.0200	0.3080	−0.0136	0.0431
D1.Debt	−0.1894	0.1234	−1.5300	0.1250	−0.4313	0.0525

Table 8 (continued)

D.ss	Coef	SE	z	P >|z|	[95% Conf. Interval]	
Constant	−9.3778	4.8061	−1.9500	0.0510	−18.7976	0.0420

Table 9 ARDL(1,0,0,1,0,1,0,0,0) regression (Model 4)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id				Number of obs	110
Time variable (t): _years				No. of groups	5
Observation per group:				Minimum	22
				Average	22
				Maximum	22
				Log Likelihood	5.1804

D.ss	Coef	SE	z	P >|z|	[95% Conf. Interval]	
Long run coefficients						
KOF	0.0239	0.0238	1.00	0.3170	−0.0229	0.0706
Demo	2.2079	1.2916	1.71	0.0870	−0.3236	4.7393
EG	1.4479	0.3211	4.51	0.0000	0.8185	2.0772
Led	1.3293	0.2992	4.44	0.0000	0.7428	1.9157
UR	0.3375	0.0793	4.26	0.0000	0.1821	0.4928
Inf	0.0452	0.0108	4.17	0.0000	0.0239	0.0665
Debt	−0.1719	0.0335	−5.14	0.0000	−0.2374	−0.1063
KOF*Demo	−0.0739	0.0407	−1.81	0.0700	−0.1536	0.0059
Short run coefficients						
ECT	−0.7273	0.2606	−2.7900	0.0050	−1.2380	−0.2166
D1.KOF	0.0118	0.0744	0.1600	0.8740	−0.1340	0.1575
D1.Demo	0.3684	0.5529	0.6700	0.5050	−0.7153	1.4522
D1.EG	−0.0204	0.0552	−0.3700	0.7120	−0.1286	0.0878
D1.Led	−106.1938	39.5901	−2.6800	0.0070	−183.7889	−28.5987
D1.UR	0.1146	0.2572	0.4500	0.6560	−0.3895	0.6187
D1.Inf	0.0250	0.0129	1.9300	0.0530	−0.0004	0.0504
D1.Debt	−0.0546	0.1585	−0.3400	0.7310	−0.3652	0.2561

Table 9 (continued)

D.ss	Coef	SE	z	P >|z|	[95% Conf. Interval]	
D1.KOF*Demo	0.0162	0.0244	0.6600	0.5060	−0.0316	0.0640
Constant	−8.3589	3.3328	−2.5100	0.0120	−14.8910	−1.8268

Table 10 ARDL(1,0,1,0,1,0,1,0,1) regression (Model 5)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id			Number of obs	110
Time variable (t): years			No. of groups	5
Observation per group:			Minimum	22
			Average	22
			Maximum	22
			Log Likelihood	121.9596

D.es	Coef	SE	z	P >|z|	[95% Conf. Interval]	
Long run coefficients						
TO	−0.0060	0.0037	−1.62	0.1060	−0.0134	0.0013
L1.FO	−0.2499	0.0345	−7.25	0.0000	−0.3174	−0.1823
Demo	0.0732	0.0582	1.26	0.2080	−0.0408	0.1872
L1.EG	0.0397	0.1592	0.25	0.8030	−0.2723	0.3517
led	1.3541	0.1275	10.62	0.0000	1.1042	1.6040
L1.UR	−0.1826	0.0442	−4.13	0.0000	−0.2692	−0.0961
INF	−0.0069	0.0046	−1.49	0.1360	−0.0160	0.0022
L1.Debt	0.0845	0.1082	0.78	0.4350	−0.1275	0.2966
Short run coefficients						
ECT	−0.4178	0.3529	−1.18	0.2360	−1.1096	0.2739
D1.TO	−0.0034	0.0072	−0.48	0.6340	−0.0175	0.0107
D1.FO	−0.0320	0.0638	−0.50	0.6150	−0.1570	0.0929
D1.Demo	0.0122	0.0597	0.20	0.8380	−0.1049	0.1293
D1.EG	0.0235	0.0280	0.84	0.4000	−0.0313	0.0783
D1.Led	−2.3606	5.4334	−0.43	0.6640	−13.0099	8.2887
D1.UR	−0.1718	0.1709	−1.01	0.3150	−0.5068	0.1632
D1.Inf	0.0029	0.0022	1.33	0.1850	−0.0014	0.0071

Table 10 (continued)

D.es	Coef	SE	z	P >|z|	[95% Conf. Interval]	
D1.Debt	0.0739	0.0768	0.96	0.3360	−0.0766	0.2243
Constant	−2.4543	2.0555	−1.19	0.2320	−6.4831	1.5745

Table 11 ARDL(1,0,1,1,1,1,1,1,1,0) regression (Model 6)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id	Number of obs	110
Time variable (t): years	No. of groups	5
Observation per group:	Minimum	22
	Average	22
	Maximum	22
	Log Likelihood	135.0133

D.es	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
TO	0.0114	0.0032	3.6000	0.0000	0.0052	0.0177
L1.FO	−0.3394	0.0383	−8.8700	0.0000	−0.4144	−0.2644
Demo	−0.7973	0.2731	−2.9200	0.0040	−1.3326	−0.2620
L1.EG	1.4250	0.1491	9.5600	0.0000	1.1328	1.7172
L1.led	0.6194	0.1099	5.6300	0.0000	0.4040	0.8349
L1.UR	0.1690	0.0379	4.4500	0.0000	0.0946	0.2434
L1.INF	−0.0059	0.0045	−1.3000	0.1920	−0.0148	0.0030
L1.Debt	−0.0024	0.0822	−0.0300	0.9770	−0.1635	0.1587
L1.TO*Demo	0.0282	0.0056	5.0700	0.0000	0.0173	0.0392
L1.FO*Demo	5.5016	0.3873	14.2000	0.0000	4.7425	6.2608
Short run coefficients						
ECT	−0.4268	0.2920	−1.46	0.1440	−0.9990	0.1454
D1.TO	−0.0034	0.0053	−0.64	0.5210	−0.0137	0.0070
D1.FO	−0.1109	0.1009	−1.10	0.2720	−0.3088	0.0870
D1.Demo	0.2609	0.1969	1.33	0.1850	−0.1250	0.6468
D1.EG	0.5881	0.4066	1.45	0.1480	−0.2089	1.3850
D1.Led	−56.9950	40.2036	−1.42	0.1560	−135.7926	21.8026

Table 11 (continued)

D.es	Coef	SE	z	P>|z|	[95% Conf. Interval]	
D1.UR	−0.0976	0.1389	−0.70	0.4820	−0.3699	0.1746
D1.Inf	0.0055	0.0039	1.41	0.1600	−0.0022	0.0132
D1.Debt	0.0480	0.0370	1.30	0.1940	−0.0245	0.1205
D1.TO*Demo	−0.0084	0.0067	−1.25	0.2120	−0.0216	0.0048
D1.FO*Demo	−2.2262	1.5374	−1.45	0.1480	−5.2394	0.7870
Constant	−2.3845	1.5442	−1.54	0.1230	−5.4111	0.6421

Table 12 ARDL(1,0,0,0,0,0,0,0,1) regression (Model 7)

Pooled mean group regression

(Estimate results saved as pmg)

Panel variable (i): c_id				Number of obs	110
Time variable (t): years				No. of groups	5
Observation per group:				Minimum	22
				Average	22
				Maximum	22
				Log Likelihood	169.7931

D.hs	Coef	SE	z	P > |z|	[95% Conf. Interval]	
Long run coefficients						
TO	−0.0174	0.0218	−0.80	0.4240	−0.0601	0.0253
FO	0.1926	0.1508	1.28	0.2020	−0.1030	0.4882
Demo	−0.2804	0.3846	−0.73	0.4660	−1.0342	0.4733
EG	−1.4648	1.2666	−1.16	0.2470	−3.9473	1.0177
Ied	1.7710	1.6751	1.06	0.2900	−1.5122	5.0542
UR	0.1708	0.1781	0.96	0.3380	−0.1783	0.5199
INF	0.0237	0.0339	0.70	0.4840	−0.0427	0.0902
L1.Debt	0.3842	0.3122	1.23	0.2190	−0.2278	0.9961
Short run coefficients						
ECT	0.0128	0.0522	0.25	0.8060	−0.0896	0.1152
D1.TO	−0.0013	0.0061	−0.21	0.8360	−0.0131	0.0106
D1.FO	0.0233	0.0685	0.34	0.7340	−0.1110	0.1576
D1.Demo	0.0945	0.0762	1.24	0.2150	−0.0548	0.2438
D1.EG	−0.0120	0.0114	−1.05	0.2920	−0.0343	0.0103
D1.Ied	1.3658	6.4523	0.21	0.8320	−11.2804	14.0120
D1.UR	−0.2005	0.2008	−1.00	0.3180	−0.5940	0.1930
D1.Inf	0.0033	0.0039	0.83	0.4050	−0.0044	0.0109

Table 12 (continued)

D.hs	Coef	SE	z	P >|z|	[95% Conf. Interval]	
D1.Debt	0.0647	0.0487	1.33	0.1840	−0.0308	0.1602
Constant	0.0651	0.4770	0.14	0.8920	−0.8698	0.9999

Table 13 ARDL(1,1,1,1,1,1,0,1,1,1,1) regression (Model 8)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id				Number of obs	110
Time variable (t): years				No. of groups	5
Observation per group:				Minimum	22
				Average	22
				Maximum	22
				Log Likelihood	235.0133

D.hs	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
L1.TO	−0.0367	0.0438	−0.84	0.4020	−0.1225	0.0491
L1.FO	1.7208	1.7260	1.00	0.3190	−1.6620	5.1036
L1.Demo	−2.3580	2.1527	−1.10	0.2730	−6.5773	1.8612
L1.EG	−0.1434	0.1021	−1.40	0.1600	−0.3436	0.0568
L1.led	−0.0889	0.4729	−0.19	0.8510	−1.0158	0.8381
UR	−0.4076	0.4088	−1.00	0.3190	−1.2089	0.3937
L1.INF	−0.0407	0.0268	−1.52	0.1290	−0.0932	0.0118
L1.Debt	0.3100	0.3251	0.95	0.3400	−0.3271	0.9471
L1.TO*Demo	0.0099	0.0162	0.62	0.5380	−0.0217	0.0416
L1.FO*Demo	−0.3030	0.5391	−0.56	0.5740	−1.3597	0.7536
Short run coefficients						
ECT	−2.6321	2.0728	−1.27	0.2040	−6.6948	1.4305
D1.TO	0.0426	0.0468	0.91	0.3620	−0.0491	0.1344
D1.FO	−1.4674	1.5788	−0.93	0.3530	−4.5617	1.6270
D1.Demo	2.3336	2.4144	0.97	0.3340	−2.3986	7.0658
D1.EG	−0.8187	0.9792	−0.84	0.4030	−2.7379	1.1004
D1.Led	77.2822	96.7750	0.80	0.4250	−112.3933	266.9577

Table 13 (continued)

D.hs	Coef	SE	z	P >|z|	[95% Conf. Interval]	
D1.UR	0.2694	0.2904	0.93	0.3540	−0.2998	0.8385
D1.Inf	0.0147	0.0181	0.81	0.4170	−0.0208	0.0502
D1.Debt	−0.8918	1.0687	−0.83	0.4040	−2.9864	1.2029
D1.TO*Demo	−0.0370	0.0568	−0.65	0.5140	−0.1483	0.0743
D1.FO*Demo	0.4803	1.0141	0.47	0.6360	−1.5072	2.4678
Constant	−8.2874	6.6992	−1.24	0.2160	−21.4176	4.8428

Table 14 ARDL(1,0,0,1,1,1,0,1) regression (Model 9)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id					Number of obs		110
Time variable (t): years					No. of groups		5
Observation per group:					Minimum		22
					Average		22
					Maximum		22
					Log Likelihood =		69.3477

D.ss_s	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
TO	0.0153	0.0040	3.84	0.0000	0.0075	0.0232
FO	0.2391	0.0519	4.61	0.0000	0.1373	0.3408
L1.Demo	−6.2052	3.7944	−1.64	0.1020	−13.6421	1.2317
L1.EG	4.0272	1.3090	3.08	0.0020	1.4618	6.5927
L1.led	3.6195	1.2355	2.93	0.0030	1.1980	6.0410
L1.UR	0.8174	0.2538	3.22	0.0010	0.3200	1.3148
INF	0.0563	0.0142	3.96	0.0000	0.0284	0.0841
L1.Debt	−0.0272	0.0310	−0.88	0.3810	−0.0880	0.0336
Short run coefficients						
ECT	−0.2720	0.2061	−1.32	0.1870	−0.6761	0.1320
D1.TO	0.0180	0.0100	1.81	0.0710	−0.0015	0.0376
D1.FO	−0.1897	0.0737	−2.57	0.0100	−0.3342	−0.0452
D1.Demo	0.2507	0.2849	0.88	0.3790	−0.3077	0.8091
D1.EG	−0.0426	0.0764	−0.56	0.5770	−0.1924	0.1072
D1.Led	−116.2064	89.3609	−1.30	0.1930	−291.3505	58.9378
D1.UR	0.4996	0.4646	1.08	0.2820	−0.4110	1.4103
D1.Inf	−0.0057	0.0111	−0.51	0.6080	−0.0274	0.0161

Table 14 (continued)

D.ss_s	Coef	SE	z	P >|z|	[95% Conf. Interval]	
D1.Debt	−0.0061	0.0333	−0.18	0.8540	−0.0714	0.0592
Constant	−7.7861	5.6565	−1.38	0.1690	−18.8727	3.3005

Table 15 ARDL(1,1,1,1,1,1,1,1,0,1,0,1,1) regression (Model 10)

Pooled Mean Group Regression

(Estimate results saved as pmg)

Panel variable (i): c_id					Number of obs	110
Time variable (t): years					No. of groups	5
Observation per group:					Minimum	22
					Average	22
					Maximum	22
					Log Likelihood	101.8287

D.ss_s	Coef	SE	z	P>|z|	[95% Conf. Interval]	
Long run coefficients						
L1.TO	0.0178	0.0091	1.95	0.0510	-0.0001	0.0356
L1.FO	-0.1591	0.0720	-2.21	0.0270	-0.3003	-0.0179
L1.Demo	0.8302	0.4235	1.96	0.0500	0.0002	1.6602
L1.EG	0.0766	0.2054	0.37	0.7090	-0.3259	0.4791
L1.led	-0.2777	0.2231	-1.24	0.2130	-0.7150	0.1595
UR	0.3506	0.0648	5.41	0.0000	0.2235	0.4776
L1.INF	-0.0196	0.0073	-2.68	0.0070	-0.0340	-0.0052
L1.Debt	-0.1256	0.0599	-2.10	0.0360	-0.2431	-0.0081
L1.TO*Demo	0.0404	0.0112	3.61	0.0000	0.0185	0.0624
L1.FO*Demo	0.0215	0.0613	0.35	0.7260	-0.0987	0.1416
Short run coefficients						
ECT	-0.3682	0.1142	-3.22	0.0010	-0.5921	-0.1443
D1.TO	0.0370	0.0141	2.63	0.0090	0.0094	0.0646
D1.FO	-0.2015	0.0945	-2.13	0.0330	-0.3868	-0.0163
D1.Demo	0.6695	0.3007	2.23	0.0260	0.0801	1.2589
D1.EG	0.0003	0.0559	0.01	0.9950	-0.1092	0.1099
D1.Led	-3.0600	7.4883	-0.41	0.6830	-17.7367	11.6168

Table 15 (continued)

D.ss_s	Coef	SE	z	P>|z|	[95% Conf. Interval]	
D1.UR	0.5889	0.4169	1.41	0.1580	−0.2281	1.4059
D1.Inf	0.0115	0.0122	0.94	0.3450	−0.0124	0.0355
D1.Debt	0.0236	0.1057	0.22	0.8230	−0.1835	0.2307
D1.TO*Demo	0.0067	0.0246	0.27	0.7860	−0.0415	0.0549
D1.FO*Demo	−0.8648	1.0917	−0.79	0.4280	−3.0045	1.2749
Constant	0.4528	0.1347	3.36	0.0010	0.1887	0.7168

Declarations

Conflict of interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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