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**INCOME INEQUALITY AND ECONOMIC
GROWTH IN CENTRAL AND EASTERN
EUROPEAN TRANSITION COUNTRIES**

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RESUMO

A evidência dos países em transição para economias de mercado no que toca à relação da desigualdade de rendimentos com o crescimento económico é preocupante e inconclusivo. A tese assenta na análise do fenómeno da desigualdade em dez países da Europa Central e Oriental (CEE), que aderiram à União Europeia em 2004 e 2007. Destacam-se dois aspetos: (1) a ligação entre a desigualdade económica e o crescimento económico; e (2) as políticas redistributivas que os governos adotaram na tentativa de equilibrar o crescimento económico com os níveis de desigualdade de rendimentos. São revistos os mecanismos de transmissão da desigualdade de rendimentos ao crescimento económico e é dada uma visão geral das políticas aplicadas durante a transição para a economia do mercado e durante a crise financeira global. As imperfeições do mercado de crédito e desigualdade da política orçamental são analisadas através de modelos não lineares de crescimento e são testadas empiricamente utilizando a técnica econométrica do modelo de distribuição autorregressiva desfasada, para os dados do rendimento no período de 1995 a 2017, para a CEE como região idiossincrática e desagregados pela desigualdade média do rendimento em dois grupos de países. Os gastos do governo e a urbanização têm um efeito negativo sobre o crescimento económico, mas a região não é idiossincrática relativamente a esse fenómeno, esse fenómeno pode ser o resultado de diferentes políticas regionais durante levadas a cabo durante a fase de transição. Os resultados empíricos sugerem que a desigualdade do rendimento afeta o crescimento económico em vários aspetos. As medidas de desigualdade de rendimento, focando-se nas mudanças no rendimento médio, têm um forte poder explicativo. Os resultados da revisão da literatura sugerem que as políticas liberais e produtivistas do bem-estar dos governos, empreendidas durante as recessões da transição dos mercados em 1990 e a crise económica global de 2008-2010, foram acompanhadas por políticas redistributivas, dependentes das disponibilidades orçamentais, mas falharam no apoio aos grupos vulneráveis, bem como foram feitas transferências sem considerar as circunstâncias específicas dos países. Para um crescimento sustentado a longo prazo, os governos devem empreender uma abordagem política de investimento social para combater as desigualdades e promover um crescimento inclusivo.

Palavras-chaves: Desigualdade de rendimentos; Crescimento económico; regressão de distribuição autorregressiva desfasada; Europa Central e Oriental; Economia de desenvolvimento.

ABSTRACT

Evidence from countries transitioning to market economy regarding income inequality and growth relationship is scarce and inconclusive. The paper sets to analyse the phenomenon in 10 countries from Central and Eastern Europe (CEE) that accessed European Union in 2004 and 2007, highlighting two aspects: (1) the link between income inequality and economic growth; (2) the redistributive policies governments have taken to balance economic growth with income inequality levels. Different income inequality – growth transmission mechanisms are reviewed, and an overview of policies during the transition to a market economy and during the global financial crisis is given. Unified credit market imperfection and fiscal policy inequality – growth nonlinear models are tested empirically using autoregressive distributed lag regression with market income data from 1995 to 2017 for CEE as an idiosyncratic region and disaggregated by average income inequality into two country groups. Empirical results are not robust but suggest that income inequality affects economic growth through various channels, and income inequality measures focusing on changes in the middle-income have strong explanatory power. Government expenditure and urbanisation have negative effects on growth, but the region is not idiosyncratic in respect due to different regional policies during the transition. Results from the policy literature overview suggest that the liberal and productivist welfare policies governments have undertaken during recessions of market transition in the 1990s and global economic crisis in 2008–2010 have been accompanied by redistributive policies, depending on budget availability, but have failed to support vulnerable groups, as well as have been transferred not accounting for specific circumstances of recipient countries. Governments should undertake a social investment policy approach to tackle inequalities and promote inclusive growth for sustained long-run growth.

Keywords: Income inequality; economic growth; autoregressive distributed lag; Central and Eastern Europe; development economics.

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INTRODUCTION

Governments commonly aim to lower socioeconomic inequalities, although the overall long-run impact of inequality on economic development, in particular growth, is not well understood, and therefore important to study across different development stages.

Since the emergence in the 1990s, the growth-inequality nexus has been researched, for the most part, in studies of developed countries. Research on Central Eastern Europe (CEE) post-communist economies, which underwent a transition to a full-fledged market economy model and saw the increase in inequality alongside the economic growth, however, is scarce and mostly found as a separate panel in European-wide studies.

The region is a good example of both economic boom and bust periods over just two decades; therefore, this paper sets to study inequality – growth nexus in CEE during 1995-2017 and undertakes an analysis of the accompanying government policies. In particular, the research questions whether there is a significant causal relationship between economic growth and income inequality and whether the relationship changes between short-run and long-run effects. Due to the short time span of data availability, the long-run cannot be tested with sufficient reliability. First, mechanisms transmitting income inequality effects onto economic growth and current developments are studied, policy analysis is undertaken, and qualitative research results are incorporated into the statistical model and tested empirically employing the autoregressive distributed lag model. Thus, the research contributes to inequality – growth literature by studying CEE as an idiosyncratic region and fulfils the research gap on such a relationship for the former Soviet Bloc countries.

Section 1 establishes the theoretical framework for income inequality – economic growth relationship, section 2 reviews recent studies on the general relationship, income inequality and growth relationship during the global financial crisis and in CEE countries specifically, and section 3 reviews policies and their effects during the transition to the market economy and the global crisis. Sections 4, 5, and 6 deal with the empirical study, describing the data used, methodology applied, and an overview of preliminary model estimation results. Conclusions briefly discuss the results and policy implications.

Chapter 1

A theoretical framework for income inequality and economic growth

To study how units of income, power, or status are distributed or possessed by components of a social system – people, places, or social groups – one must first establish equality standards (Coulter, 2019). To frame the theoretical issue of inequality in real-world economy, concepts of equality standard, as an income share (aiming for an optimal increase of national income share attributed to the relatively disadvantaged group), and partially also income crystallisation (elimination of disproportionate advantages in education, political power, social acceptability) (Cowell, 2009), is adapted in the following research, as scholars generally agree that hundred-per cent equality is not optimal for growth. Both global inequality measures and partial indices are used in literature and the following research, allowing for locating the surplus and deficit created by inequality (Coulter, 2019). The combination of Lorenz consistent Gini index and partial indices that satisfy the weak transfer principle allows detecting inequality changes that influence economic growth. Economic growth in this research can be defined as an increase of production of economic goods and services by all resident producers in the economy; coherent assessment is thus prioritised over accounting for informal economic activities, economic sustainability, and negative externalities (World Bank, n.d.).

The theoretical underpinnings of interlinkage between inequality and economic growth can be found in classical economics through the savings channel. A modern approach later emerged, emphasising political economy, including fiscal policy, and modelling with market imperfections. In the next paragraphs, an overview of the foundations of inequality and economic growth relationship is given and diving the theoretical models by their positive, negative, or time-varying effects on growth. A model accounting for globalisation and savings in imperfect credit markets is proposed.

A positive relationship between inequality and growth has been proposed by Aghion et al. (1999), who argue for positive effect through incentives channel – individuals are given the motivation to increase personal effort and become more productive to either earn high executive salaries or take on additional risk and engage in entrepreneurial and innovative activities, assuming that agents are identical and/or capital markets are perfect. Banerjee and

Newman (1991) suggest the choice between entrepreneurship and job to be skewed towards the latter in imperfect markets.

A positive effect is also supported by the classical approach of Kaldor (1975) through the physical capital accumulation channel, with more inequality favouring aggregate savings. Here, it is assumed that saving rates are increasing functions of wealth, implying that the rich would save relatively more than the reduction in the poor's investments. Bourguignon (1981) also shows that with convex savings function, the output is higher along more unequal steady-state, and in an endogenous growth model with constant exogenous saving rate and a fixed level of technology, equal income distribution leads to faster growth; with linear saving function, aggregate growth is independent of distribution. It is worth mentioning the note by Neves and Silva (2014) here that the assumption of increased savings benefiting growth is not universally accepted among classical economists. In Keynesian economics, increased savings would hamper growth due to a decrease in aggregate demand, especially during recessions.

A negative effect of net income inequality on economic growth is theoretically implied through lower cooperation and specialisation in the classical view, but inequality effects are generally abstracted from. The modern neoclassical growth theory relies on technology, labour, and capital as sources for growth, with the last two being more evident in earlier growth theoretical models.

The oldest of modern inequality-growth literature strands is tied to fiscal policy. Within the endogenous growth model accounting for political economy, growth is modelled as a function of capital, labour, and public good (Neves & Silva, 2014). Considering redistribution in models where all government spending is allocated for production and therefore does not appear in the utility function, income inequality leads to a higher tax rate and lowers growth (Alesina & Rodrik, 1994). Within a more general framework, when government spending is used for both production and consumption, voters try to optimise between public and private consumption, leading to ambiguous effects on growth (Li & Zou, 1998). The second – economic – transmission link states that the higher redistribution in itself distorts investment, removing incentives for accumulating wealth and engaging in more productive, risky activities.

The extended fiscal policy view, accounting for a political lobby, takes into consideration the fact that imperfect democracies are biased against the poor in their political

power, and income inequality further reduces participation and enlarges the participatory gap, as proposed by Filetti and Janmaat (2017). However, even then, inequality has a more substantial impact on redistribution and growth in left-wing, populist regimes, and less so in right-wing or wealth-biased ones (Benabou, 1996). Benabou (1996) emphasises that it is the mix of not only increasing divide in income, but also political lobby power that harms growth, opposed to Rachinsky and Guriev (2005), who sees lobby as a vehicle for the development of market institutions, and Rachinsky and Guriev (2005) and Aghion et al. (1999) who assuming only economic wealth crystallisation, develop a model where investment indivisibilities are necessary for predominantly private and underdeveloped capital markets. Benabou's (1996) model has an implication of the emergence of multiple steady states, depending on the balance between incentive distortions and market effectiveness. Bourgeuion and Verdier (2000) attempt to endogenise the voter with the most political power at some point of income distribution ranking. It may change during the growth process and finds that fiscal policy effects on growth are largely negative, but only when not accounting for political power.

While distribution has no effects on output in perfect markets, as the opportunity cost is the rate of interest (Benabou, 1996), in the presence of extreme market imperfections with decreasing returns to individual capital investments, less inequality leads to better opportunities to invest and increased productivity and growth (Bo, 2016). In the model by Aghion et al. (1999), even with some slight degree of market imperfections, there is not necessarily a trade-off between equity and efficiency: not affecting the wealthy's efforts to save yet raising borrowers' incentives, redistribution can give rise to credit-fuelled economic growth. The less wealthy middle-class individuals would invest in education and skill acquisition, thus improving productivity and socio-economic mobility (Alesina & Rodrik, 1994; Alesina & Perroti, 1996; Bubicco & Freytag, 2018). Here, however, cautionary adjusting fiscal policy is important, as limited investment opportunities and credit availability may have a negative effect by generating persistent credit cycles, which undermine stable growth and development (Aghion et al., 1999).

The political instability approach states that with more income inequality, social discontent and uncertainty in the politico-economic environment prevails due to policy uncertainty and threatened property rights, undermining investment necessary for growth, and generating macroeconomic volatility (Alesina & Rodrik, 1994; Aghion et al., 1999). In their summary, Neves and Silva (2014) give a different definition of political stability and

focus on the socio-political rather than politico-economic environment. Instability in their view includes unstable existing government decisions; they emphasise expectations of future extreme deviations in society and politics against, by, or within the regime.

Another strand of literature examining reverse causality from growth to inequality can be traced back to Kuznets' (1955) hypothesis, an inverted-U relation of countries increasing income inequality until reaching the wealth tipping-point of full industrialisation, and reverting it to higher income levels due to legislative interference, high population growth in lower income levels, and entrepreneurial activities (Aghion et al., 1998; Fisher & Erickson, 2007). Galor's (2000) unified income distribution model also leads to the same inverted-U relation. Nevertheless, the change from physical to human capital as the engine for growth in developed countries determine the use of classical and modern credit market imperfection approaches instead of Kuznets' classical savings channel basis of Kaldor's (1975) model. In his model, focusing on inequality effects on growth, development increases with an aggregate capital and skill accumulation, assuming the marginal propensity to save increases with income; credit market imperfections result in underinvestment in human capital, and physical capital accumulation makes inequality growth-enhancing. In contrast, as human capital forms a larger stock if it is spread among individuals, equality is conducive to its accumulation. Later, Galor and Moav (2004) adjust the model for credit market constraints to have no influence on skill acquisition in the later development stage, when inequality-growth relationship ceases to exist. Thus, for the Kuznets, Galor (2000) and Galor and Moav (2004) models, causality runs in opposite directions. Contrary to Galor's investment channel reasoning, Kuznets derives the relationship mostly from institutional and demographic drivers. While both models achieve the reversal of relationships during industrialisation, the mechanisms at work are different.

Adjusting theory to evidence of recently rising inequality, Milanovic (2016) theorises a recurring Kuznets' curve due to technology, openness, and politics, naming it "Kuznets waves". The more recent theoretical debate discusses globalisation and technological change positive effects on growth via more productive resource allocation and inequality via wage decompression, whereupon aggregate income gains are increasingly redistributed to tackle rising inequalities, even when mobile production factors (capital, labour) are prone to flight (Gozgor & Ranjan, 2017).

This paper focuses solely on inequality's effects on growth and aims to test the non-linear inverted-U relationship based on the model by Galor and Moav (2004) and Gozgor

and Ranjan (2017). Thus, in the following research, the inequality-growth nexus is modelled on the more traditional savings channel inequality-growth literature with an assumption of credit market imperfections, abstaining from politico-economic mechanism testing, but integrating fiscal policy transmission channel in times of transition to the market economy and financial turmoil. Moreover, the model integrates recent inequality-growth research development areas, as liberalisation of trade (globalisation) and technological production advancement (complexity of traded goods), which is positively correlated with human capital accumulation, and it may be particularly relevant for economies under question (Zhu & Li, 2017). Additionally, urbanisation, as an effect of globalisation and the self-sorting mechanism of skill and education, is introduced in the model, as it has a growth-enhancing effect, but only up to a certain inequality threshold (Castells & Royuela, 2011).

The model predicts that in transition economies, inequality and growth first rise together, then inequality plummets, and the relationship eventually ceases to exist. The incentives to obtain human capital increase as countries transition from planned to market economies with higher education returns. As their credit markets develop, human capital becomes the prime engine for growth and equality. Inequality due to unequal access to credit for education eventually decreases, and human capital accumulation accelerates agglomeration and sectorial shift towards a more complex production, which allows rising in individual and aggregate incomes, trade the goods in global markets, and redistribute the surplus for optimal levels of inequality via fiscal policy tools. As credit constraints become less binding with higher incomes, aggregate income distribution effect on growth then becomes less significant. Thus, inequality effects on growth are expected to be non-linear and show concave relation.

Chapter 2

Literature overview of the effects of inequality on growth

In the following sections, a summary of empirical evidence is given of inequality – growth relationship in transition and emerging economies, of such relationship during the financial crisis, and the findings of the relationship in CEE.

2.2. Income inequality and economic growth in transition economies

Inequality effects on growth in transition or developing countries are inconclusive: findings of positive or negative effects are confronted by the insignificance, depending on the econometric method used, inequality measure employed, and time span considered (e.g., Brida et al., 2020; Kesti, 2020; Younsi & Bechtini, 2020). During the transition to a market economy, inequality prevails due to privatisation (private sector growth and wage decompression, restructuring, and unemployment, growth of property income), macroeconomic stabilisation (fiscal adjustment affecting government expenditure and taxation, price liberalisation and inflation), and legal and institutional reforms (affecting and intervening with corruption, technological change, mobility, and globalisation) (Mitra & Yemtsov, 2006).

Privatisation increases inequality, as private-sector wages are less equally distributed, thus raising inequalities between public and private sectors; with wage decompression, within-group inequality and regional segregation due to minimum wage policies arise (Mitra & Yemtsov, 2006). Furthermore, within a market economy, full employment is not among the macroeconomic policy targets leading to inequalities due to loss of wage income, but for the employed, the higher concentration of wages is a strong inequality driver; the composition of income sources at different income levels may affect inequality, depending on embeddedness within general structural reform (Milanovic, 1998). The special case of financial sector privatisation and liberalisation whereupon foreign ownership brings efficient banking with spillovers (Bittencourt, 2009) have inconclusive effects on inequality: some scholars find inequality-reducing effects above minimum financial development threshold (Bittencourt, 2009; Kim & Lin, 2011; Agnello & Sousa, 2012; Zhang & Naceur, 2019), but others - overall inequality-enhancing effects (Jauch & Watzka, 2016). Thus, privatisation and liberalisation have ambiguous effects on inequality and time-varying effects on growth.

Regarding macroeconomic balances and stabilisation during the transition, on the revenue side, the value-added tax is introduced, often witnessing declining tax compliance, but mostly favouring equality; regarding expenditures, social transfers targeting the poor and subjected to fiscal stringency are used alongside public service (health and education) provision that tackle the inequality of opportunity and aid growth (Mitra & Yemtsov, 2006). Kuo (2019) counts a tight fiscal policy as the most important savings-induced growth driver. However, there may be a crowding-out effect on private savings (Dayal-Gulati & Thimann,

2006), subject to development stages (Ogaki et al., 1996). Inflation that is evident after price liberalisation during the transition increases in real interest and real income growth, in turn, is associated with higher income inequality in emerging economies (Berisha et al., 2020).

Structural changes, as globalisation, technological progress, influence inequality and growth. Economic integration can take forms of trade, capital and labour mobility, and legal and institutional international policy cooperation. Trade can promote equal income distribution and aid growth in conjunction with targeted structural reforms (Agnello & Sousa, 2012; Kuo, 2019). Foreign direct investment (FDI) aids technological improvements but leads to wage decompression and sectorial divide; economic complexity and automation is positively associated with economic growth, but technological improvements and automation of low and middle-wage worker tasks result in stagnant or decreasing incomes at the bottom and rising incomes at the top (Mitra & Yemtsov, 2006; Basu & Guarglia, 2007; Moll et al., 2021). However, countries with higher human capital, efficient public spending, and economic freedom can reduce income inequality (Chu & Hoang, 2020). Regional inequalities generated by institutional actors, as differences in minimum wage policies, can be offset with international policy cooperation. However, overall, globalisation is associated with income inequality, and its negative effects are less positive or negative as income falls (Huh & Park, 2020). Structural changes thus lead to the developer's dilemma of either structural transformation that aids productivity but may lead to skill mismatch, labour surpluses or shortages, or inclusive growth: growth acceleration or growth maintenance (Sumner, 2017).

In summary, a transition to a market economy with privatisation and liberalisation gives rise to macroeconomic imbalances in the short-run, and income inequalities, which are addressed by government transfers in the short-run, and by a good public provision in the long-run, and funded by the introduction of the stable tax base (as value-added tax). Liberalisation allows to benefit from trade, improved production technology through capital and knowledge inflows and labour migration (factors of economic integration on a regional or global scale) but leads to inequalities, which can be effectively addressed by countries with higher human capital and efficient government spending.

2.3. Income inequality and recessions

Horn et al. (2009) find inequality to contribute to weak domestic demand and instability in Germany's export-led growth model compared to US debt-led growth

experience prior to the crisis. Goda et al. (2016) integrate the hypotheses of rising inequality and stagnant demand limiting the policy choice between export-led and debt-led growth, and the view of the global rise in absolute wealth concentration with the wealthy seeking investable securities, leading to a credit boom, and conclude that economic inequality indeed leads to financial instability, contrary to findings of Bordo and Meissner (2012). Agnello and Sousa (2012) confirm the correlation but not causality of inequality rising before, and dropping after, banking crises.

During 1995 – 2017, the CEE region experienced several regional crises and the global financial crisis in 2008 – 2010. In 1997, the Czech crisis was largely contained; the Asian crisis of the same year and the Russian crisis in 1998 showed a strong response in Poland, Hungary, and the Czech Republic, and Baltic countries (Irandoost, 2019).

As per Goda et al. (2016) model, the high-income inequality and stagnant demand in CEE were addressed with debt-led growth with large current account deficit and capital inflows that led to a housing bubble and pushed countries into recession. During 2008 – 2012, income inequality further increased in Bulgaria, Estonia, Latvia, and Slovenia due to full-time employment loss. Only in the Czech Republic, Lithuania, Poland, Romania, and Slovakia, there was no change in inequality (Brzezinski, 2018).

The income inequality effects and related distributive policies on economic growth before, during, and after the Great Recession in CEE will be discussed in section 3.

2.4. Income inequality and economic growth in CEE

The privatisation and liberalisation policies led to a rise in income inequality in Central Europe (CE), Baltics, and East European country groups, but with large divergence within (Leitner & Holzner, 2008; Rose & Viju, 2014; Bilan and et al., 2020). Sukiassyan (2007) distinguishes the pattern of higher growth rates and lower inequalities in more egalitarian CE countries: Czech Republic, Slovakia, Slovenia, and Poland, which had not been part of the Soviet Union, had been more exposed to a market economy, and upon transition rapidly integrated within global production chains.

Income inequality in CEE is due to educational, regional, sectorial and age differences, among others. Disadvantaged actors (regions, industries, individuals) have lower economic development that may decrease overall economic growth, but income inequality for the disadvantaged also gives incentives to become more entrepreneurial; thus, income inequalities have an ambiguous effect on growth. The low-skilled, old and immobile

workforce are at a disadvantage during the transition (Mitra & Yemtsov, 2006; Rose & Viju, 2015). The rural areas have a relatively higher share of elderly but lower human capital, and it constrains employment, restructuring and business development, regionally and therefore growth. At the same time, in CE countries, the large-scale agricultural sector was restructured, and small rural-urban educational differences aided productivity-enhancing labour reallocation further promoted by FDI inflows, the poorer CEE countries with limited rural education service access, credit and technology access saw lower productivity gains (Macours & Swinnen, 2008). Therefore, in CEE, sectoral, educational inequalities had different relations urbanisation, and during transition did not cause uniform effects on growth.

However, some find that the young, well-educated, and entrepreneurial overall enjoy greater income gains from wage decompression and restructuring during transition (Mitra & Yemtsov, 2006; Rose & Viju, 2015). Others find that youth, in particular, suffered from unemployment, which pushed them into necessity entrepreneurship, aiding growth and innovation (Arzeni & Mitra, 2012). As income differences from educational attainment and skill acquisition raise incentives to obtain greater human capital, and the knowledge embedded in the productive structure of the economy is found to contribute to the long-run growth in CE, it may be concluded that wage decompression may have aided growth in CE (Stojkoski & Ljupco, 2017; Brzezinski, 2018). Overall, with regards to inequalities arising from educational and sectorial regionalisation and contributing to economic growth in transition countries of CEE, the empirical literature is too scarce to draw any conclusions on which mechanism is dominant in the region.

Chapter 3

Scope of policies for addressing income inequality

In the next paragraphs, the overview of macroeconomic policies implemented in CEE during transition is given. The empirical findings on their effects on inequality and growth are summarised, as well as the current state of affairs in relation to recommendations from major international economic actors.

3.1 Redistributive policies and their effects in transition economies

During the transition to a market economy, liberalisation and privatisation policies in conjunction with macroeconomic stabilisation are prioritised; there is a shift in the government expenditure level and structure, including transfers, education and health, as well as tax reforms involving lower taxation to incentivise firms and individuals, which increase inequality (Aghion & Commander, 1999). However, post-communist countries each face distinct policy challenges, as overall income inequality is largely uncorrelated with poverty or wealth crystallisation (EBDR, 2017). The effectiveness to balance growth with equity also determines society's faith in newly developed political institutions (EBDR, 2017) and undermines socio-political stability.

Although Cevik and Correia-Caro (2020) find fiscal policy statistically insignificant for inequality, EBDR (2017) find that higher levels of government spending are associated with lower inequality; targeted measures are necessary to tackle wealth concentration, income inequality, or poverty.

During the transition, countries face macroeconomic shock; many adopt *Washington consensus* policy set for privatisation and liberalisation: free movement of trade and capital; prudent fiscal policy maintaining low budget deficit, broadening the tax base, and maintaining competitive exchange rate to ignite non-traditional exports; abolishment of competition-discouraging regulations ensuring enforcement of property rights; and privatising public enterprises (Williamson, 2004). Such policies have been adopted in transitions of Eastern Bloc countries and Latin America but have been criticised for the focus on efficiency gains and not on growth strategy, among other drawbacks (Rodrik, 2006). Regarding welfare policies, the common trait of all post-communist states is the initial generous unemployment insurance, which overstrains the budget and leads to a collapse of

social welfare system, adding to existing economic distortions and later adoption of means-testing approach (Esping-Andersen, 1996).

Cevik and Correia-Caro (2020) find taxation and government spending to have opposing effects on income inequality in transitioning CEE and CIS countries. However, when structured accordingly, both can address wealth crystallisation, inequality, and poverty via wealth taxation, public service provision, and targeted subsidies, with pre-distribution policies accounting for the most part of the reduction in inequality (EBDR, 2017). These policies should be undertaken to improve the poor and the middle class's positions, as they drive the most growth (Bubicco & Freytag, 2018). To increase middle-income strata, also structural policies as enterprise reforms, promotion of productivity in agriculture, and lagging regions are important (Alam et al., 2005).

Thus, when compared to command economies, market economies typically have reduced social security and higher income inequality, but also higher growth; as countries face macroeconomic shock during the transition, transfer schemes are cushioning the poor, afterwards adjusting for more liberal social security based on means-testing. Although higher government spending levels are associated with lower inequality, targeted measures must be adopted to tackle specific distributive problems (wealth crystallisation, overall inequality, or poverty).

3.2 Stabilisation and structural policies and their effects during crisis

In the eve of the crisis, CEE had vulnerable external public finances and banking sectors; many countries (especially Baltics) experienced widening current account deficits that resulted in external debt during the global commodity price boom. Foreign trade and domestic demand decline pushed countries into recession. The crisis had hit CEE countries through worsening labour market conditions, a slowdown in remittances, lower business and consumer confidence, and tighter credit conditions (Gardo & Martin, 2010).

Neoliberal crisis management prescribes austerity measures during crisis, that is, state budget cuts, privatisation of public services, and dismantling of the welfare state to allow the private sector to revitalise growth (Schipper & Schonig, 2016). Nevertheless, European governments initially responded to the crisis with deficit spending – tax cuts and the expansion of social benefits (Hermann, 2014). Only later austerity measures were adopted, including cutting social spending (reducing the amount and/or timing of unemployment benefits, raising the retirement age), reducing the public sector payroll, as

well as labour market reforms (job flexicurity at the cost of weakening protections for vulnerable groups), and decentralising worker bargaining for enhanced growth (Hermann, 2014).

As Blazek and Netrdova (2012) found, the global economic crisis did not result in a uniform regional pattern of CEE countries. However, the policy response in all countries was focused mostly on three areas: (i) changes in interest rates (monetary easing); (ii) liquidity and exchange rate supporting measures; and (iii) fiscal policy (Gardo & Martin, 2010).

Pensions play a key role as an economic stabiliser in recession but served for budget-balancing in CEE countries. Regarding labour policies, CEE's segmented labour market improved during the crisis, with flexibility and security elements introduced, thus enhancing employability and tackling the largest determinant of inequality – full-time job loss –, but also resulting in horizontal (gender, migrant) income inequality due to easier lay-off regulations. Simultaneously, increased part-time employment had either no or positive impact on equality (Brzezinski, 2018). Austerity measures in CEE focused on “saving banking system and big capital, socialising risk for wealthy and privatising risk for the majority” (Taylor-Gooby, 2008; Dokmanovic, 2017, p.32).

In the aftermath of the crisis, European Commission (2012) further advised for structural changes to address skill mismatches with the social investment approach, which had been limited or declining during the crisis: reform apprenticeship systems, increase labour mobility between states, and plan for regional development (Bouget et al., 2015). It was also advised to introduce or raise minimum wages, implement a progressive tax system, and shift the tax burden from labour onto the property and environmental “bads”.

Introduction or raise of “clear-cut” minimum wages for reduced poverty risk of low-wage earners proved to be ineffective in CEE, even negative through their misemployment effects; however, such policy aided overall equality (measured by Gini) by pushing up low-wage incomes and tackling “wage deflation” which was coined as the cause of the global crisis (Pena-Casas, 2009; IMF, 2016).

After regressive reforms in the late 1990s (Baltics) and early 2000s (Bulgaria, Hungary, Romania, and Slovakia), the progressive personal income tax system is not implemented in most CEE countries. However, it has a potential for equity and tax revenue increases (Barrios et al., 2020). The environmental taxation system in developing European

countries is loosely connected with social and economic perspectives. (Alakbarov et al., 2020).

Lastly, regional unemployment during the CEE crisis diverged across economic and social profiles of regions associated with the centre in settlement hierarchy; the only uniting regional characteristic was a favourable position of capital cities and metropolitan regions (Blazek & Netrdova, 2011).

During a crisis, demand-side policies (increasing social security, reducing taxes) or supply-side policies (liberalising labour law) can be taken to escape the recession; during the 2008 – 2010 crisis in CEE, first, the Washington consensus austerity measures were adopted; later, welfare system productivity was enhanced through flexicurity labour market policies.

3.3 Government policies in Central and Eastern Europe

Regressive social transfer and taxation systems were a regularity in socialist states and continued into the years of transition in all countries except the Slovak Republic (Milanovic, 1998). The legacies of previous welfare states, with former Czechoslovakia (current Czech and Slovak Republics) having higher benefit levels and lower-wage inequality than former USSR and Yugoslavia, implying lower returns to education (Milanovic, 1998), evolved into different growth and welfare paths with different inequality levels (Lauzadyte-Tautliene et al., 2018; see table B1, Appendix B),

Most CEE welfare states have developed as neo-liberal, partially due to lack of social democrat parties, weak trade unions, and partially due to dependence on international financial organisation, such as International Monetary Fund (IMF) and World Bank, aid, conditional on neoliberal policy implementation. However, welfare regimes can be split into two clusters. The Eastern European welfare model (Baltics, Bulgaria, and Romania) is less advanced than that of CE due to less financial resources to spend for social protection, education, healthcare (Lauzadyte-Tutliene et al., 2018).

The communist welfare state was transformed into a liberal model as part of the shock-therapy based on growth-promoting Washington Consensus during the 1990s, with state role being marginalised to provision for the poor, and public expenditure being replaced by privatised provision and social security markets (Cook, 2007), despite the prevailing difficulties: populations were state-dependent, the welfare state was popular, and organiser stakeholders favoured its maintenance (Fenger, 2007). Later on, economic (industrial and

innovation) policies were transplanted from the European Union, thus converging with developed economies, but their local development remaining flawed (Kattel, 2010).

The main elements of the 1990s shock therapy were rapid privatisation, price liberalisation, and fiscal discipline, with uniform results: output fell, capital shrank, labour moved, trade reoriented, the structure changed, institutions collapsed, and the transition was costly, with Gini coefficient increasing by ten ppt in the first decade (Campos & Coricelli, 2002). As by Esping-Andersen (1996), in early transition, governments adopted a social provision to tackle the emergency of high inflation, unemployment, and poverty, afterwards restructuring due to rising costs, although the severity and length of recession differed to a large extent, which determined the provision of welfare (Fenger, 2007; Aidukaite, 2012). However, a more gradual adjustment process also resulted in problems, developing economically and politically strong elites, that is, oligarchs (Pena-Miguel & Cuadrado-Ballesteros, 2020).

Overall, inequality was the most pronounced with respect to education and class (benefiting entrepreneurs and white-collar workers) and the employment sectors within urbanised areas (Duke & Grime, 2010). Returns to education had been low in the pre-transition period; with privatisation, the restructuration towards the service sector gave rise to exacerbated sectorial (which largely coincided with educational and spatial) income inequalities; the agricultural income was affected more negatively than non-agricultural ones, and the skill differences evolved into the long-run unemployment trend in the early transition period (Milanovic, 1998).

Contrary to planned labour mobility in the Soviet Union, labour was now free to move; the income differences were further aggravated by urbanisation and overall migration. Increasing inequality and declining income equally contributed to an increase in poverty, but unevenly; the more prosperous Czech and Slovak Republics, Hungary, and Slovenia could cope with increased inequality with almost no poverty, whereas Bulgaria, Romania and Poland had much higher, albeit globally relatively shallow, poverty levels. As increasing inequality harms growth in countries with high levels of urbanisation (Castells-Quintana & Royuela, 2012), governments in CEE have been advised to address the development of disadvantaged (rural) areas by strengthening the social service provision and maintaining strong links with Diaspora to attract targeted remittance investment in local development projects; focus on job growth and high unemployment rates in youth is also crucial (European Commission, 2012).

Although the demographical composition of CEE during the transition was somewhat favourable for economic growth (stagnant or declining), the increase in the population of retirement age was a burden for state budgets. Compared to workers, pensioners generally held their ground during the initial stage of transition (Milanovic, 1998), though not uniformly across the states (Aidukaite, 2012). The three-pillar scheme was introduced in the late 1990s, supported by the World Bank, along with health insurance and residual safety net, thus moving towards more privately funded social security.

Macroeconomic policies have been firmly guided by international actors, especially in countries that depended on their conditional financial aid. Capital and trade openness was the cornerstone of the financial sector development in the long-run (Bayar et al., 2017). Before opening up, countries set ground establishing two-tier banking systems, encouraged new entrants with lax regulation while gradually privatising state-owned bank. However, foreign bank participation policies differed, and banking was not efficient (Bonin et al., 2019). Later, effective institutional and legislative framework, bankruptcy laws, and accounting methods were established, which resulted in mature and stable banking systems with high foreign bank ownership ratio; during the financial crisis, however, the banking sector proved to be vulnerable to both internal and external shocks, but high foreign ownership and timely central bank reaction aided resilience (Bonin et al., 2019).

Industrial policy development focusing on trade diversification, and production complexity, was flawed; aiming to restructure their economies, particularly industries, in the 1990s, CEE rapidly replaced, rather than gradually upgraded Soviet-style companies, exemplifying the weak industrial policy capacity, but also the fact that was liberalising – disassembling and privatising – previously extremely vertically integrated companies resulted in most advanced industries being hit the hardest, as foreign investment attracted low-capital industries. (Kattel et al., 2009; Kattel, 2010).

During the first decennia, Washington Consensus economic capacity building was directed towards macro-economic skills and left CEE with less skill- and technology-intensive industrial structure; the later EU's lab-to-market innovation policy injections were argued to be ill-fitting to CEE due to solving problems not existing in CEE's low-skill economies, and non-existent networking and coordination have posed further problems for product innovation (Kattel et al., 2009). The lack of policies encouraging adaptability to technological change has been found to give rise to inequality in CEE countries (Rose & Viju, 2014).

Overall, economic development policies in CEE transferred from IMF and World Bank upon transition in the 1990s were focusing first on macroeconomic stabilisation after shock therapy of privatisation and liberalisation; private (financial) sector brought knowledge spillovers, but from 2000s onwards, EU policies and funding have guided other economic development areas, such innovation, education, and regional policies.

Chapter 4

Data

Most studies researching the economic growth and income inequality relationship have used a generalised method of moments (GMM) technique and relied on secondary data sources, which enter regressions both with annual frequency and 5-year average periods. The data used for economic growth is usually the GDP per capita, while for inequality measures, predominantly Gini coefficient is used. The most popular control variables are trade openness, human capital measures, investment, and population growth.

This research's main objective is to find out the relationship between inequality and economic growth in the former communist Eastern European countries that accessed European Union in 2004 and 2007 and transitioned towards a market economy after 1989 and 1991. Inequality measured by income, rather than by consumption wealth is used due to availability of data for these countries; although income-based measures are blamed for effective inequality measurement due to lack of permanence, consumption-based and income-based measures of inequality are fairly consistent in countries that assessed EU in 2004 (Mitra & Yemtsov, 2006). To test the Kuznets' hypothesis and Galor's hypothesis that inequality is positively related to economic growth in the short-run, the model had to capture both short-run and long-run effects. The following sections continue specifying the data used (Table 1) and the empirical model applied.

Table 1
Data sources and variable descriptive statistics

Variable	Acronym	Obs.	Mean	St. Dev.	Min	Max	Source
GDP per capita growth	Ypc	220	0.041	0.080	-0.154	1.038	World Bank Development Indicators
Gini index	G	229	43.734	6.467	31.328	57.644	World Inequality Database
Palma ratio	PAL	230	2.4561	0.8575	1.1646	5.0036	
80th/20th income share	I8020	230	14.0313	6.9657	4.8981	53.7615	
90th/10th income share	I9010	230	92.8231	281.6525	-1721.5	3068	
90th/50th income share	I9050	230	0.4255	0.0406	0.3372	0.5284	
10th/50th income share	I1050	230	0.0310	0.0274	-0.0352	0.2799	
Trade as a share of GDP	TR	230	103.959	34.463	33.214	187.229	World Bank Development Indicators
Government expenditure as a share of GDP	GOV	230	0.2036	0.0344	0.1226	0.3219	
Urban population share	URB	230	63.813	7.428	50.649	74.669	
Financial development index	FDpc	230	33.062	11.138	9.506	57.776	International Monetary Fund
Economic Complexity index	ECOM	230	0.881	0.448	0.05	1.69	The Observatory of Economic Complexity
Final electricity consumption per capita	ELpc	230	0.004	0.001	0.002	0.007	Eurostat

The study relies entirely on secondary data. For the dependent variable, economic growth, the annual data on GDP in constant LCU were used and obtained from the World Bank World Development Indicators (WDI) database. Income inequality, rather than inequality based on consumption or wealth inequality, is used due to the availability of data for these countries and is deemed to be a good proxy for wealth inequality. Several measures were tested, but only the Gini index, Palma ratio, quantile ratio, and 90th to 10th income share ratio were included in the final model.

The annual inequality data was obtained from the World Inequality Database (2020). The choice of control variables was based on neoclassical growth theory and previous empirical literature. For control variables, as trade openness, urbanisation, and government expenditure, the World Bank WDI database was used; economic complexity index was sourced from the MIT Media Lab's Observatory of Economic Complexity (n.d.); financial development index - from International Monetary Fund, and final electricity consumption as a proxy for economic development - from Eurostat. The control variables of financial development, electricity consumption, urban population, and trade (models I and III), and economic complexity, financial development, and government expenditure (models III and IV) were included in the final models. The set of variables entered regression by their natural logarithms in first differences and lagged once, according to ARDL specification, or in first differences only, according to OLS specification, and inequality measure enters the regression in its squared and/or linear form, according to model. The statistical/econometric software used for model estimations was Stata 15.

The researcher only studied the former communist Central and Eastern European countries that accessed European Union in 2004 and 2007 (Czech Republic, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Romania). During the collection of annual data for 1991–2019 for these countries, the time span for the data was shortened to 1995–2017, as the Economic Complexity index was available up to 2017, and trade (imports and exports of goods and services) data was not available for Poland, Latvia, and Lithuania up to 1995.

Chapter 5

Methodology

The study followed Brida et al. (2020), Juuti (2020), Koh et al. (2020), and Manyeki and Kotosz's (2020) approach to test income inequality and economic growth using the ARDL model. This cointegration technique was preferred, as it can accommodate variables integrated of different orders (I(0), I(1), or a mix of I(0) and I(1), but not I(2)) and disentangle short-run and long-run effects. Moreover, it is robust in the presence of endogeneity. Complementary to the ARDL models with fixed effects (models I and III), random-effects and pooled OLS estimations were performed for better comparability.

The long panel of 10 country data spanning over 23 years was unbalanced, but no missing values were generated. The data contained cross-sectional dependence for most logarithmically transformed variables, examined by applying the Pesaran (2004) test.

Before specifying the model for using analysis, it was investigated the order of integration of variables to avoid spurious estimation results. First-generation Fisher-type Augmented Dickey-Fuller, and Im–Pesaran–Shin and second-generation Maddala and Wu (1999) and Pesaran (2007) CIPS panel unit root tests were applied. A lag of 1 year was set due to the short time span of the data. First-generation tests returned results state that all panels at levels except FD contain unit roots at a 5% significance level, but only URB contains unit root when differenced once. Second generation test results also suggest that variables are integrated with different orders (but not I (2)).

Due to different orders of integration, and ARDL estimation technique was chosen for the model estimation. The model I depicts the baseline linear model with squared inequality term, model II depicts the OLS method to supplement the findings. Models III (ARDL) and IV (OLS) estimate income inequality on economic growth, including squared and linear terms of inequality, to test the inverted-U relation despite the study's short time span.

Model I

$$y_{it} = q_0 + a_1(\ln Inequality)^2_{it} + a_2 \ln X_{it} + a_3 y_{it-1} + a_4 \ln X_{it-1} + u_{it}, \quad (1)$$

Model II

$$y_{it} = b_0 + c_1(\ln Inequality)_{it} + c_2 \ln X_{it} + e_{it}, \quad (2)$$

Model III

$$y_{it} = p_0 + b_1 \ln Inequality_{it} + b_2 (\ln Inequality_{it})^2 + b_3 \ln X_{it} + b_4 y_{it-1} + b_5 \ln X_{it-1} + r_{it} \quad (3)$$

Model IV

$$y_{it} = j_0 + k_1 \ln Inequality_{it} + k_2 (\ln Inequality_{it})^2 + k_3 \ln X_{it} + r_{it} \quad (4)$$

In equations 1-4, y_{it} denotes GDP per capita growth rate in the country i at the time t , *Inequality* denotes the income inequality of a country i at time t measured by Gini coefficient (a), Palma ratio (b), interdecile 80/20 ratio (c), or 90/10 ratio (d), and X represents control variables for each country i at time t . These are trade share, government expenditure, urban population share, financial development index, economic complexity index, electricity consumption for each country i at time t .

Dummy variables for countries and years are also included in all estimations (see t

Tables A1-A6 in Appendix A) using a cut-off point for lowest and highest values of 0.07 estimated by visual inspection of residuals, as this method was appropriate in the context of a small set of countries, for which the cut-offs summarised by Schutte and Violette (1996) were too high to identify any value as an outlier, and thus did not lead to any outliers defined as such by interquartile range method.

All countries have experienced negative shock due to the global financial crisis in 2009, except Poland, which avoided recession due to economic condition before the crisis, low dependence on credit, and relatively big domestic market, among other factors (Drozdowicz-Bieć, 2011). The crisis had severe negative effects for different time periods in Baltic countries (Estonia, Latvia, and Lithuania) in 2008, 2010, and 2009, respectively (Staehr, 2013), as well as in Romania in 2010 due to severe austerity measures (Stoiciu, 2012). Bulgaria suffered from a banking crisis in 1996, resulting in hyperinflation in 1997 (Kovatchevska, 2000). After the economic bust over 1997 – 1999, Romania reduced its current account deficit. It received external financial support in 1999 (European Commission, 1999a), having an outstanding positive growth impact. However, given the decreased in-land demand due to tax rises and the slowdown of Slovenia's main export partners Germany and Italy, 1999 was an outstandingly negative year for growth (European Commission, 1999b).

Testing for the model fit, first, the endogeneity (fixed and random effects) was tested. Hausman test results showed that fixed effects for models I and III are appropriate. The Breusch and Pagan LM test was used to test for individual-specific effects for models II and

IV, and returned results suggest the use of pooled OLS. The Wald test for groupwise heteroskedasticity in the fixed effect regression model indicates that all explanatory variables in the model are significant at 1%. Models I and III were also estimated with random effects assuming individual country effects to aid comparability,

Pesaran's and Frees' cross-sectional dependence tests returned values indicating cross-sectional dependence in panels. Woolridge's test for serial autocorrelation also suggests that there is autocorrelation in panels, possibly due to the global economic crisis. Models were tested for multicollinearity with VIF statistic. An acceptable level of multicollinearity was detected, noting that both linear and quadratic terms of inequality measures were included in models III and IV. None of the variables was centred.

Chapter 6

Empirical analysis

First, a graphical analysis was used to obtain information about general trends. Table B1 (Appendix B) shows the divergence in inequality: Slovakia, Slovenia, Czech Republic, and Hungary are among the most equal countries, while Baltic countries, Romania, Bulgaria, and Poland are more unequal. During the economic downturn in CEE in the late 1990s and 2008 – 2010, the overall inequality was at its lowest. However, the decrease in inequality follows also immediately after accession to Europe in 2004 (see Figure 1a and 1b in Appendix B). Inequality measures of extremes do not seem to follow any specific pattern (see Figures 1c and 1d, Appendix B).

The estimated results of the panel ARDL fixed-effects model I (baseline model) are presented in Table 2. In contrast, the random-effects model I results can be consulted in Table A1 (Appendix A), alongside the random effect model III estimations (Appendix A, Table A2) and model II and IV estimations (Tables A3 and A4). Results from low-inequality and high-inequality country panels I and II, respectively, (see Table B1, Appendix B), can be consulted in Table 3 (baseline model I), Table A5 (model III for Panel I) and Table A6 (model III for Panel II).

Table 2

GDP growth estimation results from the model I and III with fixed effects

Variable	Ia	Ib	Ic	Id	IIIa	IIIb	IIIc	IIId
<i>Variables in logs</i>								
Inequality ₂	0.0064	0.0224**	0.0003	-0.0004	-0.4204*	-0.1064**	-0.0392	-0.0018
Inequality	-	-	-	-	3.1843*	0.2090*	0.1818***	0.0016
GOV	-	-	-	-	-	-	-0.5667***	-
	0.2975** *	0.0288** *	0.3072** *	0.3148** *	0.5573** *	0.5497** *		0.6040** *
ELpc	0.5301** *	0.5453** *	0.5474** *	0.5884** *	-	-	-	-
URB	-	-	-	-	-	-	-	-
	4.4227** *	4.0627** *	3.9167** *	3.2337** *				
ECOM	-	-	-	-	0.0562** *	0.557***	0.0423***	0.0366** *
FD	-	-	-	-	0.1295**	0.1273** *	0.1450***	0.1541** *
<i>Lagged once variables</i>								
Ypc	-	-0.026***	-	-	-	-	-0.6974***	-
	0.2574** *		0.2607** *	0.2407** *	0.6857** *	0.6897** *		0.7104** *
Inequality ₂	0.0146** *	0.0176**	0.0024	0.0005	-	-	-0.0677***	-0.0067**
					0.3821** *	0.1188** *		
Inequality	-	-	-	-	2.9706** *	0.2723** *	0.0364***	0.0543*
GOV	-	-	-	-	-	-	-0.6244***	-
	0.0239** *	0.2284** *	0.2441** *	0.2453** *	0.5982** *	0.6161** *		0.5966** *
ELpc	0.0871** *	0.0935** *	0.0850** *	0.0668**	-	-	-	-
URB	-	-0.2266**	-0.1801*	-0.1200	-	-	-	-
	0.0281** *							
ECOM	-	-	-	-	0.0511** *	0.0484**	0.0358*	0.0290**
FD	-	-	-	-	0.1089*	0.1108**	0.1273**	0.1497**
TR	-	-	-	-	-0.1391**	-	-0.1353**	-0.1170**
						0.1574** *		
Const.	3.7039** *	3.8136** *	3.4865** *	2.9563** *	0.4408	6.1750** *	5.7402***	6.1715** *
F	16558.09	7809.81	13152.14	15506.04	22814.05	21309.71	7208155.0 5	5129.85
Prob>F	0.000	0.000	0.0000	0.0000	0.000	0.000	0.000	0.000
R ²	0.9222	0.9198	0.9179	0.9244	0.7553	0.7610	0.7655	0.7678

Note. ***, ** and * denote significance at 1%, 5%, and 10% levels, respectively

The results from models I and III with fixed effects suggest that income inequality may be growth-enhancing, depending on the inequality specification. In all CEE countries (see Table 2), inequality measures focusing on middle-income disparities, as PAL and G were positive and significant (only PAL in model I), but only in the short-run. In the long-

run (comparing with long-run growth elasticities), only model III showed statistically significant results for inequality (except IIIId), suggesting that the inverted-U hypothesis may hold, but income crystallisation reflected in official wage income is not significant for growth in countries in question (see Figure 5, Appendix B).

Table 3

GDP growth estimation results from the model I with fixed effects, disaggregated by two panels

Variables	Panel I				Panel II			
	Ia	Ib	Ic	Id	Ia	Ib	Ic	Id
<i>Variables in natural logarithms</i>								
Inequality ²	- 0.0043	-0.0087	-0.0099	- 0.0009** *	0.0156** *	0.0191** *	-0.0001	-0.0003
GOV	- 0.1784	-0.1878*	-0.2289**	- 0.2710** *	- 0.3149** *	- 0.3095** *	- 0.3360** *	- 0.3109** *
ELpc	0.6039 ***	0.6045** *	0.6611** *	0.6559** *	0.4257** *	0.4444** *	0.4326** *	0.5083** *
URB	- 7.8236 ***	- 7.3459** *	- 6.8738** *	- 7.2145** *	-0.4013	-0.5333	-0.6653	1.1458
<i>Lagged once variables</i>								
Ypc	- 0.3283 ***	- 0.3517** *	- 0.3473** *	- 0.3564** *	-0.1567*	-0.1700*	-0.1693**	-0.1504*
Inequality ²	0.0194 **	0.0933**	0.0029	-0.0003	0.0077	0.0077	-0.0001	0.0005
GOV	- 0.1606 **	-0.1512	-0.2241**	-0.2609**	- 0.2237** *	-0.2167	- 0.2392** *	- 0.2104** *
ELpc	0.3689 ***	0.3619** *	0.4004** *	0.4283** *	-0.0502	-0.0436	-0.0642	-0.0706
URB	- 0.7480 ***	- 0.8058** *	-0.5315*	-0.4487*	- 0.4755** *	- 0.4251** *	- 0.4161** *	- 0.3638** *
Const.	8.3504 ***	9.0618** *	7.9922** *	7.8649** *	2.6873** *	2.7521** *	2.5604**	2.1681**
F	1221.6 3	2043.06	1473.98	2902.33	3401.74	1666.81	3669.95	8383.03
Prob>F	0.0000	0.0000	0.0000	0.000	0.0000	0.0000	0.0000	0.0000
R ²	0.9660	0.9664	0.9650	0.9653	0.8308	0.8249	0.8198	0.8431

Note. ***, ** and * denote significance at 1%, 5%, and 10% levels in the short run, respectively

When countries were segregated by their average inequality levels into relatively equal (Panel I: Slovenia, Slovakia, Czech Republic, Hungary) and unequal (Panel II: Lithuania, Latvia, Poland, Bulgaria, Romania, and Estonia), the results (see Table 3) support that measures G and PAL are growth-enhancing in short-run (panel II), but inequality between the very rich and very poor harms growth (panel I). In the long-run, in the model I, when compared to elasticities, income inequalities are not significant growth determinants.

Model III results (Tables A5 and A6, in Appendix A) do not return Kuznets' and Galor's inverted-U relation in the short-run. However, they show that inequality positively influences growth in the long-run in unequal (panel II) countries, and PAL does so in the short-run. In equal countries (panel I), inequality does not significantly impact growth.

Due to the short panel and lag of 1 year, the divergence in the short-run and long-run effects should not be stressed, but the overall significance of PAL, less so of G and, marginally, also I8020, measures show that the main driver of growth is the inequality in the middle class, which is a necessary base for consumption and domestic savings. Although most CEE economies have a flat income tax regime, it must be noted that the regression uses market income data, which does not reflect taxation effects but takes into account social transfers.

These results align with Younsi and Bechtini (2020) 's findings, who find a weak positive relationship in BRICS countries. However, as the relationship found is not robust, the results should be taken with caution. When the statistical analysis is complemented with graphical inspection, one can see that inequalities, especially those focusing on the tails (I8020) rose during the Washington consensus reforms in the late 1990s; only later, around the 2000s when the banking sector was modernised, credit- accessible, and countries reached their pre-transition incomes, stark differentiation in incomes faded away, possibly due to credit-fuelled poverty reduction. Middle-income inequality declined during the growth years until the end of the crisis (2004 – 2010), while I8020 jumped in 2009, suggesting optimal government intervention, as the overall middle-income inequality level (PAL and G) incentivised short-run productivity and growth. However, results from models I and III are not robust; inequality does not significantly influence growth in the long-run.

Relaxing the baseline country-specific (fixed) effect assumption with random effects ARDL models (see Tables A1 and A2 in Appendix A), inequality proves to be insignificant for growth. Pooled OLS results (see Tables A3 and A4 in Appendix B) show that not accounting for a country or time-specific effects, highly polarised income distribution (I9010) undermines growth. However, model IV returns inequality as non-significant for growth. Interestingly, the same negative effect of I9010 is found in equal countries (model I). These results align with the findings of Bartak and Jablonski (2020). It suggests that high market income divergence did not carry the economic growth effects in the transitioning CEE, as modelled in oligarchy-lobby models by Rachinsky and Guriev (2005).

Regarding the other significant growth determinants, GOV was impeding growth in the short-run across all models, more so in panel II, and when focusing on tails of the income distribution. The results of GOV in the long-run are not coherent across models in CEE, but when disaggregated by panels, both models return a high impact of GOV spending on growth. It is the main growth determinant. As GOV has especially large negative effects in panel II, it may suggest that countries could not cope with social security spending targeted at the poor in times of recession.

URB is undermining growth in both short-run and long-run overall and in equal countries in particular. It aligns with the findings of Castells-Quintana and Royuela (2012), although it is also intuitive considering the returned positive inequality – growth link and analysis of Mitra and Yemtsov (2006), who find that migration to higher-income areas reduced inequality; the insignificance of G for growth in equal countries is, however, undermining the robustness of this link. The largest negative effect on growth is observed when overall inequality is considered; this may point towards the differences of rural-urban inequalities in CE and other poorer CEE countries, which have less developed rural economies due to high percentage of elderly, less human and physical capital, and less access to credit and information for development (Macours & Swinnen, 2008).

ELpc is driving growth in the short-run only, which is not expected, as electricity consumption signifies higher industrial production and higher income for households' consumption. Likewise, ECOM is strongly positively associated with growth in the short-run, but FD is only significant in SR in random effects and OLS models. This result suggests that human capital endowment leading to innovation, production sophistication and economic diversity are somehow less important long-run drivers for sustained economic growth for the transition economies, possibly due to low development and integration in high-value production. However, they exhibit a strong short-run association with growth. Interestingly, trade only appears a significant growth driver in the long-run (model III) in the random-effects model.

Model III supports the inverted-U hypothesis, but only in the long-run (see Figure B5 in Appendix B), in partial alignment with Soava et al. (2020), who, regressing growth to inequality, found the inverted-U hypothesis to hold true when comparing emerging with highly developed EU countries over 2005 to 2016. However, the long-run result is not robust (it does not hold equally in both panels being evident only in Panel II), and therefore should be taken with caution. However, the inequality effect on growth only in Panel II may be

explained by the fact that these countries are generally of lower income and have not been able to optimise government spending. It may also suggest that Galor's (2000) hypothesis holds true: the positive inequality-growth relationship in less developed economies (Panel II) is eventually during development process and transition to human capital-fuelled growth, then reversed, and then ceases to exist (Panel I). The conclusions of the tested fixed effect models I and III do not align with findings of Manyeki and Kotosz (2020), who find strong positive short-run relationship and weak long-run relationship in emerging economy studied. It may be explained by cross-country growth regression findings by Juuti (2020), who conclude cross-country heterogeneity. Longer time spans for testing Galor's (2000) hypothesis in the long-run should be considered.

In sum, inequality measured with middle-income sensitive measure (Palma coefficient) and global measure (Gini index) is positively associated with economic growth during 1995 – 2017 in CEE in the short-run. Galor's hypothesis of inverted-U relationship is only confirmed in the long-run. In less equal countries, growth is enhanced by middle-income inequality in the short-run, and by most inequality measures in the long-run. Urbanisation and government expenditure both undermine growth, and urbanisation has highly negative effects in equal countries. Measures of income inequality crystallisation have a negative effect on growth, where significant. Overall, the analysis shows that the relationship is not robust, and many underlying factors may be in play. The results from inverted-U hypothesis testing are not robust, which may partially be attributed to the study's short time span, but comparison between the panels show that in the long-run, inequality drives growth in less developed countries, and is insignificant in higher developed countries, in alignment with the underlying hypothesis of Galor.

CONCLUSIONS

The findings represented add to the literature of inequality – growth relationship in transition economies, which confirms positive, but a rather ambiguous relationship, depending on the inequality measure chosen. It also shows the lack of fit for one specific transmission mechanism dominating the relationship, as different inequality measures show different dynamics through different growth periods.

The two essential findings are that (i) inequality in the middle class determines the growth the most; and (ii) the government expenditure and, especially, urbanisation has great negative effects on growth, reflecting the importance of governments adopting more productivity-enhancing social investment structural welfare policies.

Although the findings show that the choice of the indicator has great importance on the inequality-growth relationship, it must be noted that data available for CEE do not feature after-tax income or social transfers, that is, the effect of government redistributive policies, and do not show the unofficial earned income. While most countries have adopted a flat labour tax rate, welfare system generosity varies; incorporating redistributive effects into growth analysis may have clearer effects.

Further research should have yet to confirm the positive income inequality – growth trend in CEE countries, especially in light of high inequality. With better data available for migratory flows, technology and productivity of firms, and education over a longer time span, equality of opportunity and incentive mechanisms should be researched to understand how well welfare systems have been restructured to address the needs of changing demographics, lagging regions and improved institutions capable of more complex national strategy development and policy implementation.

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Appendices

A. Alternative model estimation

Table A1
Results from ARDL random effect model I estimations

Variable	Model Ia		Model Ib		Model Ic		Model Id	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
Id2009	-0.0295	0.000	-0.0275	0.000	-0.0277	0.000	-0.0219	0.001
Pol2009	0.0504	0.000	0.0525	0.000	0.0512	0.000	0.0516	0.000
Rom1999	0.0686	0.000	0.0686	0.000	0.0705	0.000	0.0849	0.000
Bul1997	-0.1303	0.000	-0.1269	0.000	-0.1265	0.000	-0.1202	0.000
Est2008	-0.1135	0.000	-0.1042	0.000	-0.1082	0.000	-0.1064	0.000
Est2009	-0.1184	0.000	-0.1135	0.000	-0.1158	0.000	-0.1105	0.000
Lit2009	-0.0871	0.000	-0.0916	0.000	-0.0876	0.000	-0.0826	0.000
Rom2010	-0.1226	0.000	-0.1082	0.000	-0.1212	0.000	-0.1304	0.000
Lat2010	-0.0851	0.000	-0.0825	0.000	-0.0880	0.000	-0.0831	0.000
Trend	-0.0014	0.000	-0.0012	0.000	-0.0013	0.044	-0.0015	0.019
G ²	0.0004	0.948	-	-	-	-	-	-
PAL ²	-	-	0.0203	0.044	-	-	-	-
I80202	-	-	-	-	0.0002	0.945	-	-
I90102	-	-	-	-	-	-	-0.0004	0.321
GOV	-0.1542	0.036	-0.14	0.049	-0.1492	0.049	-0.1577	0.073
ELpc	0.6964	0.000	0.7078	0.000	0.7088	0.000	0.7516	0.000
URB	-3.8617	0.000	-3.5801	0.000	-3.5567	0.000	-3.0514	0.001
<i>Lagged variables</i>								
Ypc	-0.0007	0.532	-0.0018	0.172	-0.0015	0.177	-0.0014	0.168
G ²	0.0045	0.033	-	-	-	-	-	-
PAL ²	-	-	0.0037	0.182	-	-	-	-
I8020 ²	-	-	-	-	0.0014	0.158	-	-
I9010 ²	-	-	-	-	-	-	0.0007	0.009
GOV	-0.0564	0.006	-0.0501	0.025	-0.0504	0.022	-0.0523	0.020
ELpc	0.0057	0.329	0.0021	0.690	0.0023	0.657	0.0061	0.269
URB	0.0359	0.084	0.0436	0.050	0.0451	0.049	0.0496	0.024
Const.	-0.2189	0.041	-0.1920	0.077	-0.2052	0.062	-0.2096	0.047
Wald Chi ²	34555.52		39788.07		29921.78		51465.05	
Prob> Chi ²	0.0000		0.0000		0.0000		0.0000	
R ²	0.8886		0.8872		0.8864		0.8990	

Table A2

Results from ARDL random effect model III estimations

Variable	Model IIIa		Model IIIb		Model IIIc		Model IIIId	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
Id2009	-0.1121	0.000	-0.1109	0.000	-0.1146	0.000	-0.1125	0.001
Pol2009	0.1183	0.000	0.1171	0.000	0.1172	0.000	0.1195	
Rom1999	0.0028	0.869	0.0026	0.865	0.0035	0.821	0.0152	0.298
Bul1997	-0.2864	0.000	-0.2861	0.000	-0.2852	0.000	-0.2848	
Est2008	-0.0948	0.000	-0.0966	0.000	-0.0974	0.001	-0.0936	0.003
Est2009	-0.0634	0.000	-0.0627	0.000	-0.0651	0.000	-0.0574	
Lit2009	-0.0818	0.001	-0.0832	0.001	-0.0766	0.004	-0.0702	0.001
Rom2010	-0.0801	0.000	-0.0853	0.000	-0.0939	0.000	-0.0952	
Lat2010	-0.0531	0.013	-0.0521	0.024	-0.0595	0.001	-0.0545	
Trend	-0.0066	0.166	-0.0066	0.157	-0.0064	0.181	-0.0063	0.195
G ²	-0.1200	0.665	-	-	-	-	-	-
G	1.0803	0.627	-	-	-	-	-	-
PAL ²	-	-	-0.0597	0.525	-	-	-	-
PAL	-	-	-0.1851	0.443	-	-	-	-
I8020 ²	-	-	-	-	-0.0261	0.487	-	-
I8020	-	-	-	-	0.1582	0.512	-	-
I9010 ²	-	-	-	-	-	-	-0.0021	0.650
I9010	-	-	-	-	-	-	0.0197	0.730
ECOM	0.0147	0.067	0.0158	0.050	0.0138	0.094	0.0150	0.211
GOV	-0.2108	0.001	-0.2088	0.000	-0.2144		-0.2445	
FD	0.0973	0.018	0.0943	0.018	0.0969	0.018	0.1138	0.009
<i>Lagged variables</i>								
Ypc	-0.0065	0.295	-0.0066	0.315	-0.0063	0.314	-0.0068	0.305
G ²	-0.0936	0.457	-	-	-	-	-	-
G	0.7322	0.427	-	-	-	-	-	-
PAL ²	-	-	-0.0193	0.309	-	-	-	-
PAL	-	-	0.0458	0.097	-	-	-	-
I8020 ²	-	-	-	-	-0.0081	0.392	-	-
I8020	-	-	-	-	0.0510	0.243	-	-
I9010 ²	-	-	-	-	-	-	-0.0008	0.607
I9010	-	-	-	-	-	-	0.0086	0.578
ECOM	0.0223	0.327	0.0230	0.305	0.02281	0.311	0.0260	0.264
TR	0.0661	0.161	0.0661	0.158	0.0611	0.204	0.0597	0.246
GOV	-0.1365	0.208	-0.1362	0.226	-0.1340	0.243	-0.1487	0.192
FD	-0.0125	0.319	-0.0122	0.296	-0.0120	0.277	-0.0132	0.293
Const.	-1.7137	0.358	-0.3075	0.184	-0.3405	0.214	-0.2954	0.215
Chi ²	174636.41		53140.08		50144.64		56992.29	
Prob>Chi ²	0.0000		0.0000		0.0000		0.0000	
R ²	0.2796		0.2818		0.2785		0.2779	

Table A3

Results from model II estimations

Variable	Model IIa		Model IIb		Model IIc		Model II d	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
Id2009	-0.0243	0.046	-0.0238	0.049	-0.0234	0.050	-0.0187	0.121
Pol2009	0.0494	0.114	0.0501	0.107	0.0494	0.114	0.0483	0.115
Rom1999	0.0706	0.025	0.0672	0.031	0.0692	0.027	0.0767	0.013
Bul1997	-0.1066	0.001	-0.1068	0.001	-0.1070	0.001	-0.1013	0.001
Est2008	-0.0981	0.001	-0.0915	0.002	-0.0973	0.001	-0.0954	0.001
Est2009	-0.1123	0.000	-0.1098	0.000	-0.1119	0.000	-0.1054	0.001
Lit2009	-0.0826	0.009	-0.0879	0.005	-0.0822	0.010	-0.7927	0.011
Rom2010	-0.1109	0.000	-0.0965	0.002	-0.1089	0.000	-0.1144	0.000
Lat2010	-0.0853	0.004	-0.0800	0.006	-0.0836	0.005	-0.0763	0.009
Trend	-0.0003	0.375	-0.0003	0.347	-0.0004	0.288	-0.0004	0.272
G ²	-0.0041	0.619	-	-	-	-	-	-
PAL ²	-	-	0.0187	0.121	-	-	-	-
I8020 ²	-	-	-	-	-0.0010	0.664	-	-
I9010 ²	-	-	-	-	-	-	-0.0009	0.011
GOV	-0.1357	0.002	-0.1294	0.003	-0.1349	0.002	-0.1481	0.001
ELpc	0.7321	0.000	0.7272	0.000	0.7293	0.000	0.7489	0.000
URB	-3.2495	0.000	-3.3245	0.000	-3.2758	0.000	-3.0768	0.000
Constant	0.0310	0.000	0.3101	0.000	0.319	0.000	0.0305	0.000
F	104.88		106.47		105.16		109.08	
Prob>F	0.0000		0.0000		0.0000		0.0000	
R2	0.8785		0.8791		0.8778		0.8894	

Table A4

Results from model IV estimations

Variable	Model IVa		Model IVb		Model IVc		Model IVd	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
Id2009	-0.1046	0.001	-0.1044	0.001	-0.1039	0.001	-0.1005	0.002
Pol2009	0.0987	0.217	0.0987	0.215	0.0983	0.216	0.0989	0.229
Rom1999	-0.0255	0.774	-0.0253	0.744	-0.0241	0.756	-0.0189	0.814
Bul1997	-0.2322	0.003	-0.2323	0.003	-0.2308	0.003	-0.2195	0.008
Est2008	-0.0739	0.333	-0.0750	0.323	-0.0803	0.287	-0.0788	0.311
Est2009	-0.0671	0.400	-0.0667	0.402	-0.0660	0.406	-0.0584	0.497
Lit2009	-0.0667	0.407	-0.0660	0.409	-0.0576	0.473	-0.0591	0.472
Rom2010	-0.0612	0.431	-0.0631	0.417	-0.0706	0.343	-0.0713	0.353
Lat2010	-0.0694	0.353	-0.0691	0.353	-0.0696	0.349	-0.0632	0.413
Trend	-0.0015	0.073	-0.0015	0.072	-0.0016	0.056	-0.0015	0.087
G ²	0.0629	0.902	-	-	-	-	-	-
G	-0.4063	0.916	-	-	-	-	-	-
PAL ²	-	-	-0.0003	0.997	-	-	-	-
PAL	-	-	0.0257	0.897	-	-	-	-
I8020 ²	-	-	-	-	-0.0012	0.974	-	-
I8020	-	-	-	-	-0.01229	0.954	-	-
I9010 ²	-	-	-	-	-	-	0.0013	0.813
I9010	-	-	-	-	-	-	-0.0219	0.713
ECOM	-0.0036	0.893	-0.0037	0.891	-0.0054	0.840	-0.1015	0.719
GOV	-0.1218	0.307	-0.1228	0.300	-0.1260	0.287	-0.1226	0.339
FD	0.1031	0.068	0.1021	0.066	0.1057	0.058	0.1297	0.038
Constant	0.0609	0.000	0.0610	0.000	0.0624	0.000	0.0598	0.000
F	3.59		3.67		3.68		3.41	
Prob>F	0.0000		0.0000		0.0000		0.0000	
R2	0.2105		0.2123		0.2129		0.2130	

Table A5

Results from ARDL fixed model III estimations, panel I

Variable	Model IIIb		Model IIIc		Model IIId	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
Id2009	-0.0003	0.990	0.0046	0.858	0.0106	0.669
Trend	0.0147	0.016	0.0142	0.031	0.0123	0.024
G ²	-	-	-	-	-	-
G	-	-	-	-	-	-
PAL ²	-0.0989	0.744	-	-	-	-
PAL	-0.1593	0.621	-	-	-	-
I8020 ²	-	-	-0.0758	0.424	-	-
I8020	-	-	0.3452	0.418	-	-
I9010 ²	-	-	-	-	0.0019	0.475
I9010	-	-	-	-	-0.0305	0.335
ECOM	0.1095	0.001	0.9935	0.000	0.0825	0.002
GOV	-0.5541	0.013	-0.6034	0.004	-0.6154	0.004
FD	0.1670	0.007	0.1630	0.014	0.1696	0.018
<i>Lagged variables</i>						
Ypc	-0.8317	0.000	-0.8284	0.000	-0.8322	0.000
G ²	-	-	-	-	-	-
G	-	-	-	-	-	-
PAL ²	-0.1656	0.642	-	-	-	-
PAL	0.2942	0.469	-	-	-	-
I8020 ²	-	-	-0.1121	0.396	-	-
I8020	-	-	0.5364	0.384	-	-
I9010 ²	-	-	-	-	-0.0024	0.462
I9010	-	-	-	-	0.0222	0.534
ECOM	0.1101	0.000	0.0999	0.000	0.0870	0.001
TR	-0.0778	0.415	-0.0561	0.612	-0.0009	0.990
GOV	-0.5680	0.007	-0.5834	0.000	-0.5666	0.000
FD	0.0837	0.065	0.0914	0.084	0.1129	0.059
Const.	8.6084	0.000	7.8984	0.000	8.2292	0.000
F	472.71		369.48		344.07	
Prob>F	0.0000		0.0000		0.0000	
R2	0.9081		0.9056		0.9051	

Table A6

Results from ARDL fixed model III estimations, panel II

Variable	Model IIIb		Model IIIc		Model IIId	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
Id2009	-0.0910		-0.0929		-0.0876	0.000
Pol2009	0.0977		0.1032		-.1014	
Rom1999	0.0321	0.133	0.0286	0.140	0.0393	0.041
Bul1997	-0.2769		-0.2615		-0.2448	
Est2008	-0.0612		-0.0583		-0.0570	
Est2009	-0.0499	0.008	-0.0471	0.001	-0.0414	0.037
Lit2009	-0.0613	0.002	-0.0536	0.007	-0.0513	0.008
Rom2010	-0.0822		-0.0893		-0.0887	
Lat2010	-0.0973		-0.1024		-0.0923	
Trend	0.0038	0.223	0.0044	0.134	0.0043	0.162
G ²	-		-		-	-
G	-		-		-	-
PAL ²	-0.0972	0.095	-		-	-
PAL	0.2409	0.042	-		-	-
I8020 ²	-		-0.0312	0.129	-	-
I8020	-		0.1724	0.154	-	-
I9010 ²	-		-	-	-0.0014	0.775
I9010	-		-	-	0.0040	0.937
ECOM	0.0115	0.546	0.0076	0.702	-0.0012	0.958
GOV	-0.3251	0.000	-0.3106	0.001	-0.3182	0.001
FD	0.0725	0.045	0.0820	0.025	0.1043	0.026
<i>Lagged once variables</i>						
Ypc	-0.2310	0.010	-0.2263	0.004	-0.1969	0.014
G ²	-	-	-	-	-	-
G	-	-	-	-	-	-
PAL ²	-0.1622	0.073	-	-	-	-
PAL	0.3896	0.054	-	-	-	-
I8020 ²	-	-	-0.0681	0.008	-	-
I8020	-	-	0.4083	0.007	-	-
I9010 ²	-	-	-	-	-0.0089	0.052
I9010	-	-	-	-	0.0886	0.053
ECOM	0.0070	0.557	0.0036	0.768	0.0025	0.830
TR	-0.0441	0.253	-0.0439	0.175	-0.0440	0.170
GOV	-0.2349	0.001	-0.2183	0.000	-0.1931	0.000
FD	0.0557	0.028	0.0607	0.006	0.0556	0.015
Const.	1.5830	0.025	1.1624	0.045	1.3320	0.035
F	14216.74		18275.76		117233.60	
Prob>F	0.0000		0.0000		0.0000	
R2	0.7750		0.7796		0.7842	

B. Inequality compared

Table B1

Average inequality in 1995 – 2017 by country

Measure	CZ	SK	HU	SI	PL	BG	LT	LV	RO	EE
G	0.34	0.38	0.39	0.40	0.45	0.47	0.47	0.49	0.50	0.51
PAL	1.37	1.62	1.81	1.84	2.52	2.68	2.66	3.01	3.44	3.61
I8020	5.58	9.81	9.53	10.30	14.96	13.71	14.32	17.42	23.64	21.03
I9010	13.57	220.13	65.47	36.56	106.35	47.42	77.82	28.05	265.40	61.34
Panel	I	I	I	I	II	II	II	II	II	II

Source: World Inequality database

Figure 1a. *Inequality (G) in CEE*

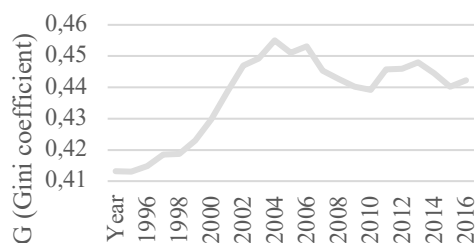


Figure 1b. *Inequality (PAL) in CEE*

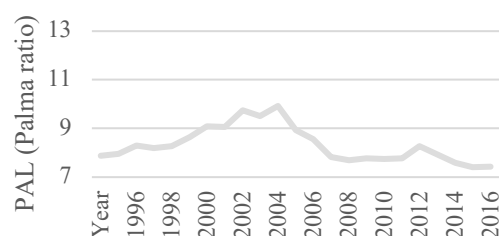


Figure 1c. *Inequality (I8020) in CEE*

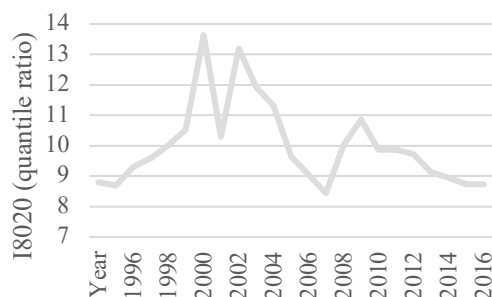
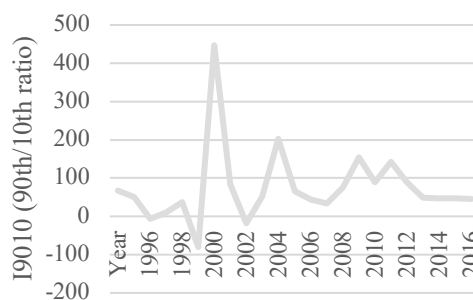


Figure 1d. *Inequality (I9010) in CEE*



Figures 1a – 1d. CEE countries by inequality measures. Source: World Inequality Database (n.d.)

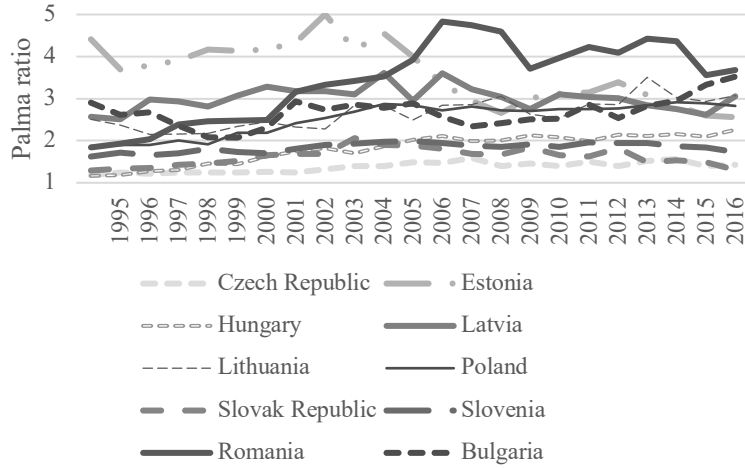


Figure B2. Palma ratio in CEE countries in 1995 – 2017. Source: World Inequality database (n.d.)

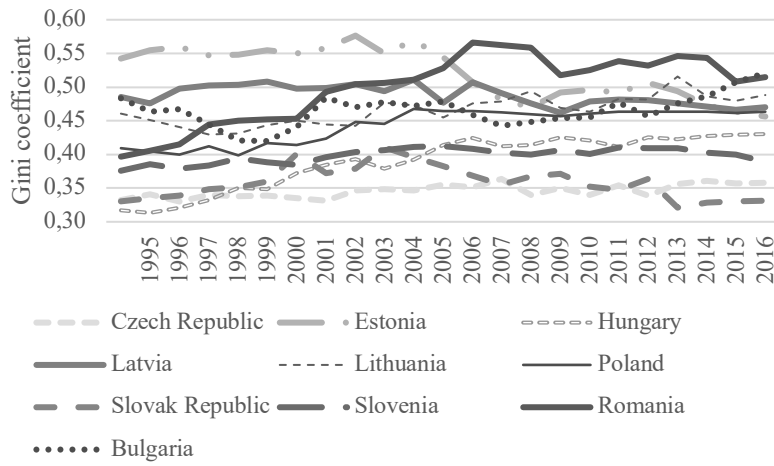


Figure B3. Gini index in CEE countries in 1995 – 2017. Source: World Inequality Database (n.d.)

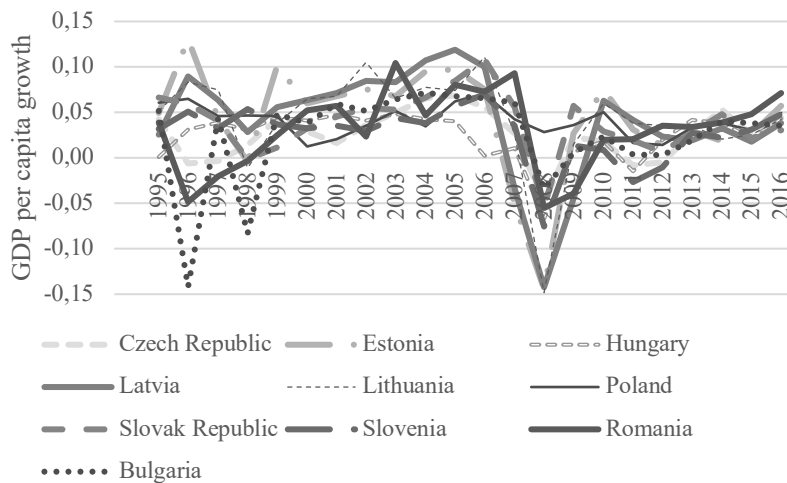


Figure B4. GDP growth in CEE countries in 1995 – 2017. Source: World Bank Development Indicators

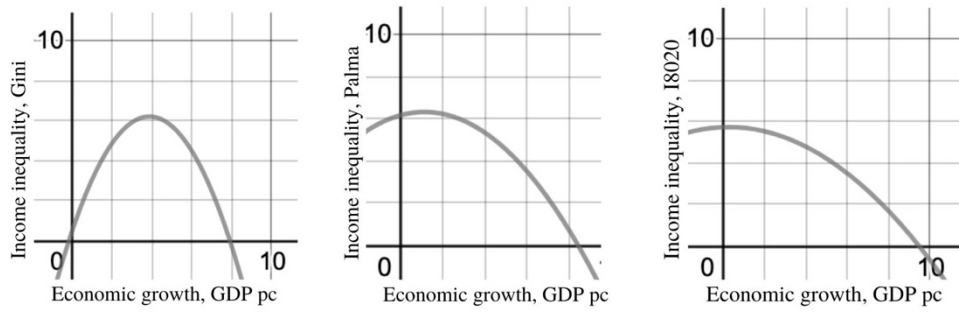


Figure B5. Inequality – growth long-run relationship in CEE countries by inequality measures (model III, fixed effects). Source: compiled by author