FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION

VILNIUS UNIVERSITY

GLOBAL BUSINESS AND ECONOMICS

Justina Mataitytė

MASTER THESIS

NELYGYBĖ IR SKURDAS POSOVIETINĖSE ŠALYSE	**INEQUALITY AND POVERTY IN POST-SOVIET COUNTRIES**

Master degree student _____

(signature)

Supervisor _____

(signature)

Assoc. prof. dr. A. Laužadytė-Tutlienė

Date of submission of Master Thesis: _____

Ref. No. _____

Vilnius, 2021

TABLE OF CONTENTS

TABLES

FIGURES

INTRODUCTION

Inequality and poverty topics cause a lot of discussion whenever brought to the table. One of main reasons being that the discussed phenomena is recognised interdisciplinary. This is arguably one of the arguments why for last decades inequality has not received much spotlight in economics society. Scientists of the field even debated if topic of inequality should be something that economists should be concerning themselves with (Atkinson, 2015). Another reason that prevented analyses of global income inequality before last couple of decades of last century was that data collected about income distribution was not comparable (Atkinson, 2015). Lack of information and data for scientific purposes is especially noticeable in countries that encountered political turbulences and are in geographical regions influenced by neighbouring countries with expansionist agenda (Milanovic, 2006). In recent decades income inequality and poverty topics are gaining traction. In 2015 UN (United Nations) Members States adopted 17 Goals as a part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the goals. Goal number 1 - No Poverty, as 10% of the world population is still living in extreme poverty and struggle to fulfil the most basic needs. Goal number 10 – Reduced inequalities, as the richest 10% have up to 40% of global income whereas the poorest 10% earn only between 2% to 7% (UN). European Union adopted a goal of reducing the number of people at risk of poverty or social exclusion by 20 million by 2020 compared with the 2008 (monitoring of progress towards Europe 2020 headline targets takes data for the EU without Croatia from 2008 as a baseline year). 22.4% of the population in the EU remained at risk in 2017 – 15.7 million more than foreseen by the Europe 2020 target (Eurostat, 2019).

Income inequality was increasing in both advanced and developing economies in recent decades. Increasing inequality and in turn poverty has been attributed to a wide range of factors like skill-biased technological change, declining top marginal income tax rates, increasing bargaining power of high earners, growing share of high-income couples and single-parent households (IMF, 2014). The **importance of the topic** stem from it being universally met through all the social statuses, countries and political systems. During the last three decades studies regarding the historical legacies and implications of historical events on the country and society flourished. Majority of the studies are related to social problems that communism and communist ideology impacted (Millar, 1994; Alesina, Fuchs-Schündeln, 2007; Bönisch, Schneider, 2010, 2013; Malisauskaite, Klein, 2018; Pop-Eleches, Tucker, 2011). Studies relating to inequality and poverty in former Soviet countries also have been topic for researchers. Broader scope studies across the multiple countries with different belonging to international organizations, geographical situation and previous influences from Soviet Union still can be considered somewhat of the

novelty though, various studies have been carried out to measure the Soviet legacy impact on inequality and poverty (Libman, Obydenkova, 2019; Bandelj, Mahutga, 2010; Bernhard, Jung, 2017; Habibov, 2013; Kufenko, 2014; Milanovic, 1998).

The main goal of the paper is to measure whether former belonging to Soviet Union has an impact on inequality and poverty trends in selected countries. More so, to determine whether belonging to current international organizations such as EU or CIS has any considerable impact to the analysed matter as well as to identify the factors contributing to the inequality and poverty in the selected sample of countries.

Studies to address the issues arising from the phenomena are done by national organisations as well as on intragovernmental and supranational institutions level. Even though the work done by field professionals is majorly contributing to the public policies of the countries there are not a lot of studies that focus on countries sharing same historical indicator and its possible implications to further development of the country and the historical factors that can contribute to the inequality and poverty in those countries. This is why the chosen **object** of this paper is inequality and poverty in countries that till last decade of the last century comprised former Soviet Union.

The main **hypothesis** which is formed before the analysis is that inequality and poverty among above mentioned countries are preconditioned by the historical factor – belonging to Soviet Union, and the legacy structures and policies inherited.

In order to achieve the goal following **tasks** should be performed:

1. Explain the key terms and concepts, historical relations and predicaments for full understanding of the main object of the thesis; point out the causes and consequences of income inequality and poverty;
2. Overview measuring tools that can be used for analysis of the topic;
3. Describe methodology of empirical part, overview the model chosen, and data set used;
4. Perform analysis of inequality and poverty trends dynamics in identified groups of countries, apply Granger tests and panel data regression analysis to test raised hypotheses;
5. Evaluate and compare results of performed tests, draw conclusions and propose recommendations.

Thorough analysis of the recent decade's scientific studies and publications is conducted to bring full understanding of the main theories, historical circumstances and measurement tools used.

The ability to compare data is integral part of any research therefore, one of the main **limitations** of the study is scarce data during the period of Soviet Union and limited time frame after the fall of Soviet Union to perform thorough analysis. Lack of sample countries to bring into comparison where data is trusted and have not been watered down according to national governments agenda.

1.THEORETICAL REASONS FOR THE INEQUALITY AND POVERTY ANALYSIS IN POST-SOVIET COUNTRIES

1.1. Inequality and poverty: terms, causes, consequences, types and tools of measurement

1.1.1. Inequality: why it is important?

At the very start it is crucial to clarify and define terms that will be used throughout the study. Income is the most suitable measure for inequality therefore, there is a need to clarify what is meant by it. It is gross domestic product (GDP) per capita expressed in one currency. This can be done in international currency or in other words purchasing power parity (PPP). Of course, if income inequality is highly unequally distributed, GDP can be misleading for objective view of an individual in population. Threshold for the poverty level usually refers to $1 or $2 per day per person (Kohl, 2003).

Inequality is a concept and a measure in itself. Inequality can be understood as an imbalance in a social, political or economic system. It also represents unequal distribution amongst individuals in a group, among groups in set of population or among countries that can be expressed in metrics.

Milanovic (2012) articulates 3 concepts of inequality in his work. Concept 1 is inequality between countries of the world without addressing the size of population. Each country is compared by mean income or GDP utilizing Gini coefficient. In such comparison China and Lithuania would have the same importance. Concept 2 has all the same factors as Concept 1 but takes into account sizes of the populations. In Concept number 3, which is focused on individuals of the word not the countries, each person brings their actual income to the calculation. For this calculation household surveys are used and not all countries conduct those. First usable surveys from the former Soviet Union are available from 1988. To calculate global inequality people's income has to be adjusted to the PPP and usually method of dividing into deciles or quintiles is used for easier comparability. Concept number 4 uses household surveys as well but results are not weighted by population size and no exchange rate is used. This concept is used as an intra-country one (Goda, 2013).

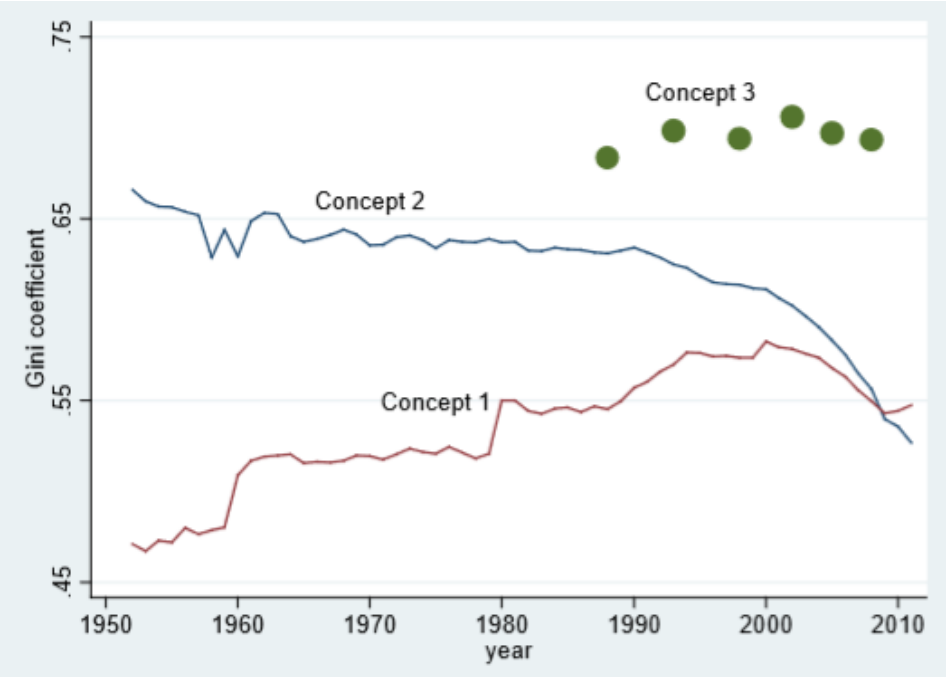

Figure 1. Comparison of the three concepts of inequality

Source: Milanovic, (2012) Global Income Inequality by the Numbers: in History and Now

In Figure 1 Milanovic (2012) visually presents 3 types of inequalities after the Second World War. It illustrates how one trend, in particular globalisation, can be reflected differently using two different concepts. If one wish to emphasize positive impact of globalisation on inequality Concept 2 would be the one to focus on, and while using Concept 1 it would be easy to argue that inequality gap is widening.

Some inequality in economic sense is integral to the effective functioning of a market economy and the incentives needed for investment and growth, but it can also be destructive to growth or result in inequality of opportunity. It is hard to conclude on the evidence as some find that average growth over long periods of time is higher with more initial equality, others argue that an increase in equality tends to lower growth in the near term (Berg and Ostry, 2011). Therefore, it is actually imperative that we address relevant types of inequality.

1.1.2. Types of inequality

When discussing the term inequality in the economic sense there are 3 types of the phenomena that requires deeper look and proper differentiation.

Income inequality

Income is defined as a household disposable income in a particular year. It consists of earnings, self-employment and capital income and public cash transfers. The income of the household is attributed to each of its members, with an adjustment to reflect the differences in needs for households of different sizes (OECD).

Wealth inequality

When unequally distributed income is saved, it results in unequally distributed wealth. Wealth includes everything from real estate, savings, investments etc. Even though income inequality is almost synonymous with the *inequality* as a phenomenon in general but due to recent trends and changes in global economy in developed countries issue of wealth inequality is more concerning and requires addressing on national and international level. In countries like USA wealth inequality has reached and exceeded the levels of 1970s (Inequality.org).

Inequality of opportunities

Considering two above mentioned types it is integral to notice that not all of the participants of the economy have the same starting point in order to compete for income and acquire wealth. This concept cannot be tackled by economist alone as there are a lot of underlying social circumstances to it. When addressing the issue economists usually follow two principals: principal of compensation to individuals encountering circumstances outside their control; principle of reward by preserving differential rewards that are results of the individual effort (The World Bank, 2019).

1.1.3. Main inequality drivers in recent decades

In order to understand what impact inequality has on the society analysis of the causes and the consequences have to be done. Some of the factors contribute to the positive effects on society and economic development as well as negative ones which are best realised in longer timeframe. Apart from natural qualities that person carry as intelligence, physical capacity, or talent that sets one individual apart from other there are more complex factors taking place that causes or enhances the inequality.

Technological change

One of the most recognizable causes of income and wealth inequality is technological change and the resulting rise in the skill premium and the decline of low-skilled and unskilled

labour (IMF, 2015). This trend is noticeable in advanced economies as well as in more economically developed countries (EMDC). Rising skill premium in advanced countries not only deepens the inequality in the country itself but also in comparison with other countries. Major factor is *employment* of machinery instead of human labour, which in turn cuts costs in a long run even if the initial costs are hefty. In order to facilitate advanced technologies specific set of skills is required and that translates to labour market focusing on employees with higher education, even more with technological concentration. By eliminating low-skilled jobs through automatization capital owners can enjoy extra income without the need to distribute it (Spence, 2013). Globalisation has also played a smaller but reinforcing role in this change.

Globalisation

In economic sense globalisation should be understood as an integration of national economies into the world economy which was enabled by free trade, movement of capital and technological change (Kohl, 2003). It also concerns policy reforms regarding privatization and deregulation. It has been accelerating since the 1980s and the advantageous effect is felt mostly by the richest and middle class of population in emerging countries (Milanovic, 2012). By analysing the change in real income between 1988 and 2008 that Milanovic (2012) provides it also quite hard to ignore that income of the poorest 5% of the population have remained the same and income of those between the 75th and 90th percentiles of the global income distribution, which is where many people from former Communist countries can be placed.

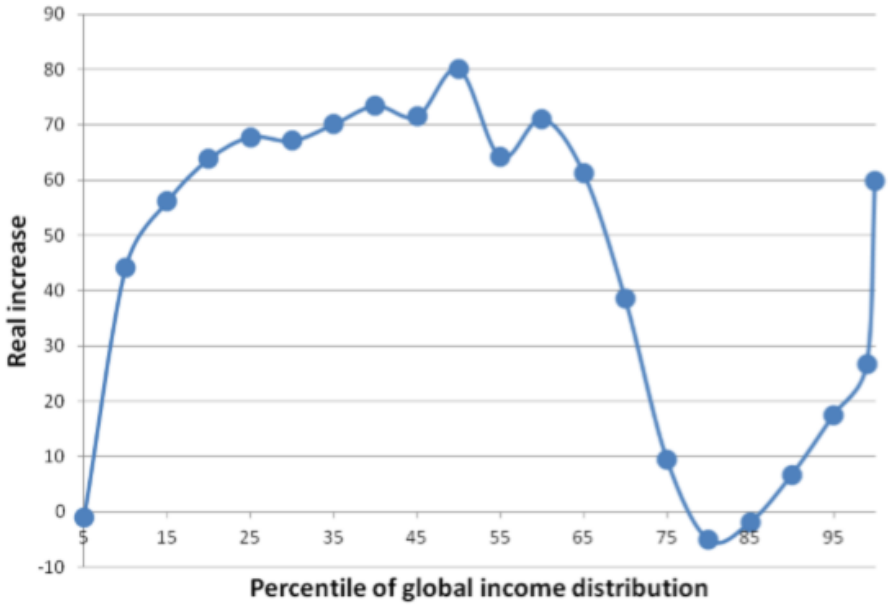

Figure 2. Change in real income between 1988 and 2008 at various percentiles of global income distribution (calculated in 2005 international dollars)

Source: Milanovic, (2012) Global Income Inequality by the Numbers: in History and Now

Immobility of wealth

Whether wealth is inherited or accumulated throughout one's life it provides owner with the ability to use the position that was acquired through it to achieve better and prestigious education, have a possibility to invest and receive the profits from real estate, stock market, reach best possible healthcare, etc. Since wealth is more concentrated than income it contributes to widening gap in inequality (De Nardi, 2004). Lower levels of wealth mobility between the generations are more pronounced in countries with higher levels of income inequality. Since wealthy do not have to spend as much as middle class or lower class but can rather use the aggregated wealth by predecessors.

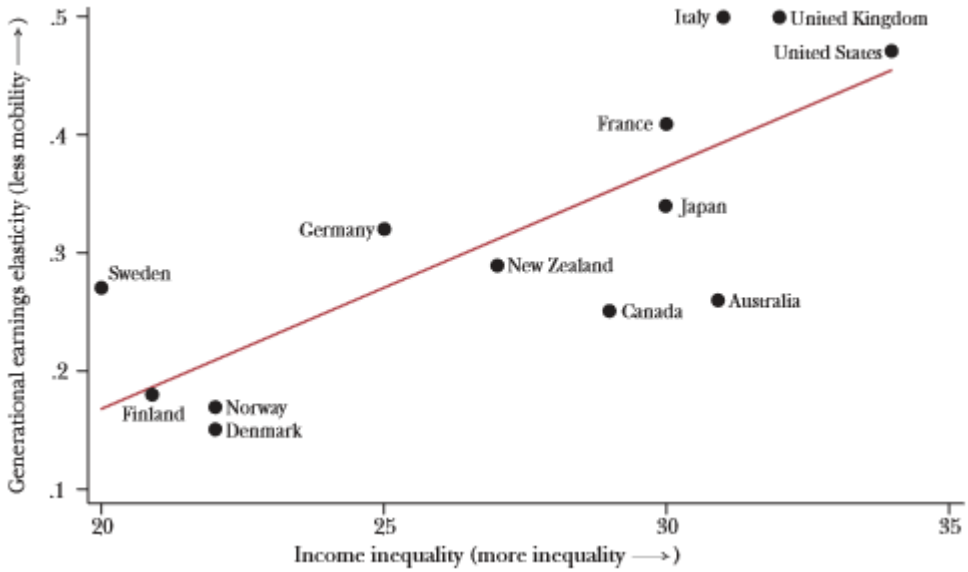

Figure 3. The Great Gatsby Curve: More Inequality is Associated with Less Mobility across the Generations

Source: Corak, (2013) Income Inequality, Equality of Opportunity, and Intergenerational Mobility

To understand the causality of inequality in specific population requires even more detailed examination taking into account smaller nuances. Accumulation of capital is becoming more pronounced issue whether it is due to inheritance or owning the means of production and continuing towards automatization. Restructuring and rethinking national policies in order to keep up with inequality trends should be treated as one of the priorities especially in advanced economies.

1.1.4. Consequences of inequality

Inequality has not only serious effects on economy but also social and political consequences. This illustrates that this interdisciplinary recognized phenomenon should be addressed by professionals from different fields and on national level handled with utmost inclusivity.

Effects on economic growth

Income inequality negatively affects growth and its sustainability (Ostry and others, 2014). In the IMF publication Causes and Consequences of Income Inequality: A Global Perspective (2015) the authors point out that the higher is net Gini coefficient the lower is output growth over the medium term. The inverse relationship between income share that goes to rich and economic growth have been observed (see Figure 4). It is noticed that if the income share of the top 20% increases by 1 percentage point the GDP growth will be 0.08 percentage point lower for 5 consecutive years. In reverse situation where the bottom 20% experiences increase in the income share it will translate to 0.38 percentage point higher growth.

	Dependent Variable: GDP Growth					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Lagged GDP Growth	0.145***	0.112***	0.118***	0.113***	0.097***	0.114***
	(0.033)	(0.030)	(0.031)	(0.031)	(0.030)	(0.031)
GDP Per Capita Level (in logs)	-1.440***	-2.198***	-2.247***	-2.223***	-2.122***	-2.222***
	(0.361)	(0.302)	(0.307)	(0.308)	(0.304)	(0.307)
Net Gini	-0.0666*					
	(0.034)					
1st Quintile		0.381**				
		(0.165)				
2nd Quintile			0.325**			
			(0.146)			
3rd Quintile				0.266*		
				(0.152)		
4th Quintile					0.0596	
					(0.180)	
5th Quintile						-0.0837*
						(0.044)
Constant	17.34***	18.82***	18.12***	17.45***	19.41***	25.32***
	(3.225)	(2.579)	(2.713)	(3.058)	(4.203)	(3.496)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
#. of Observations	733	455	455	455	455	455
#. of Countries	159	156	156	156	156	156

Figure 4. Regression Results of Growth and Income Distribution

Source: IMF, (2015) Causes and Consequences of Income Inequality: A Global Perspective

It is also needed to mention that there are theoretical and empirical research done indicating that inequality has positive or no effect to the economic growth. Usually, positive impact is related with short-term economic growth, or dependent on initial income distribution, profile of inequality (Castells-Quintana and Royuela, 2014).

Implications on education

High levels of inequality of opportunity can lead to diminished ability of an individual to receive an education and occupation (IMF, 2015). Good education can be out of reach for people with potential therefore, they cannot contribute to the society to the level that in other circumstances they would. By not achieving the higher education they are subjected to lower rates of return in the future. Lower income communities tend to concentrate in one area which in turn leads poor students to attend same schools. The academic level of peers, availability of resources in school, the disciplinary climate, class size, student truancy, better, more creative and innovative teachers are the factors that influence student performance (OECD, 2018). Educational resources can also be very limited in household of lower income and can dampen the development of a child outside of the classroom. According to Cingano (2014) parental education background (PEB) has impact on child's attendance of the school which is large evidence of significant inter-generational trend. By low PEB it is meant that neither parent has attained upper secondary education, medium PEB - at least one parent has attained secondary and post-secondary, non-tertiary education and by high PEB it is indicated that at least one parent has attained tertiary education.

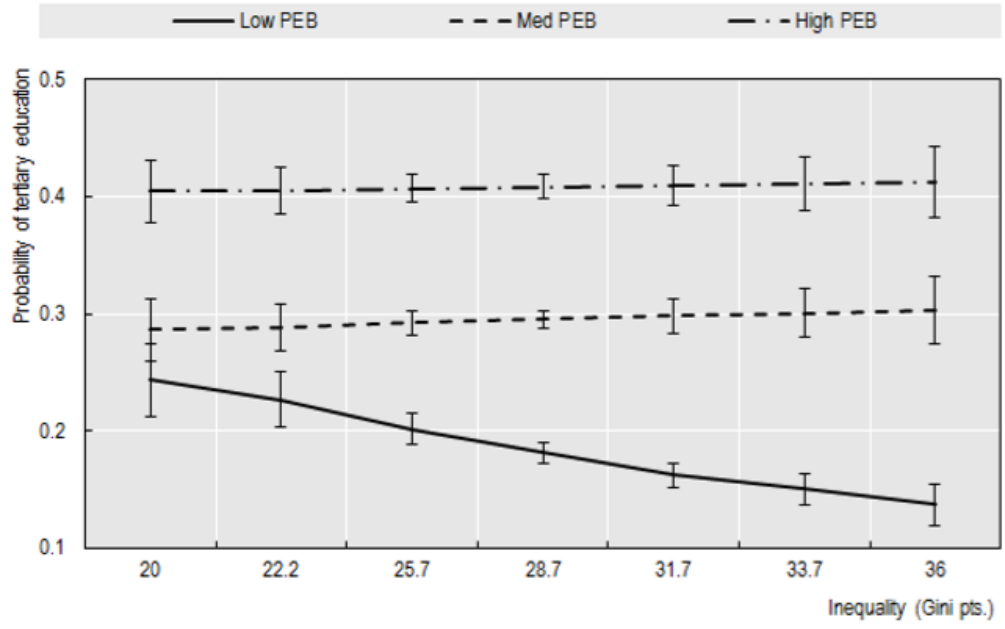

Figure 5. Average probability of tertiary education by parental education background and inequality

Source: Cingano, (2014) Trends in Income Inequality and its Impact on Economic Growth

Effects on politics

Inequality attributes to class-conflict between the ones who are on the opposite side of the scale that results in mounting social and political tensions. Political instability can manifest through political protests, instances of violence, frequency of governmental collapses (Alesina and Perotti, 1994). In high inequality countries business favouring policies can no longer satisfy the citizens so higher regulation and taxation on corporations usually are insisted (Cingano, 2014). Rich part of society has more impact on national politics and can use it to advance their position so if the concerns regarding inequality would go unaddressed this can lead to citizens losing confidence in institutions.

Implications on health and death rate

Individuals' health and wealth are quite closely related whether it is between or within the countries. The lower one's socio-economic position is the higher is the risk of poor health. In the publication The Spirit Level: Why Equality is Better for Everyone (2010) authors use data of 23 countries and demonstrates how physical and mental health, addictions, obesity, infant mortality, etc., are more pronounces in more unequal societies (Wilkinson and Picket, 2010).

Connection with criminal activity

Income inequality, poverty and unemployment are the main factors that cause crime (Weatherburn, 2001). Studies on relation between poverty, inequality and crime indicates that most disadvantaged members of society are the ones under pressure to commit crimes especially in areas of high inequality. Feelings of dispossession and unfairness catalyzes low-income people to *even* the situation (Kelly, 2000). Meta-analysis on 34 aggregate studies concerning different geographics concluded that income inequality is positively associated with violent crime (Hsieh and Pugh, 1993).

Consequences of inequality are far reaching and worrisome. It is evident that widening income disparities lowers the outcomes of individuals from low socio-economic backgrounds. Location, education, living conditions, impact on society, etc., are conditioned by one's position in income distribution.

1.1.5. Poverty and its relationship with inequality

There is rarely a discussion about the phenomena of inequality as a whole without touching poverty and vice versa. Poverty is usually characterised as insufficient resources of goods and

services required to establish minimal standard of living though poverty is a multidimensional issue and whilst discussing capturing it there is a need to address not only material deprivation but also other objective circumstances like unemployment or education as well as psychological aspects of poverty (Yang and Vizard, 2017). When it comes to determination of poverty usually the first step is to indicate what threshold distinguishes poor part of the population from the rest and afterwards how to transform this information into measure of poverty for the whole society (Yang, 2017). Throughout the studies of poverty there are two concepts that can be distinguished: absolute and relative. Absolute poverty refers to a level of resources that does not change whilst general living standard changes over time whereas in relative concept the threshold of defining the poor changes in line with changes in the general living standard (Yang, 2017). Since in absolute poverty thresholds are usually lower it can also be linked to the term of extreme poverty.

Inequality and poverty directly and indirectly affect each other. Poverty can be reduced by increased income, by changes in income distribution, or by both. Inequality has an influence on growth therefore, by directly influencing growth it in turn indirectly influences poverty. Low inequality affects the poor by increasing overall growth and average income as well as letting them share more in that growth. Changes in income distribution policies is the most influential tool in reducing poverty even if it does not reflect significantly in measures of inequality (Naschold, 2002).

Centre for Analysis of Social Exclusion (CASE) in collaboration with The London School of Economics and Political Science (LSE) International Inequalities Institute embarked on three-year programme of research dedicated understanding of the connections between inequality and poverty (LIP). Eleni Karagiannaki one of the CASE researchers in her paper for the LIP project aims to better understand the driving forces behind the correlation between poverty and inequality trends. In her study she discovers a very strong positive and statistically significant correlation between level of inequality and level of poverty, and changes in both of them (Karagiannaki, 2017).

1.1.6. How it is measured and analysed

In order to have the ability to compare and draw conclusions on country or region progress in regard to inequality and poverty a number of measurement tools can be applied to determine the differences among individuals in that particular society. To measure inequality and poverty below listed tools can be considered depending on the subject of interest:

Gini coefficient

The Gini coefficient is based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive. It ranges between 0 (0%) in the case of perfect equality and 1 (100%) in the case of perfect inequality. In other words, it is the area between the Lorenz curve and line of a completely equal distribution (The World Bank). This is the most common tool of expressing the inequality between the countries. It is considered that distribution among population is highly unequal if coefficient is equal to or higher than 0.30 (30 %) (Blažienė, 2002).

Atkinson's index

Atkinson's index of inequality can be used as an advanced tool for measuring inequality as it allows for varying sensitivity to inequalities in different parts of the income distribution not like Gini coefficient (J Epidemiol community health, 2007). Additional weighting parameter ε is introduced and it measures aversion to inequality, which ranges between 0 and 1, where 1 stands for absolutely unequal distribution. As ε rises, increases in lower incomes are given more weight in producing social welfare. If it falls, meaning nears to 0 than it gets less sensitive to the changes in the lower part of distribution. This index indicates social welfare or social justice unlike any other tool measuring inequality.

Lorenz curve

Lorenz curve is one of the most commonly used measurement tools for inequality within a country or using the tool for comparison with other countries. It shows the cumulative share of income from different sections of the population. All recipients are divided into quintiles and all individuals are ranked by their income starting from the poorest. Stating from the 0 income and 0 population dots are added after each quintile until the Lorenz curve is drown. If there has been a reduction of inequality, then the curve would get closer to the line of perfect equality (The World Bank).

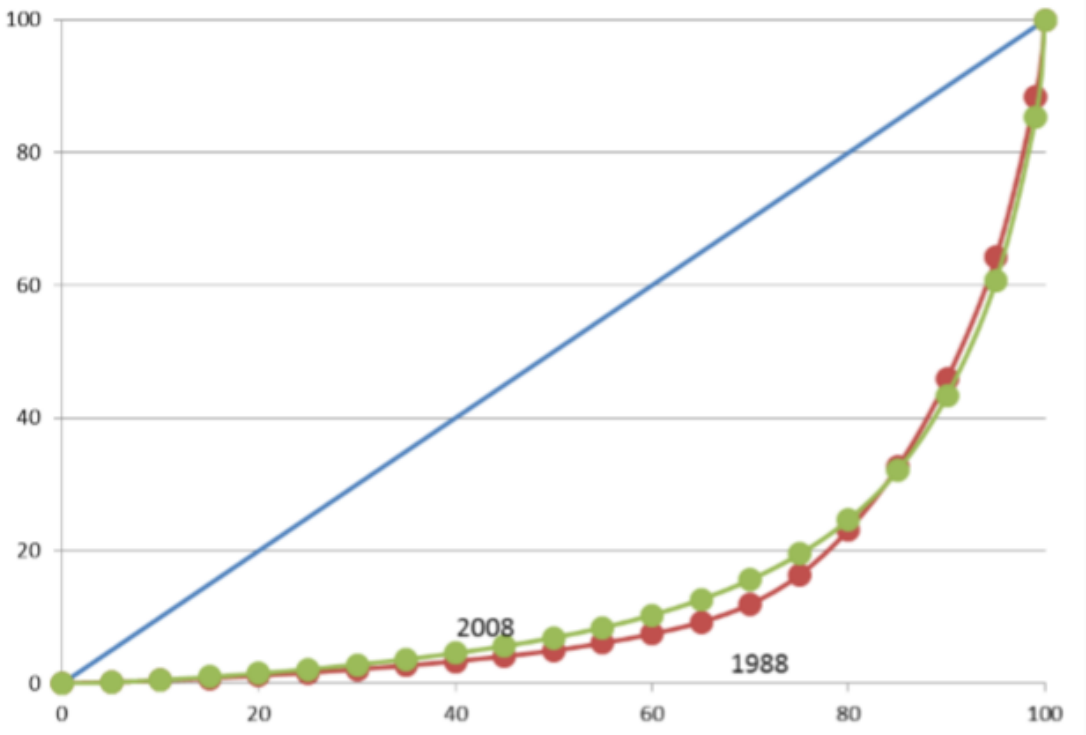

Figure 6. Blue line – Prefect equality, green and red – Lorenz curves

Source: Milanovic, (2012) Global Income Inequality by the Numbers: in History and Now

S80/20 ratio

Ratio S80/20 ratio is the average income of the 20% richest to the 20% poorest. Simply put the ratio indicates how many times income of the richest quintile exceeds the income of the poorest quintile (The World Bank).

Theil index

Theil entropy index belongs to the family of generalized inequality measures and is used for measuring regional disparities. The Theil index ranges between 0 and ∞, with 0 indicating an equal distribution and higher values indicating the higher inequality (OECD, 2016). The index assigns equal weight to each region not depending on its size therefore, the differences in values of the index among countries may be due to differences in the average size of regions in each country.

Differentiation coefficients

Deciles, quartile and quintiles and median are the most common differentiation coefficients. Deciles divide income into tenths, quartiles into quarters and quintiles into fifths, median in half. Dividing population in such manner has the poorest part of it in the beginning of the line and richest at the end.

Palma ratio

The share of all income received by the 10% people with highest disposable income divided by the share of all income received by the 40% people with the lowest disposable income. Palma ratio addresses the Gini coefficient over-sensitivity to changes in the middle of the distribution and insensitivity to changes at the top and bottom (Atkinson, 1970).

Median/Mean income ratio

This ratio is representation of PPP adjusted median income divided by PPP adjusted mean income. The wider the gap between the above mentioned the higher the income inequality.

AROPE poverty indicator

At-risk-of poverty or social exclusion (AROPE) indicator defines the share/number of people who are at risk of poverty or severely materially deprived or living in households with very low work intensity. The EU-SILC collects data at household and household members' level and presenting individuals in several sub-indicators being counted once. (Eurostat). In the EU, people falling below 60% of national median income are considered to be at risk of monetary poverty.

Watts poverty index

This index was first introduced by Harold W. Watts in 1968 and it is one of the measures that satisfies all desirable axioms. It is the mean across the population of the proportionate poverty gaps, as measured by the log of the ratio of the poverty line to income, where the mean is formed over the whole population, counting the non-poor as having a zero-poverty gap. This index is considered to be sensitive to a transfer at the lower end of the distribution than at the upper end of the income distribution of the poor (SESRIC, 2015).

Foster-Greer-Thorbecke index

- Poverty headcount: The headcount is one of the most popular measurement of poverty because it is simple and understandable. It measures the proportion of population living in households with consumption or income per person below the poverty line.
- Poverty gap: This measure indicates how far on average households/individuals fall below the poverty line. It represents the minimum cost for eliminating poverty with monetary transfers.
- Squared poverty gap: instead of taking the mean of the proportional shortfall, in this measure mean is taken of the squared values of proportional shortfall.

Based on the described wide range of tools available for measuring inequality it is integral to decide what tool will be the most useful for the purpose of the research. Poverty and inequality often rise and fall together but there can be instances of high inequality in society but relatively low levels of poverty.

1.2. Inequality and poverty in Soviet Union

1.2.1. Geographical scope and terminology

Before starting to look into what information is available for analysis during the time of Soviet occupation it is first needed to clarify the definitions on what countries can be considered to be in scope for the analysis of this thesis. Post-Soviet countries or in other words Soviet Republics that comprised the former Soviet Union (1922 – 1991) are the ones that formed their sovereign nations after the fall of Union of Soviet Socialist Republics (USSR). 15 new countries were formed or re-established their independence after the USSR break-up as is the case for 3 Baltic countries that were the first to declare their independence: Lithuania (March 11, 1990), Estonia (August 20, 1991), Latvia (August 21, 1991). 12 more countries followed shortly after that: Armenia (September 21, 1991), Azerbaijan (August 30, 1991), Belarus (August 25, 1991), Georgia (April 9, 1991), Kazakhstan (December 16, 1991), Kyrgyzstan (August 31, 1991), Moldova (August 27, 1991), Russia (December 12, 1991), Tajikistan (September 9, 1991), Turkmenistan (October 27, 1991), Ukraine (August 24, 1991), Uzbekistan (August 31, 1991) (McCauley, 2007).

During the Cold War (1946-1991) Western countries came up and used the term *satellite nation* to indicate countries that gravitated towards USSR regime and in turn USSR had reasonable amount of influence and pressure present in those countries. This term was used to describe Poland, Czechoslovakia, Hungary, Romania, Bulgaria and East Germany (Encyclopedia Britannica, 2020). There are also disputed territories within the territory of the former Soviet Union with some being recognized on international level and some not. Focus shall be concentrated on 15 above mentioned countries as satellite nations and disputed territories are not the subject for the thesis but can be used for comparison in analysis part.

1.2.2. Economy based on ideology

During the first decade of existence of the Soviet Union no clear and coherent plan was put in place to transition highly agriculturally dependent society to industrialized one. At the end of 1920s and during the 1930s strategy of five-year plans was realized and took definitive form.

World War II was also the catalyst for developing heavy industry and only around the middle of the XX century the state was transformed into an industrial economy (McAuley, 2008). The plans should have set the government's priorities and be a reference point to the lower level institutions and clerks on set goals and expected results. Objectives were ambitious and required tremendous cooperation between the ministries therefore, leaving plans fragmented or in some cases infeasible. On manufacturing level misreporting and other practices were common and obtaining accurate and up-to-date information about the enterprises production possibilities were unclear which led to so-called ratchet principle: this year's target equals last year's achievement plus x percent (McAuley, 2008). This meant that enterprises usually diminished real capacity and that authorities had to tolerate to some extent such semi-legal or illegal practices.

As per socialist ideology, most of the residents of the Soviet Union were supposed to work in state sector which was deemed more efficient than the private to achieve "developed socialism". State owned all the means of production via various forms: direct state ownership, "social" ownership, or some other form of collective ownership. Accumulation of wealth was against the ideology of communism as it allowed the owner certain degree of independence from imposed political obedience (Milanovic, 1998).

Country	*Share*
Socialist average	*90.0*
Czechoslovakia	98.8
U.S.S.R.	96.3
Romania	95.2
German Democratic Republic	94.7
Hungary	93.9
Bulgaria	91.5
Yugoslavia	78.9
Poland	70.4
OECD average	*21.2*

Figure 7. State employment as a proportion of the labor force, 1988

Source: Milanovic, (1998) Income, Inequality, and Poverty during the Transition from Planned to Market Economy

On average, 90% of the labour force was employed by state, compared to 21% average in the member countries of Organisation for Economic Co-operation and Development (OECD) (Milanovic, 1998).

Both men and women were expected to participate in the state provided employment. Income and consumer goods were distributed in egalitarian manner through central planning. Household incomes were determined by centrally set wages supplemented by significant public consumption that provided access to heavily subsidized or nominally free public health, education, housing, transport, culture, and other social services (Slay, 2009).

1.2.3. Inequality and poverty tendencies in Soviet Union

Since the data during the period of Soviet Union and to some extent after the fall is fragmented and rarely objectively documented there is a need to attempt to combine various available data sources in order to present consistent picture of accumulation and distribution of income and wealth during that time. There are variating opinions regarding inequality levels in Soviet Union. In their study 'The Distribution of Income in Eastern Europe' (1992) Atkinson and Micklewright overview the two opposing sides. Lydall (1979), Morrison (1984), Bergson (1984) draw from their research and provide examples that support conclusion of inequality being rather similar or even greater to Western countries. Opposing side state that inequality was significantly lower under Communism. McAuley (1979), Wiles (1978), Pryor (1973) all support such conclusion.

In the Table 1 below on estimated distribution of income during the period an obvious rise in median income from 1967 is shown and slight decrease in inequality at the end of 1980s.

Table 1. Estimated distribution of income: USSR, 1967-1989 (Rubles per month)

	1967	**1973**	**1980**	**1989 State employees**	**1989 All**
Median	56.0	83	101	143	140
P(5)	-	51	-	-	-
P(10)	57.7	56	53	53	52
P(25)	76.6	73	73	72	72
P(75)	133..6	131	136	136	136
P(90)	176.9	178	174	181	182
P(95)	-	216	200	-	-
P(90)/P(10)	3.1	3.15	3.25	3.4	3.53
Gini	-	0.268	0.245	0.284	0.289

Source: Author's (2020) based on Atkinson and Micklewright (1992), McAuley (2008)

McAuley (2008) tried to estimate the actual poverty line and as for the end of 1960s he assumes it to be around 30 rubles per month which would indicate that around 32% percent of non-agricultural state employees were below it, but this does not take other state or farm employees into account. Based on the end of 1970s sources the poverty line should have been around 50 rubles per month which would account for around 34% of population living in poverty. Statistical authorities have set a wage of 75 rubles per person per month, though it was not officially called poverty line, nor did it serve an explicit social policy function (Slay, 2009). Based

on that assumed poverty according to McAuley would have been translated into 11% of citizens living in poverty. In his work Slay (2009) indicates that at the end of 1980s around 30 million Soviet citizens were living in poverty if $2.15/per day threshold is used, if it would be up to $4.30/per day the count of citizens in poverty would be nearly 120 million. During the same time inflation and rising real income, shortages of goods plunged Soviet Union in economic crises.

Even though elite officially did not exist in Soviet Union but state bureaucrats, Soviet party leadership, directors of manufacturing companies, scientific and artistic intelligentsia, lead military officers were able to use their income, status and rank to advance their position. They were able to enjoy greater monetary income and more importantly secure consumer goods and services, secure better living conditions and have the ability to travel abroad. Special treatment of such citizens was also not uncommon in public sector which allowed them to have easier access to better schools and universities, hospitals (Matthews, 1978).

In socialist countries income composition differs from the rest. Child benefits were substantial in Soviet Union. Lower direct taxation, compared with market economies it was 15 percent lower under socialism, but total payroll taxes were high and total tax burden was evened out and not much different from market economies. Share that comes from primary income was smaller in socialist economies. Great importance was assigned to income redistribution whether it was via publicly available resource (accounted for 19% of gross income) and privately (around 6%) (Milanovic, 1998).

Compared with Tsarist Russia, the level income inequality has actually decreased during the Soviet Union period, and between the second half of 1970s and 1989 increased minimum wage lowered the number of people living in poverty. Poorer part of population was more subsidized by the state but at the same time allowed small group of citizens benefit from the various forms of special treatment. Throughout the time of USSR existence, the goal of eradicating poverty, or inequality, especially differences between the urban and rural areas, was not achieved and a small group of citizens were able to abuse their status for advancement.

1.3. Inequality and poverty after the fall of Soviet Union

Bureaucratic and centralized structure combined with inefficient run of state-owned enterprises, made systemic problems worse over time. Political choices to prioritize military spending, supporting socialist regimes, and providing economic privileges to the country elite drained Soviet economy. Loosened central government grip and frustration with worsening economy inspired independence movements in the Soviet republics which resulted in USSR dissolution.

After the fall many republics were faced with aftermath of legacy structures, underdeveloped national institutions and little experience on how to run the state. Due to historic circumstances, newly independent countries had little to no democratic traditions to fall back on as no country of former Soviet Union had lived in a democratic system for more than 25 years. On top of that in some countries political instability added to the plummeting living conditions and numbers of displaced people were on the rise (Milanovic, 1998).

Inequality and poverty during the Soviet Union would seem to be quite modest compared to the levels it rose after the fall of the Soviet Union (Bukowski and Novokmet, 2017). Increase in Gini coefficient is steep in all post-Soviet countries, the range to which it rose also widened.

	Gini coefficient (annual)[a]		
	Income per capita		Expenditures per capita
Country	1987–88	1993–95	1993–95
Balkans and Poland	24	30	
Bulgaria	23[b]	34	
Poland	26	28[e]	31[e]
Romania	23[b]	29[c]	33[c]
Central Europe	21	24	
Czech Republic	19	27[c]	
Hungary	21	23	27
Slovakia	20	19	
Slovenia	22	25	
Baltics	23	34	
Estonia	23	35[d]	31[d]
Latvia	23	31[d]	
Lithuania	23	37	
Slavic republics and Moldova	24	40	
Belarus	23	28[d]	30[d]
Moldova	24	36	
Russia	24	48[d]	50[e]
Ukraine	23	47[c]	44[c]
Central Asia	26	39	
Kazakhstan	26	33	
Kyrgyz Republic	26	55[d]	43[d]
Turkmenistan	26	36	
Uzbekistan	28[b]	33	
All transition	24	33	

Figure 8. Changes in Inequality during the Transition

Source: Milanovic, (1998) Income, Inequality, and Poverty during the Transition from Planned to Market Economy

In 1989 estimated number of people living on less than $4 per day was 14 million, and within next few years it was more than 140 million people that lived below the same poverty line. Unemployment reached 15 million people by 1996 and was still rising. Social transfers, education, healthcare was on demise and mortality rates were increasing. Milanovic (1998) presents growth

rates for the former Soviet Union during 1987-96 that indicates double digit negative growth. For 3 consecutive years, in 1990-1992, GDPs of almost all countries dropped drastically.

Region	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*
Eastern Europe	1.9	1.6	0.5	-8.2	-14.7	-8.1	-1.9	4.1	5.5	3.6
Former Soviet Union	2.4	5.2	2.7	-2.5	-6.5	-16.1	-10.1	-14.0	-5.2	-4.7
Total	2.3	4.0	1.9	-3.7	-8.6	-14.3	-8.1	-9.2	-1.9	-2.0

Figure 9. GDP Growth Rates in Eastern Europe and the Former Soviet Union, 1987-96 (percent per annum)

Source: Milanovic, (1998) Income, Inequality, and Poverty during the Transition from Planned to Market Economy

Figure 9 above indicates slight decrease GDP during 1987-1989, and in 1990 it was close to double digits. The decline reached its high in 1992 with over 16% decrease in GDP. Signs of recuperation started to show around 1994 to next following years, between 1994 and 1995 GDP grew by 8.8% (Milanovic, 1998). Real wage bill was cut around one-half in countries of the former Soviet Union. Composition of disposable income also have changed during the transition period. From the Figure 10 it is visible that labour income in the GDP has declined, social cash transfers in GDP has risen, non-wage private sector income in GDP increased as well as share of health and education in the GDP.

	Wages		*Cash social transfers*		*Non-wage private sector income*		*Social transfers in kind (health and education)*		*Total*	
Country	*1987–88*	*1993–94*	*1987–88*	*1993–94*	*1987–88*	*1993–94*	*1987–88*	*1993–94*	*1987–88*	*1993–94*
Eastern Europe	*33*	*32*	*11*	*15*	*10*	*19*	*7*	*9*	*62*	*75*
Bulgaria	27	25	11	14	9	21	7	11	55	71
Czech Republic	41	32	12	13	4	24	9	12	67	82
Hungary	32	37	13	19	10	14	7	12	63	83
Poland	27	32	9	20	22	25	7	9	65	85
Romania[a]	35	33	9	9	3	14	4	5	52	61
Slovakia	42	31	13	13	4	17	11	6	70	68
Slovenia	28	34	11	16	10	20	7	7	57	77
Baltics	*43*	*35*	*8*	*12*	*9*	*14*	*9*	*8*	*70*	*69*
Estonia[b]	46	33	9	11	8	10	11	8	73	62
Latvia	38	33	8	14	8	12	8	9	62	69
Lithuania[b]	46	40	8	10	12	18	9	8	76	76
Slavic republics	*41*	*29*	*8*	*9*	*6*	*16*	*6*	*9*	*61*	*63*
Belarus	40	37	6	8	7	17	7	12	59	74
Moldova	43	23	7	8	8	28	10	12	69	72
Russia	41	26	8	9	5	23	5	7	59	64
Ukraine	42	25	9	12	7	8	7	10	66	55

Figure 10. Population Income by Sources in 1987-88 and 1993-94 (percent per GDP)

Source: Milanovic, (1998) Income, Inequality, and Poverty during the Transition from Planned to Market Economy

The transition has not come without a cost. Unemployment and job-loss as well as macroeconomic instability all due to systemic changes contributed to higher inequality, lower income and greater poverty. Lastly, the cost of lives lost, displaced and property destructed due to civil strife.

1.4. Public policies to reduce poverty and inequality

Legacy policies inherited from Soviet period were poorly suited to combat inequality and poverty in newly formed countries. That was comprised of several reasons. Funding for social services and social protection fell significantly due to declines in GDP and share to be used for redistribution, frameworks that were inherited were ineffective in reaching those that requires assistance the most (Slay, 2009). Unfavorable demographic trends and countries being unable to substantiate public sector and services contributed to the increased inequality and poverty in the region.

Countries have chosen different paths and alliances after gaining independence. 3 Baltic countries joined European Union (EU) and NATO. While Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan and Uzbekistan formed Commonwealth of Independent States (CIS). Ukraine and Turkmenistan were among the founding states but never fully ratified the charter. Georgia withdrew from CIS in 2008 (Encyclopedia Britannica, 2018) as well as Ukraine in 2018 (Encyclopedia Britannica, 2018). That entails particular alignment with international agenda of organizations.

A number of reforms were introduced to address these issues by many former Soviet countries. Overview of the measures introduced described by Slay (2009) in his work Poverty, Inequality, and Social Policy Reform in the Former Soviet Union:

Tax reforms

High tax rates needed to maintain universal benefit, extensive formal worker protection schemes, centralized wage setting mechanisms are difficult tasks for the countries. Simplified tax policy, reduced tax rates, numbers of exemptions for value added, personal and corporate income tax changes were done. Difference in inequality across the economic groups within the population through time is attributed substantially to redistributive fiscal policies (IMF, 2017).

Labour market reforms

Labour code reforms done which described employee protection legislation. Unemployment benefits were proposed to be reduced, and arrangements of firing and hiring workers made easier.

Promotion of well-targeted active labour market policies and enhancing employment of low-skilled, the long term unemployed and discouraged jobseekers, unexperienced youth. Actions to decentralize collective bargaining systems were done to boost labour market performance and inclusiveness.

Social benefit reform

Increase incentives for the recipient of benefits when a proper venue of actions is taken, like linking child support or unemployment benefits to enrolment to school or particular training courses. According to changing demographics restructuration of education system, pension system was initiated. Over the medium-term investments in public sector can help reduce inequality and impact intergenerational poverty (IMF, 2017).

Financial crisis had significant impact on inequality and poverty in the region. Earnings of workers dropped significantly due to job loss and cut wages. Relative price changes caused by currency depreciation, affect poor individuals and households the most. On top of that tighter monetary and fiscal policies were employed, cuts on social benefits introduced, employment in public sector decreased (Baldacci and others, 2002). Inequality is increased if a fall in the income share of the lowest income quintiles of society is strongly pronounced compared to ones in richest quintile. In prolonged time it affects poorest households to cope with expenditures on food, health, education, utilities (Ortiz and Cummins, 2011). Cline (2002) have estimated 7% increase in the average poverty headcount of a developing country that is due to financial crisis.

During the transition period countries have experienced changes in their policies and implement structures that would be efficient in addressing inequality and poverty issues. Not long after financial crisis indicated gaps in those structures that required reassessment. Advanced countries focus on reforms that to increase human capital and skills combined with tax reforms is important factor for sustained inclusive growth (IMF, 2015).

Inequality and poverty are topics of multiple disciplines and they still remain focus for researchers today. Former Soviet Union countries had unique history experiencing transition from socialist to market economy, changes of ideology that impacted the new formed countries. Before trying to test and identify if and how Soviet legacy impacted in scope countries it was vital to overview main concepts and terms relating to the topic. There is no one specific reason but rather multiple mix of factors that cause inequality and poverty as well as consequences of inequality and poverty impact various spheres of society. Overview of current trends that have implications to the object of this thesis was necessary in order to consider them whilst performing analysis part

of the work. Even though egalitarianism was the key element of communism ideology inequality and poverty was never eradicated in Soviet Union and some groups of society had privileges and accesses to different set of goods and services than others. Understanding circumstances under communist regime, transition period and current tendencies will allow for comprehensive analysis part and more inclusive conclusions and recommendations.

2. RESEARCH METHODOLOGY

2.1. Structure of the research

The main purpose of this part of the paper is to create a structure of the research in which inequality and poverty among the EU countries, EU FSU (former Soviet Union) countries and CIS FSU countries are weighted over chosen period of time. To achieve the goal of the thesis the following steps are considered: grouping of countries, analysis of inequality and poverty trends dynamics throughout the selected timeframe within the identified groups, applying Granger test to realize the causality between the variables, and performing panel data regression analysis.

Visual representation of intended analysis structure:

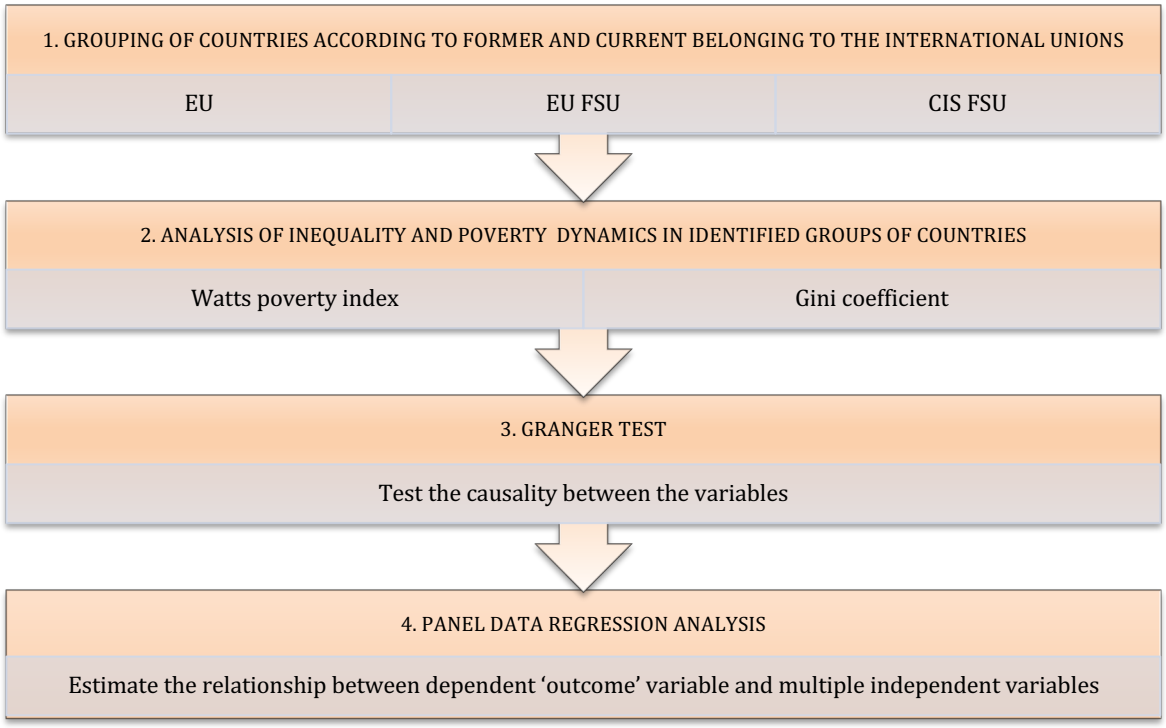

Figure 11. Historical factors' impact on inequality and poverty in post-Soviet countries analysis scheme

Source: Author's (2020)

2.2. Data set

2.2.1. Variables

For this analysis the annual data of the selected countries from 2004 till 2017 is chosen as this is the newest available comparable data, in total 14 observations for each country and each variable. Reliable databases such as The World Bank and UNECE Statistical Database will be used for above mentioned analysis. EViews software package is used for the analysis.

Granger tests are being performed to realize causality between the variables and afterwards two different panel model estimations are carried out. In each of the panel model different dependent variable is chosen and the independent variables remain the same.

Two dependent variables are chosen. The first one is Gini coefficient, a widely acceptable inequality indicator. The value of Gini varies from 0 to 1, with 0 meaning perfect equality and 1 standing for absolute inequality. The second dependent variable is Watts poverty indicator. This is the mean across the population of the proportionate poverty gaps, as measured by the log of the ratio of the poverty line to income, where the mean is formed over the whole population, counting the non-poor as having a zero-poverty gap (The World Bank).

The independent variables used in this analysis are given below:

- Final consumption expenditure as a percentage of GDP;
- Labour productivity as GDP per person employed in PPP;
- Globalisation – expressed in total trade as a share of GDP as a percentage;
- General government final consumption expenditure as a percentage of GDP;
- Unemployment, as a percentage of total labour force according to the national estimate;
- Exports of goods and services as a percentage of GDP;
- Imports of goods and services as a percentage of GDP;
- Inflation as measured by the annual growth rate of the GDP;
- Foreign direct investment as a net inflow (BoP, current US$);
- Gender pay gap as a difference in monthly earnings.

Dummy variables chosen for the analysis:

1. Former belonging to Soviet Union – dummy variable with the value 0, when a country has not been the member of Soviet Union, and value 1 when country was a member of Soviet Union;
2. Belonging to European Union - dummy variable with the value 0, when a country is not a member of European Union, and value 1 when country is a member of European Union;
3. Belonging to Commonwealth of Independent States - dummy variable with the value 0, when a country is not a member of Commonwealth of Independent States, and value 1 when country is a member of Commonwealth of Independent States.

Other variables such as government expenditure on education, net migration, gross average monthly wages, tax system influence and income were considered for the analysis but were not found in any database to be used in comparable manner.

2.2.2. Log- transformation

Log-transformation is used when performing the tests in order to erase differences between the variables used in the analysis as they are expressed in different units of measurement.

In order to apply log-transformation all data have to be expressed in positive values. To comply with this, negative data values are added most negative value as a constant to all values of a specific variable to make it positive. This shall be expressed by log(Y+a), where a is a constant value. Constant values that shall be added are represented in the below table.

Table 2. Log-transformation

Variable	**(a) value**
FDI	140000000000

Source: Author's (2020)

2.2.3. Codification of countries

Throughout the analysis Alpha-2 code system to identify countries will be used. These codes will be used in estimation part as well as in the software where the tests will be performed.

Table 3. Country Alpha-2 code list

Country	**Alpha-2 code**	**Country**	**Alpha-2 code**
Lithuania	LT	Greece	GR
Latvia	LV	Hungary	HU
Estonia	EE	Ireland	IE
Bulgaria	BG	Italy	IT
Croatia	HR	Netherlands	NL
Malta	MT	Poland	PL
Romania	RO	Portugal	PT
Luxembourg	LU	Slovakia	SK
Austria	AT	Slovenia	SI
Belgium	BE	Spain	ES
Cyprus	CY	Sweden	SE
Czechia	CZ	European union	EU
Denmark	DK	Kazakhstan	KZ
Finland	FI	Kyrgyzstan	KG
France	FR	Georgia	GE
Germany	DE	Ukraine	UA

Source: Author's (2020) according to IBAN information

2.3. Granger test

In order to identify causal relationship between the variables Granger test (Granger, 1969) is performed in third part of the analysis. Assumption before the Granger test is that X causes Y therefore, before changes happen with Y changes to X have to happen prior to that and not vice versa. With the help of this test, it will be possible to answer whether changes in X causes changes in Y (Brooks, 2008).

There are two conditions that have to be met:

1. X have to statistically significantly influence Y
2. Y should not statistically significantly influence X

Two sets of Granger tests are applied, where in first set Gini coefficient is dependent variable Y, and in second one – Watts poverty index. The independent X variables are the same in both tests: final consumption expenditure, labour productivity, globalisation, general government final consumption expenditure, unemployment, exports, imports, inflation, foreign direct investment, gender pay gap.

2.4. Panel data analysis

After the variables are checked and causality established by Granger test panel data regression analysis is performed in order to determine the strength of dependency between the dependent and independent variables. Two panel data regression analysis for each dependent variable are performed. This model combines cross-sectional and time series data, where the same unit cross section is measured at different times. If we have T time periods and N the number of individuals, then with panel data analysis it will be total observation units of N x T. In the time series one or more variables are observed on one observation unit within a certain time frame and in cross section data the observation of several units of observation in a single point of time is checked.

Panel data can be analysed under three approaches – fixed effect, random effect or common effect. Fixed effect model estimates a separate intercept for each subject with dummy variable. The drawback of this model that it suffers from the large loss of degrees of freedom. In order to overcome the serial correlation and heteroscedasticity of the panel data random effect can be used. This model estimates panel data where interference variables may be interconnected between time and individuals. Third one is called common effect or pooled least square model and it combines only time series and cross section data and it is assumed that behaviour of data is the same in

various periods. In order to understand what model is the most suitable to use special test can be applied.

Two tests were applied in this thesis - Chow and Lagrange multiplier test. Chow test determines whether common effect or fixed effect is most appropriate to use in the analysis. If result:

H0: Select CE ($p > 0.05$)

H1: Select FE ($p < 0.05$)

Lagrange Multiplier test is also applied to determine if it suggests common effect over random effect for the analysis. If result:

H0: Select CE ($p > 0.05$)

H1: Select RE ($p < 0.05$)

After the combined analysis described above will be performed possible impacts on inequality and poverty in post-Soviet countries can be identified and raised hypotheses can be proved or disproved. Conclusions and recommendations shall be provided accordingly.

3. IMPACT OF FORMER BELONGING TO SOVIET UNION, EU AND CIS MEMBERSHIP AND OTHER FACTORS ON POVERTY AND INCOME INEQUALITY

The hypotheses that are formed before the estimation is that:

H1: former belonging to SU has an impact on inequality and poverty in former members;

H2: inequality and poverty are influenced by final consumption expenditure, labour productivity, globalisation, general government final consumption expenditure, unemployment, exports, imports, inflation, FDI and gender pay gap;

H3: belonging to EU or CIS has an impact on inequality and poverty.

3.1. Grouping of countries

For the purpose of the paper 3 groups of countries are considered to be introduced:

- EU - European Union countries except for post-Soviet countries
- EU FSU - European Union countries that belonged to Soviet Union
- CIS FSU - members or former members of Commonwealth of Independent countries that formerly belonged to Soviet Union

List of countries that will comprise EU group are the following: Czechia, Finland, Netherlands, Slovakia, and Sweden. Other countries were excluded from the list due to lack of available comparable data or for atypically high data parameters like Luxembourg compared to other countries or EU average.

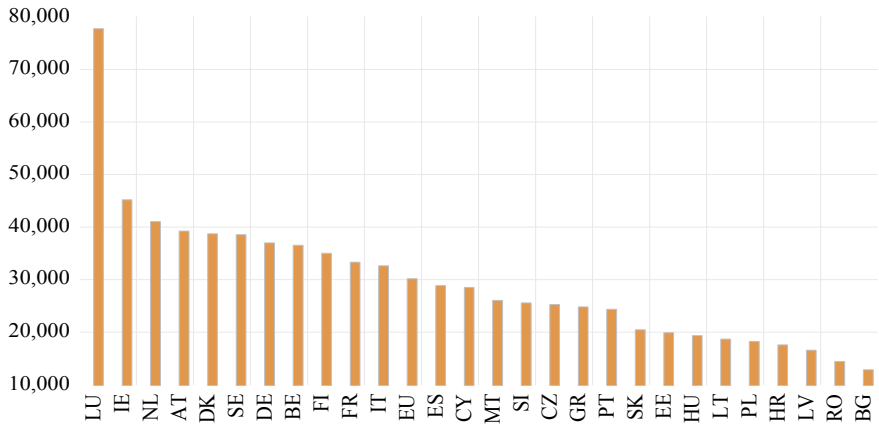

Figure 12. EU countries according to average GDP per capita, PPP, 1995-2019.

Source: Author's (2020) according to The World Bank data

EU FSU countries are European Union countries that were formerly Soviet Union republics. Baltic states Lithuania, Latvia, Estonia are the only members of EU that were previously incorporated in Soviet Union therefore, all belong to EU FSU group. In scope for CIS FSU group 12 countries are considered (listed in section 1.4.) even though Georgia and Ukraine left the union. Georgia, Kazakhstan, Kyrgyzstan, and Ukraine will comprise this group. All other countries excluded due to lack of comparable data.

Overview of inequality and poverty trends throughout timeframe of defined groups of countries is performed in next paragraph. Inequality and poverty measurements that are used for the analysis are described in detail in section 1.1.6. Gini coefficient and Watts poverty index were selected for analysis and comparison amongst groups.

3.2. Dynamic analysis

3.2.1. EU FSU group

First group of countries that will be revised in dynamic analysis are Baltic countries. One of the most popular and universally recognised inequality measurements is Gini coefficient. This coefficient from 0 (0%) to 1 (100%) where 0 represents perfect equality. Visual representation of Gini dynamics in Baltic countries through 2004-2017 can be found in the Figure 13 below. Throughout the analysed period Latvia registered highest Gini coefficient in 2005 at 39% which then decreased by 3.4% in the following year. In 2007 and 2008 it slightly bounced back but from 2009 kept decreasing and never reached the pre-financial crisis high. In 2017 slight increase in Gini coefficient by 1.3% was registered after the period of consecutive decrease in registered coefficient. In comparison to slow and modest decrease in registered inequality in Latvia, Lithuania does not share the same tendency and has clearly more dramatic fluctuation. Starting from 37% in 2004 inequality decreased during the next two years by 2.6%. Gini coefficient peaked in 2009 with 37.2% and during the following years mostly due to measures applied after the financial crisis drop in income inequality by 4.7%.

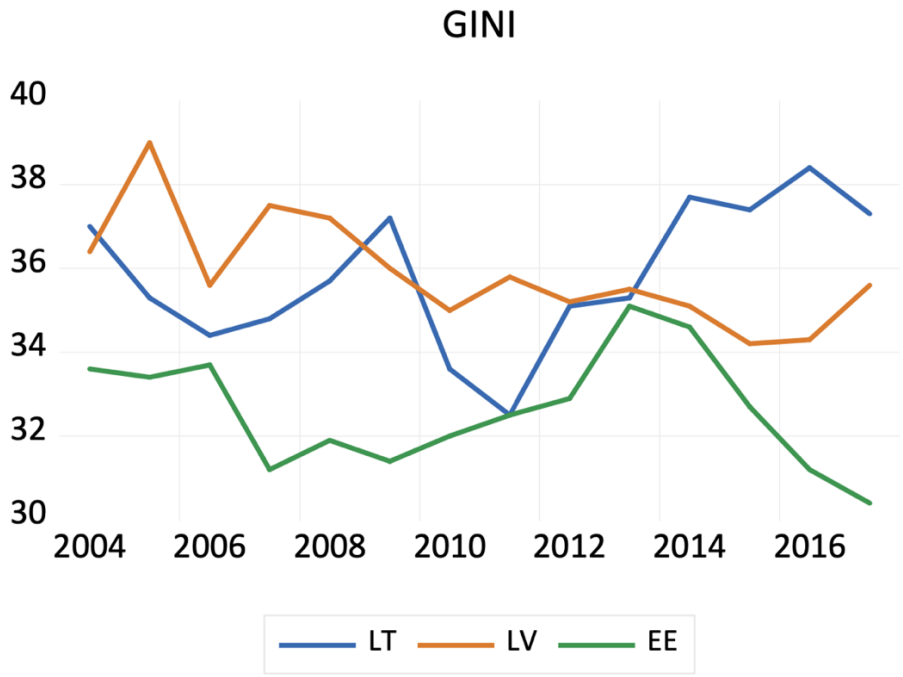

Figure 13. Gini coefficient dynamics in Baltic countries, 2004-2017

Source: Author's (2020), according to The World Bank data

After the short-lived decrease in 2012 Gini coefficient increased by 2.6% and kept on increasing till the end of the analysed period. From 2013 Lithuania consequently registered higher Gini coefficient than the neighbouring countries which indicates that Lithuania has higher income inequality than Latvia and Estonia. Estonia has registered lower Gini coefficients throughout the analysed period than Latvia and Lithuania. Only one peak period of two years 2013 and 2014 can be identified as more significant where Gini coefficient reached respectively 35.1% and 34.6%. Watts poverty index which is sensitive to transfers to the poorest part of society indicates that it was lowest in Lithuanian in 2004 and 2008 with 0.03. Though after these respective years the index increased in the following years by more than 1 point. In 2011 Watts index dropped to 0.34 and till the end of the analysed period stayed within relatively modest amplitude comparing to the first half of the period. Latvia shares very similar dynamic to Lithuania were in 2004 Watts index was registered at 0.06 and in 2007, 2008 and 2009 were 0 or very close to that (2009 – 0.05). After these periods Watts index peak in 2005 by 1.34 and in 2010 by 1.09. After these fluctuations Watts stayed lower than but still higher than in neighbouring countries. Compared to neighbours Estonia experienced fluctuations in much lower amplitude. First peak registered in 2006 was at 0.55 which was increase by 0.29 from the previous year. After the 2 year of decreasing Watts index in 2010 it bounced back to 0.5 and stayed almost stagnant for 4 years. In the similar manner to Latvia and Lithuania after the fluctuations even if in more modest manner Watts index decreased in the following years.

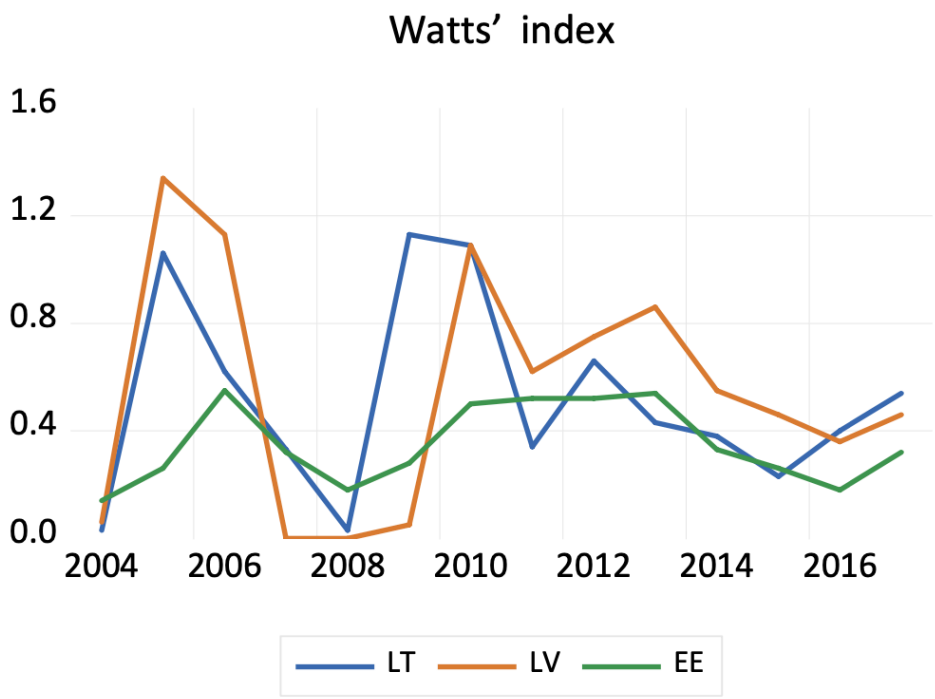

Figure 14. Watts' index dynamics in Baltic countries, 2004-2017

Source: Author's (2020), according to The World Bank data

3.2.2. CIS FSU countries

The second group in analysis is CIS FSU group of countries. Out of 4 countries Georgia registers highest Gini coefficient therefore, higher inequality. Overall fluctuations in Gini are modest with amplitude of 3.4% during the analysed period. After the slight peak period of 2010 – 2012 where Gini exceeded 39% it slowly decreased to the numbers before it. On the contrary Ukraine registered lowest Gini coefficient amongst analysed countries. During the first three years of analysed period Ukraine had higher income inequality but it slowly subsided and never returned to the highest point registered in 2009 (29.8%). Kazakhstan and Kyrgyzstan share similar dynamics with radical fluctuations in the beginning of the analysed period. In 2005 Kazakhstan registered Gini coefficient at 39.8% which is 8% higher from the previous year and then a drop by 9.6% in following year. From 2006 Gini coefficient was slowly declining without any major turbulences. Similarly, to Kazakhstan, Kyrgyzstan also experienced fluctuations in the beginning of the analysed period with Gini reaching 37.4% in 2006 which was afterwards followed by drop of 3.5%. In the following years Gini kept decreasing in the same manner as for Kazakhstan.

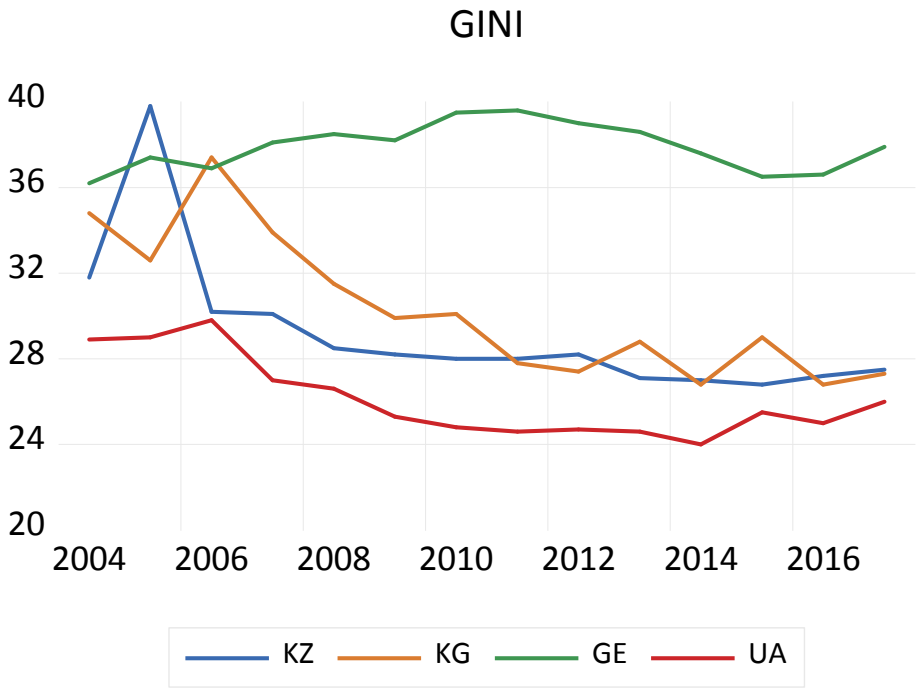

Figure 15. Gini coefficient dynamics in CIS member countries, 2004-2017

Source: Author's (2020), according to The World Bank data

Sharing the same tendency as with Gini coefficient, Georgia registers higher Watts index as well. During the first 8 years of the analysed period Watts fluctuated within the amplitude of 1.14 and registered first meaningful reduction in 2012 by 1.98 points. After this period Watts decreased in the following years. Comparing to the second highest Watts registering country in the group Kyrgyzstan and Georgia there is a difference of up to 5.03 points between the countries which is quite significant. Even though Kyrgyzstan had very modest fluctuations during the analysed period the main tendency of Watts index is decreasing. At the beginning of the period Watts was registered above 2.5 but after these two years were steadily decreasing apart for one slight bounce back in 2010 by 1.15 points from the previous year. During the analysed period Kazakhstan and Ukraine are almost flatlined apart from the Kazakhstan indicating some fluctuation in the beginning of the period and registering the Watts index in 2005 at 1.64.

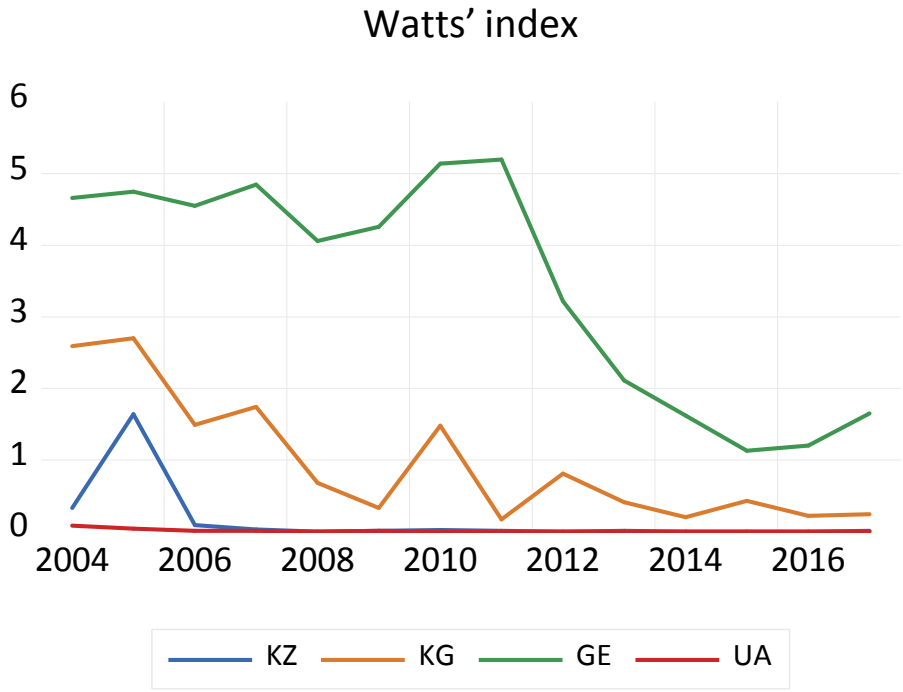

Figure 16. Watts' index dynamics in CIS member countries, 2004-2017

Source: Author's (2020), according to The World Bank data

3.2.3. EU countries

Lastly, EU group of countries. Countries that indicate lower income inequality in this group are Slovakia and Czechia. Slovakia indicates the lowest Gini coefficient amongst the countries and had relatively the same level during the period with one dip in 2008 till 23.7% and one peak period in 2013 up to 26.2% which then gradually decreased. Even thought at the beginning of the analysed period Czechia registered 27.4% during the later years Gini coefficient gradually decreased and in 2017 was at 24.9%. Finland indicates very stable Gini coefficient throughout the years with slight decrease and with amplitude of 1.5% and almost divides the EU group countries right in the middle. In 2004 Sweden registered Gini coefficient at 26.1% and during the analysed period Gini coefficient was steadily increasing which indicates growing income inequality in the country. Highest registered coefficient was in 2016 at 29.6% which is increase by 3.5%. Netherlands registered highest Gini coefficients during the 2004 and 2008 which was followed by period of four years of decrease. From 2013 Gini increased slightly and kept around the same level till the end of analysed period.

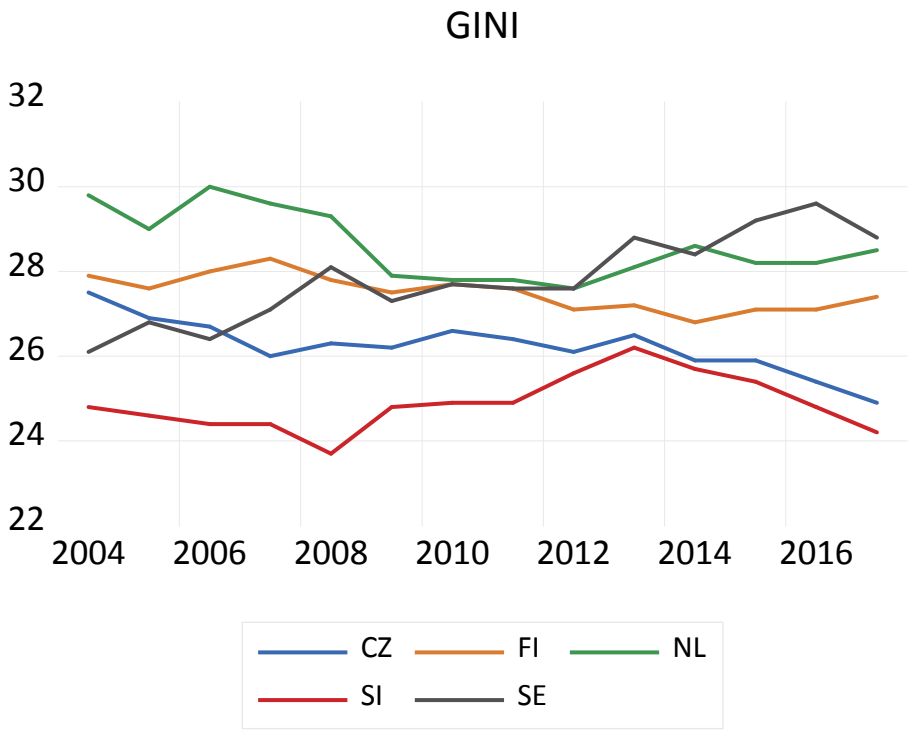

Figure 17. Gini coefficient dynamics in EU countries, 2004-2017

Source: Author's (2020), according to The World Bank data

Amongst the EU group of countries Sweden indicated the most fluctuating Watts index with consecutive drops and peaks in the index. Also, Sweden registers overall higher Watts index than other countries in the group, even though the index never exceeds 0.7 in all countries. In case of Sweden there are 5 drops that can be indicated in 2004, 2006 and 2007, 2010, 2013 and the end of the analyzed period in 2016 and 2017. All of these drops were followed by peaks of one or two years. Worth mentioning is that this circle of drops and peaks in Watts index are getting lower in amplitude during the analyzed period. Four other countries in the group fluctuate in very modest amplitude of 0.15. Slovenia has a very slight peak of 0.12 in 2005 and during the rest of the period is almost completely flatlined. Czechia is also almost flatlined apart for two slight increases in 2007 by 0.06 and in 2011 and 2012 by the same amount. Finland and Netherlands never quite reach the flat line and fluctuates in very modest amplitudes of 0.11 and 0.14 respectively.

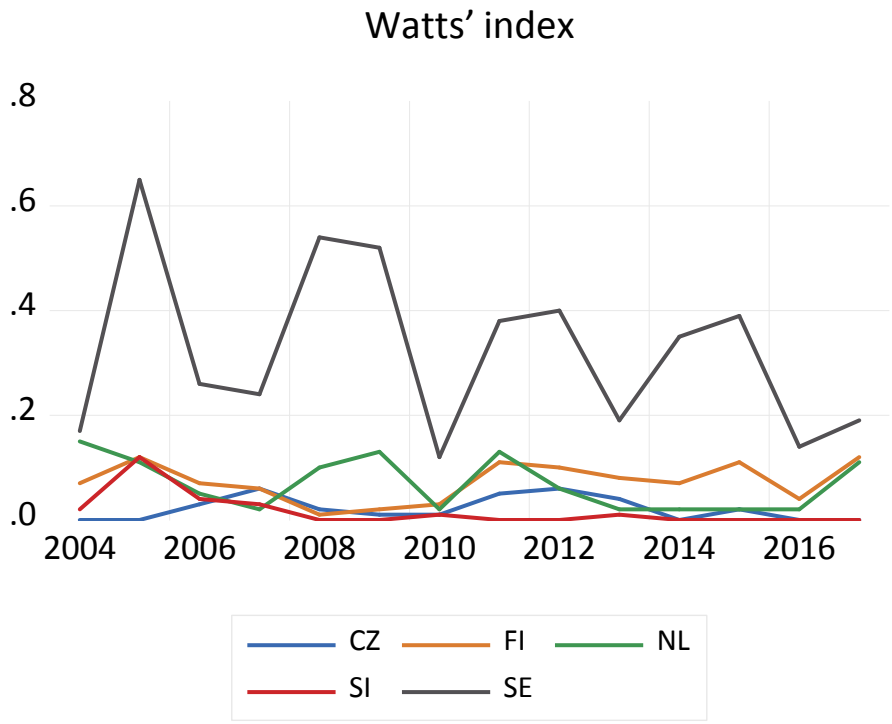

Figure 18. Watts' index dynamics in EU countries, 2004-2017

Source: Author's (2020), according to The World Bank data

3.3. Granger tests

Third step in analysis structure is Granger tests to determine the causal relationships between the variables. By applying this test, it is possible to determine whether changes in variable x Granger cause changes in variable y. In this analysis the multivariate Granger causality tests were applied as more than two variables are included. Granger tests are checked with 11 lags and significance level applied is (α) 0.05. First set of tests was performed with Gini coefficient and all the independent variables listed in paragraph 2.2.1. By performing these tests, the following hypotheses are tested:

H0: Import does not Granger cause Gini

H1: Import Granger cause Gini

H0: Export does not Granger cause Gini

H1: Export does Granger Cause Gini

H0: Unemployment does not Granger cause Gini

H1: Unemployment does Granger cause Gini

H0: Inflation does not Granger cause Gini

H1: Inflation does Granger cause Gini

H0: FDI does not Granger cause Gini

H1: FDI does Granger cause Gini

H0: Final consumption expenditure does not Granger cause Gini

H1: Final consumption expenditure does Granger cause Gini

H0: Labour productivity does not Granger cause Gini

H1: Labour productivity does Granger cause Gini

H0: General government consumption expenditure does not Granger cause Gini

H1: General government consumption expenditure does Granger cause Gini

H0: Globalisation does not Granger cause Gini

H1: Globalisation does Granger cause Gini

H0: Gender pay gap does not Granger cause Gini

H1: Gender pay gap does Granger cause Gini

According to the results of the first set of Granger tests performed p levels stay above significant threshold that was applied for FDI throughout all eleven lags. Therefore, it is not possible to state that prior mentioned variable has causal relationship and influences income inequality expressed by Gini. Unemployment shows significant level from first lag (0.0208), and in second lag showing even more pronounced result (0.0088). Significant results are also detected in lag number 5 and 6, 9 and 10, all not exceeding 0.0315. Import indicates significant level with delay in 6^{th} (0.0485), 7^{th} (0.0381), 9^{th} (0.0255) and 11^{th} (0.0062) lags. The later the lag the more pronounced significance detected. Export indicated significant level in only one lag – 7^{th} with 0.0387 as well as final consumption expenditure with 0.0272. In lag 2 and 10 inflation indicated very significant level respectively 0.0154 and 0.0039. General government consumption expenditure indicates significant level for 3 consecutive years 4 (0.0208), 5 (0.0464), and 6 (0.0198). In lag 3 (0.0211), 5 (0.0399) and 9 (0.0162) gender pay gap indicates significant level. Globalisation shows significant result only in the last 11^{th} lag – 0.0281. Labour productivity shows significance in 3^{rd} lag with 0.0401. All above described results indicate that the import, export, unemployment, inflation, final consumption expenditure, general government consumption expenditure, globalisation, gender pay gap and labour productivity can be considered to be having causal relationship with income inequality expressed in Gini coefficient.

Second set of Granger tests is performed with Watts poverty index and the same prerequisites as in the first set of tests where 11 lags are checked, and significance level applied is (α) 0.05. All the independent variables listed in paragraph 2.2.1. that were used for the tests with

Gini coefficient are used here as well. By performing this analysis, the following hypotheses are tested:

H0: Import does not Granger cause Watts
H1: Import does Granger cause Watts
H0: Export does not Granger cause Watts
H1: Export does Granger Cause Watts
H0: Unemployment does not Granger cause Watts
H1: Unemployment does Granger cause Watts
H0: Inflation does not Granger cause Watts
H1: Inflation does Granger cause Watts
H0: FDI does not Granger cause Watts
H1: FDI does Granger cause Watts
H0: Final consumption expenditure does not Granger cause Watts
H1: Final consumption expenditure does Granger cause Watts
H0: Labour productivity does not Granger cause Watts
H1: Labour productivity does Granger cause Watts
H0: General government consumption expenditure does not Granger cause Watts
H1: General government consumption expenditure does Granger cause Watts
H0: Globalisation does not Granger cause Watts
H1: Globalisation does Granger cause Watts
H0: Gender pay gap does not Granger cause Watts
H1: Gender pay gap does Granger cause Watts

Results from this test indicates that FDI, globalisation, gender pay gap and labour productivity could not be considered as causing Watts as they have p levels above significant threshold decided in the beginning of the test throughout the 11 lags that were checked. On the contrary, unemployment consequently indicated significant results for four first years (0.0329, 0.0022, 0.0104 and 0.0293) and then again 8th and 9th year (0.0003 and 0.0003). Final consumption expenditure indicates delayed significance from 3rd through 10th year (0.0116, 0.0417, 0.00002, 0.00000002, 0.000002, 0.0407, 0.0003 and 0.0056). General government consumption expenditure also displays delayed significance from 3rd through 7th year (0.0028, 0.0002, 0.00002, 0.0001 and 0.00001). Imports, exports and inflation appears only once throughout the tested 11 lags. Imports indicate significant level in 4th year with 0.0498, exports in 8th year with 0.0452 and

inflation in 9th year with 0.0381, which in overall is not the most significant results comparing with other tested variables.

After performing the Granger tests it can be considered that FDI has no significant causal relationship with Gini coefficient that represents inequality and Watts index that represents poverty, therefore can be deemed redundant for the following panel data regression analysis.

3.4. Panel data regression analysis

In the fourth step of the analysis two panel data regressions are carried out with different dependent variables: Gini coefficient and Watts poverty index, and the same independent variables as well as dummy variables described in second part of the thesis. The aim of the estimation is to identify variables that contribute to inequality and poverty. The main hypothesis is that inequality and poverty depend on former belonging to Soviet Union. In the estimations the following hypotheses are also checked:

1. Inequality and poverty depend on membership in international organizations: European Union and Commonwealth of Independent States;
2. Inequality and poverty are influenced by final consumption expenditure, labour productivity, globalisation, general government final consumption expenditure, unemployment, exports, imports, inflation and gender pay gap.

The Granger test discovered that FDI has no significant causal relationship with Gini coefficient or Watts poverty index, therefore it is not included in further analysis.

The first panel data analysis is carried out with Gini as a dependent variable.

3.4.1. Gini coefficient panel model

After the compiling of data into equation it is checked what effects are more appropriate for the model. Likelihood ratio method suggests that fixed effect is not appropriate to use as null hypothesis cannot be rejected due to the Prob.>0.05.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.896023	(11,3)	0.0693
Cross-section Chi-square	274.597199	11	0.0000
Period F	8.906720	(6,3)	0.0503
Period Chi-square	246.504006	6	0.0000
Cross-Section/Period F	6.346280	(17,3)	0.0767
Cross-Section/Period Chi-square	303.231370	17	0.0000

Figure 19. Redundant fixed effects test, Gini

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

Lagrange multiplier test is performed which also confirms that common effect is more suitable for the model as it indicates Prob.>0.05.

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.005605 (0.9403)	2.652243 (0.1034)	2.657848 (0.1030)
Honda	0.074867 (0.4702)	-1.628571 (0.9483)	-1.098634 (0.8640)
King-Wu	0.074867 (0.4702)	-1.628571 (0.9483)	-1.265544 (0.8972)
Standardized Honda	0.104282 (0.4585)	-0.664180 (0.7467)	-3.293310 (0.9995)
Standardized King-Wu	0.104282 (0.4585)	-0.664180 (0.7467)	-3.778115 (0.9999)
Gourieroux, et al.	--	--	0.005605 (0.7195)

Figure 20. Lagrange multiplier Tests for Random Effects, Gini

Source: Author's (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

From Figure 21 it is clear that there is no autocorrelation detected in the sample as Durbin-Watson statistic equals to 1.91 which is considered close to ideal according to the Durbin Watson significance table (Durbin-Watson significance tables, 2014).

R-squared is 0.76 which is means that variables listed in the model explain 76% of the range and it can be considered as sufficient. Significance of the model is indicated by Prob (F-statistic) which is 0.00 and is less than 0.05 suggesting that the model shall be considered as significant.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.200766	0.096529	2.079858	0.0422
D(EXP01(-2))	0.435265	0.175714	2.477119	0.0163
D(EXP01(-4))	0.443468	0.142290	3.116643	0.0029
D(EXP01(-5))	-0.041820	0.018206	-2.297119	0.0254
D(FCE)	0.125357	0.034998	3.581853	0.0007
D(FCE(-1))	-0.157108	0.044536	-3.527681	0.0009
D(FCE(-2))	-0.209925	0.045493	-4.614465	0.0000
D(FCE(-4))	-0.075386	0.033205	-2.270293	0.0271
D(FCE(-6))	-0.105990	0.029950	-3.538916	0.0008
D(GGCE(-4))	0.305788	0.082974	3.685346	0.0005
D(GGCE(-6))	0.222604	0.074263	2.997494	0.0041
D(GLOB(-1))	-0.104363	0.034913	-2.989211	0.0042
D(GLOB(-2))	-0.549112	0.179758	-3.054735	0.0035
D(GLOB(-4))	-0.494029	0.147910	-3.340068	0.0015
DLOG(GPG)	2.966148	0.868871	3.413798	0.0012
DLOG(GPG(-1))	3.136496	0.944767	3.319862	0.0016
DLOG(GPG(-4))	-1.113806	0.550439	-2.023487	0.0479
DLOG(GPG(-5))	-1.171792	0.550325	-2.129273	0.0377
D(IMP(-1))	0.246547	0.068714	3.588046	0.0007
D(IMP(-2))	0.640954	0.180796	3.545178	0.0008
D(IMP(-4))	0.504158	0.149899	3.363325	0.0014
D(INFLATION)	0.090686	0.015930	5.692948	0.0000
D(INFLATION(-3))	-0.117297	0.016608	-7.062633	0.0000
D(INFLATION(-5))	-0.051353	0.014678	-3.498602	0.0009
D(UNEMPL(-3))	-0.211984	0.057770	-3.669437	0.0006
D(UNEMPL(-4))	0.148869	0.055474	2.683573	0.0096
D(UNEMPL(-6))	0.111305	0.046591	2.388978	0.0204
DLOG(LPROD(-2))	-8.005466	2.936531	-2.726165	0.0086
DLOG(LPROD(-3))	-7.128887	3.098647	-2.300645	0.0252

Root MSE	0.447496	R-squared	0.761560
Mean dependent var	-0.022619	Adjusted R-squared	0.640172
S.D. dependent var	0.921935	S.E. of regression	0.553029
Akaike info criterion	1.920179	Sum squared resid	16.82124
Schwarz criterion	2.759389	Log likelihood	-51.64751
Hannan-Quinn criter.	2.257534	F-statistic	6.273782
Durbin-Watson stat	1.912450	Prob(F-statistic)	0.000000

Figure 21. Panel Least squares method with common effect and ordinary coefficient covariance with dependent Gini

Source: Author's (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Summing up the Figure 21 results it can be stated that gender pay gap, import, export, general government expenditure and unemployment contribute to deepening income inequality,

while higher levels of globalisation, final consumption expenditure, labour productivity and inflation tend to decrease Gini coefficient. During the analysis it became clear that dummy variables cannot be tested when C is present in the equation due to collinearity therefore, C was removed, and dummy variables added to the equation to test their significance. Dummy variables indicate no significance as according to probability they exceed 0.05. All other tested variables are significant according to the results presented above in Figure 21.

Analysis of residuals in graphical manner is used to evaluate the actual and the fitted values of the dependent variable.

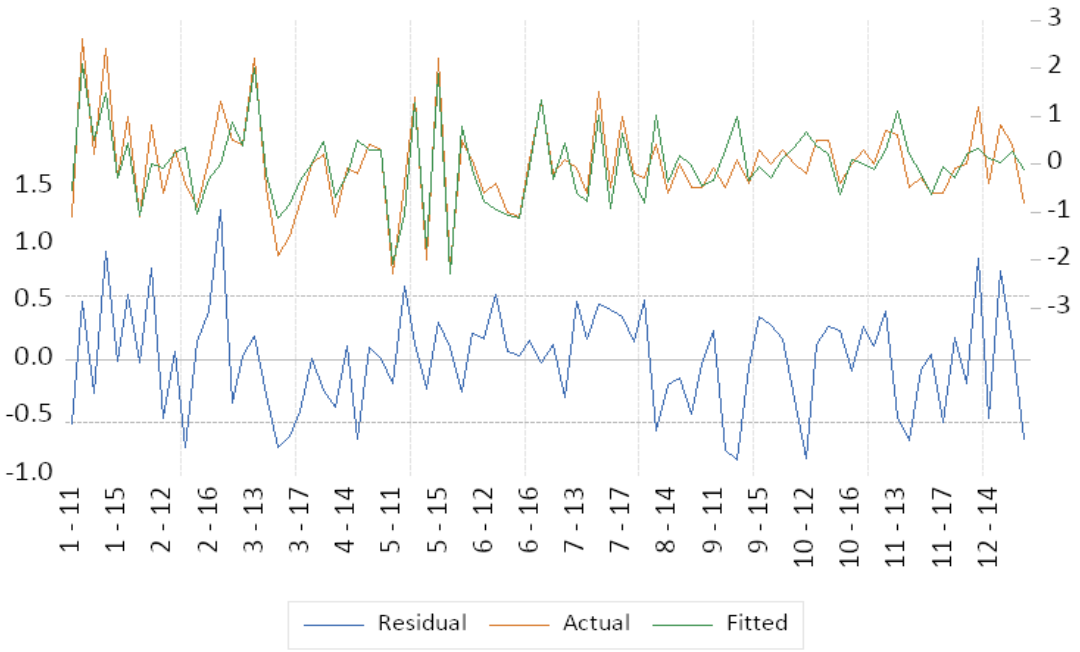

Figure 22. Actual and fitted values for dependent variable Gini

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

From the graph above it is clear that that the fitted values overlap the actual values of dependent variable but not with great precision. With more data and possible observations, it can be assumed that better fit would be achieved. Residuals are slightly more volatile in the first half of the sample than in the second half.

Jarque-Bera test is also performed to understand whether residuals are normally distributed. Probability of Jarque-Bera tests is more than 0.05 therefore, null hypothesis that residuals are normally distributed cannot be rejected.

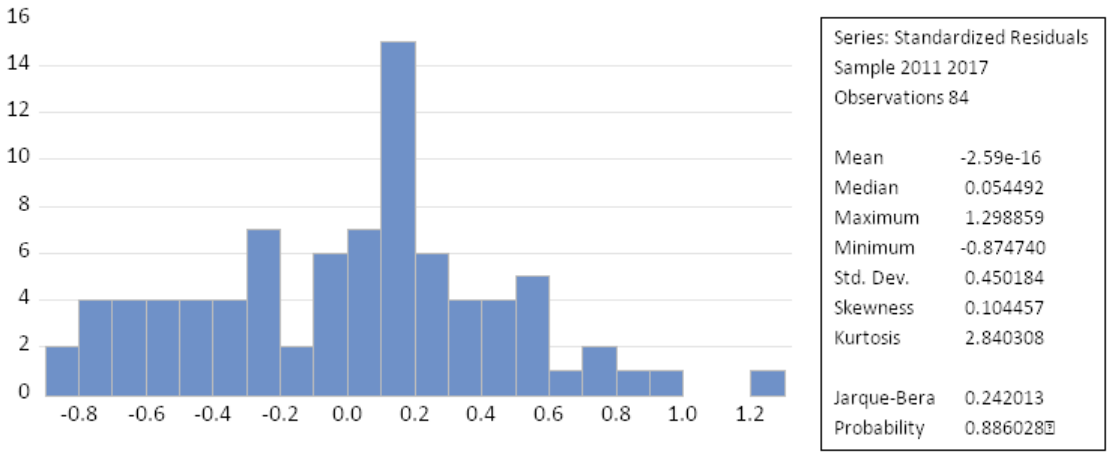

Figure 23. Jarque-Bera test, Gini

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

3.4.2. Watts index panel model

After the compiling of data into equation it is checked what effect is more suitable for the model. Likelihood ratio method is performed which suggests that fixed effect is not appropriate to use as null hypothesis cannot be rejected due to the Prob.>0.05.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.712757	(11,3)	0.7062
Cross-section Chi-square	107.911486	11	0.0000
Period F	1.524104	(6,3)	0.3920
Period Chi-square	117.455029	6	0.0000
Cross-Section/Period F	0.831945	(17,3)	0.6610
Cross-Section/Period Chi-square	146.410472	17	0.0000

Figure 24. Redundant fixed effects test, Watts

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

Lagrange multiplier test is also performed which suggests that common effect is most appropriate for the model as it indicates Prob.>0.05.

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.442905 (0.5057)	2.745401 (0.0975)	3.188305 (0.0742)
Honda	-0.665511 (0.7471)	-1.656925 (0.9512)	-1.642210 (0.9497)
King-Wu	-0.665511 (0.7471)	-1.656925 (0.9512)	-1.728202 (0.9580)
Standardized Honda	-0.418933 (0.6624)	-0.746371 (0.7723)	-3.834112 (0.9999)
Standardized King-Wu	-0.418933 (0.6624)	-0.746371 (0.7723)	-4.317569 (1.0000)
Gourieroux, et al.	--	--	0.000000 (1.0000)

Figure 25. Lagrange multiplier Tests for Random Effects, Watts

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

From Figure 26 it is clear that there is no autocorrelation detected in the sample as Durbin-Watson statistic equals to 2.04 which is considered almost ideal according to the Durbin Watson significance table (Durbin-Watson significance tables, 2014).

R-squared is 0.85 which is means that variables listed in the model explains 85% of the range and it can be considered as sufficient. Significance of the model is indicated by Prob (F-statistic) which is 0.00 and is less than 0.05 suggesting that the model shall be considered significant.

From Figure 26 it can be stated that gender pay gap, import, export, final consumption expenditure and inflation contributes to deepening poverty, while globalisation, general government consumption expenditure, unemployment and labour productivity contribute to decreasing it. Dummy variables indicate no significance as according to probability they exceed 0.05. All other tested variables are significant according to the results presented below in Figure 26.

Dependent Variable: D(WATTS)
Method: Panel Least Squares
Date: 01/02/21 Time: 06:58
Sample (adjusted): 2011 2017
Periods included: 7
Cross-sections included: 12
Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.094617	0.027427	3.449767	0.0010
D(EXP01)	0.093940	0.018995	4.945590	0.0000
D(EXP01(-1))	0.064430	0.011780	5.469518	0.0000
D(EXP01(-4))	-0.062737	0.012367	-5.072796	0.0000
D(FCE)	0.143336	0.014265	10.04797	0.0000
D(FCE(-2))	0.052923	0.006765	7.822934	0.0000
D(FCE(-4))	-0.017854	0.008032	-2.222867	0.0301
D(FCE(-6))	-0.047390	0.007138	-6.639082	0.0000
D(GGCE)	-0.192018	0.033032	-5.813165	0.0000
D(GGCE(-5))	-0.080189	0.020541	-3.903761	0.0002
D(GLOB)	-0.042685	0.009945	-4.292083	0.0001
D(GLOB(-1))	-0.033903	0.007138	-4.749835	0.0000
D(GLOB(-4))	0.032737	0.006327	5.174267	0.0000
D(GLOB(-5))	-0.019114	0.006072	-3.147855	0.0026
DLOG(GPG(-1))	0.874014	0.261220	3.345896	0.0014
DLOG(GPG(-2))	0.504386	0.153467	3.286604	0.0017
DLOG(GPG(-3))	0.561726	0.139030	4.040313	0.0002
D(IMP(-5))	0.024239	0.009299	2.606537	0.0116
D(INFLATION(-2))	0.023348	0.003591	6.502083	0.0000
D(INFLATION(-4))	0.009845	0.003931	2.504160	0.0151
D(INFLATION(-6))	0.016548	0.003715	4.453924	0.0000
D(UNEMPL)	-0.092067	0.022994	-4.004060	0.0002
D(UNEMPL(-2))	-0.050011	0.015223	-3.285259	0.0017
D(UNEMPL(-3))	0.054627	0.011668	4.681819	0.0000
DLOG(LPROD(-6))	-3.758746	0.568602	-6.610502	0.0000

Root MSE	0.126300	R-squared	0.856815
Mean dependent var	-0.069881	Adjusted R-squared	0.798571
S.D. dependent var	0.335780	S.E. of regression	0.150701
Akaike info criterion	-0.705079	Sum squared resid	1.339937
Schwarz criterion	0.018378	Log likelihood	54.61332
Hannan-Quinn criter.	-0.414255	F-statistic	14.71063
Durbin-Watson stat	2.045612	Prob(F-statistic)	0.000000

Figure 26. Panel Least squares method with common effect and ordinary coefficient covariance with dependent Watts

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

Analysis of residuals in graphical manner is used to evaluate the actual and the fitted values of the dependent variable.

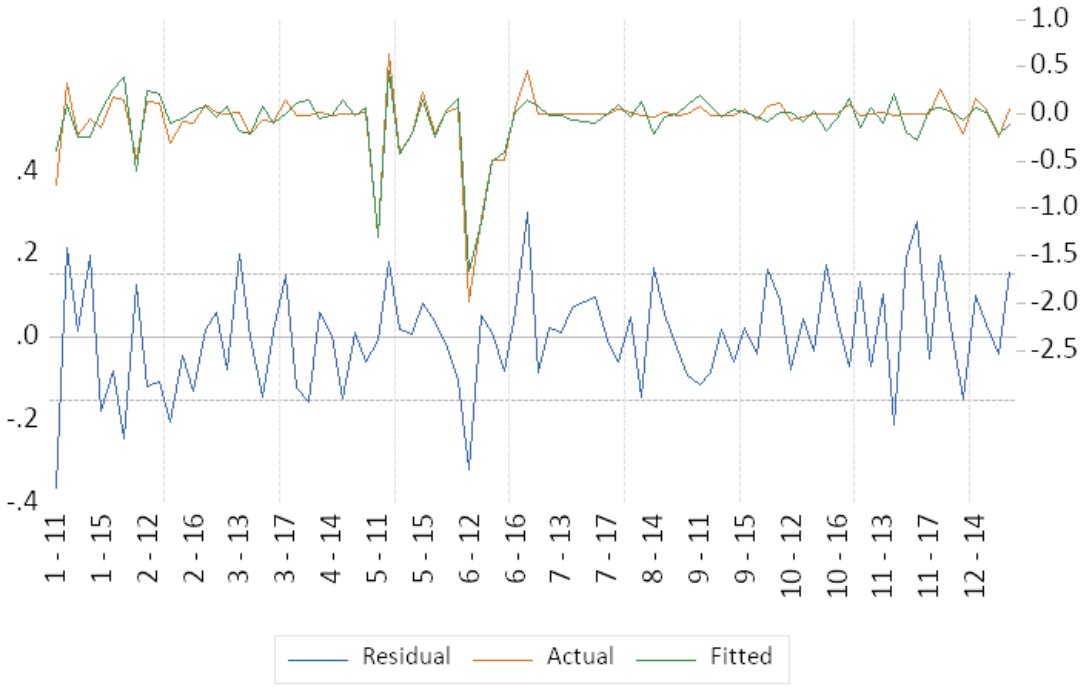

Figure 27. Actual and fitted values for dependent variable Watts

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

From the graph above it is clear that the fitted values overlap actual values of dependent variable with greater precision than with Gini coefficient. With more data and possible observations, even better fit could be achieved. Residuals are slightly more volatile in the first half of the sample than in second half.

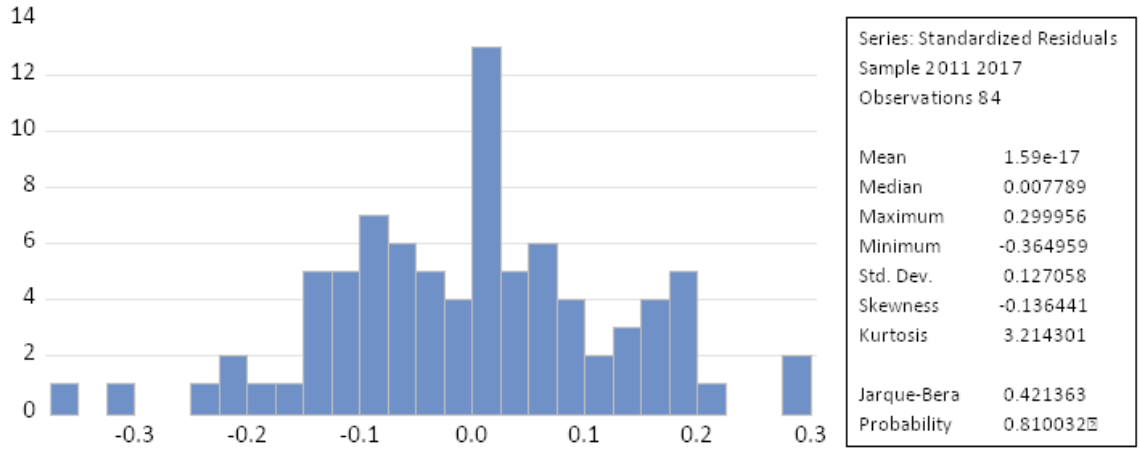

Figure 28. Jarque-Bera test, Watts

Source: Author's (2020) by EViews using data from The World Bank and UNECE Statistical Division Database

Jarque-Bera test is also performed to understand whether residuals are normally distributed. Probability of Jarque-Bera tests is more than 0.05 therefore, null hypothesis that residuals are normally distributed cannot be rejected.

3.4.3. Comparison of estimated results

After both regression models are performed comparisons of their results can be made. Neither one of the models indicated that former belonging to the Soviet Union has an impact on inequality and poverty. Since data is taken only from 2004 as it is the earliest comparable year it is possible that former belonging to SU could be more significant during the first decade of independence and does not carry significance for a longer period. Belonging to European Union and Commonwealth of Independent States also proved to be insignificant and does not impact inequality and poverty rates in analysed countries.

During the Granger tests it was confirmed that variable FDI has no causal relationship with Gini coefficient and Watts index thus was removed from further panel data analysis. In both models gender pay gap as well as import and export impact the rise in inequality and poverty. Gender pay gap not only directly impacts the earnings of different sexes but also influences other factors such as education which in turn can exacerbate the problem. Combined with likelihood of women working in informal sector which is usually less compensated it creates an issue that is detrimental to productivity and growth (Jain-Chandra, 2015). Incentivizing women involvement in labour market by changes in benefits and tax policies, as well as encouraging higher education, especially in high-earning sectors, as well as removing any legal or gender-bias stereotypes would contribute to lowering inequality and poverty in society. Imports and exports are usually attributed to higher labour productivity which indicates higher involvement in labour market and in turn reduced inequality and poverty but according to performed analysis they influence increasing inequality and poverty rates. This would suggest that only limited part of society that is related to exports and imports reap the fruits of increased income and therefore it contributes to higher inequality in the country. Even though export and import might increase average income in the country but that does not necessarily mean that it reaches the poor. On the contrary, increased income median would mean that poverty threshold also increases thus the share of persons living below it increases.

Oppositely, globalisation and labour productivity indicates lowering rates of inequality and poverty. This can be explained by theory as globalisation can reduce inequality and poverty by stimulating economic growth, creating more jobs by transferring them from richer countries to poorer and lifting per capita income. This relates to increased labour productivity as it also

indicates economic growth in the country. It is double swarded relationship because globalisation can have negative impact on inequality and poverty as well by increasing specialisation amongst other drawbacks.

The most interesting observation from the regressions above is that whilst final consumption expenditure and inflation contributed to deepening poverty both of them can be indicated as factors decreasing inequality. Final consumption expenditure can be explained by poor part of society not being able to attain goods and services which would benefit their position by providing advantage like books for education. Deconstructing this from inequality perspective it can be assumed that the money is used for services and goods enabling to advance ones position. As for inflation it can be assumed that the income increased for the people who earn less by employers having to compensate for raising inflation but not as much for the high earners. Increasing rates of poverty can be explained by inflation driven rise in income median as well as poverty threshold. Considering that poor are reliant on social transfers without proper indexation to compensate for the inflation it can lead to growing poverty in the country.

Furthermore, the same behaviour just with different direction can be noticed with general government expenditure and unemployment, where they contribute to decreasing poverty but deepening inequality. Unemployment benefits received during the period of unemployment can be attributed to relative minimization of poverty but does not influence inequality measures in the country. Same is for general government consumption expenditure, it provides benefit to poorer part of society by ensuring collective needs of the country like health care, education and other social transfers but not necessarily has an impact on inequality.

CONCLUSIONS

1. The complicated nature of inequality and poverty causality requires multiple variables and comparable data to be taken into account as well as specific factors of the particular region when measured.
2. By applying different methodology and sets of data there is possible to get different results on the trends that affect inequality. It strongly depends on research objective and representation of the results. The most common measurement tools being Gini coefficient, Theil index, Lorenz curve, Atkinsons index, and differentiation coefficients deciles, quintiles, quartiles.
3. Many factors contribute to the inequality and multiple measures have to be set in place to reverse it. It strongly depends on geopolitical situation of the country and involvement in international organizations (EU).
4. Transition from planned economy dramatically changed post-Soviet countries trajectory regarding inequality and poverty and plunged the region in deep and one of the worst crises in recorded history.
5. Legacy structures, lack of knowledge how to run a country, macroeconomic factors prolonged the crisis. Policies that had counter fight inequality and poverty had to be set in place in newly independent countries.
6. In most post-Soviet countries, there are proportional income taxes in place which is on the contrary for many Western Europe countries. This means that all citizens pay the same tariff not taking into account actual income.
7. The best tool that combines cross-sectional and time series data and enables to include multiple independent variables is panel data regression analysis which is used in combination with Granger test in this thesis.
8. Former belonging to Soviet Union does not have an impact on inequality and poverty according to the performed tests. Analysis with earlier data can be performed to check whether this impact is more noticeable during the first decade of independence of the countries.
9. Belonging to international organizations such as European Union and Commonwealth of Independent States proved to have no impact on inequality and poverty rates in selected countries during the analysis.
10. Model with Watts index which represents poverty indicated that globalisation, general government consumption expenditure, unemployment and labour productivity contributes to reducing poverty. Oppositely, gender pay gap, imports, exports, final consumption

expenditure and inflation deepens the poverty. R-squared equals to 0.85 and signals that the model explains 85% of the range.

11. Model with Gini coefficient which represents inequality indicated that globalization, final consumption expenditure, labour productivity and inflation contributes to reducing inequality while gender pay gap, import, export, general government consumption expenditure and unemployment increases it. R-squared equals to 0.76 and announces that the model explains 76% of the range.

REFERENCES

1. Alesina, A., and Fuchs-Schündeln, N. (2007). Goodbye Lenin (or not?): The effect of communism on people's preferences. American Economic Review, 97(4), 1507–1528.
2. Alesina, A. and Perotti, R. (1994). The Political Economy of Growth: A Critical Survey of the Recent Literature [online]. Available at: < http://documents1.worldbank.org/curated/en/383001468764673841/pdf/multi-page.pdf> [Accessed 29th of July]
3. Atkinson, A. B. (1970). On the Measurement of Inequality [online]. Available at: < http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.521.849&rep=rep1&type=pdf > [Accessed 28th of August]
4. Atkinson, A. B. (2015). INEQUALITY: What can be done? Harvard University Press, Cambridge, Massachusetts London, England. ISBN 978-0-674-50476-9.
5. Atkinson, A. B. and Micklewright, J. (1992). Economic Transformation in Eastern Europe and the Distribution of Income.
6. Atkinson, A. B. and Micklewright, J. (1992). The Distribution of Income in Eastern Europe [online]. Available at: < https://cadmus.eui.eu/handle/1814/438> [Accessed 16th of July]
7. Baldacci, E., De Mello, L., and Inchauste, G. (2002). Financial Crises, Poverty, and Income Distribution [online]. Available at: < https://www.imf.org/external/pubs/ft/fandd/2002/06/baldacci.htm> [Accessed 20th of July]
8. Bandelj, N., & Mahutga, M. C. (2010). How socio-economic change shapes income inequality in post-socialist Europe. Social Forces, 88(5), 2133–2161.
9. Berg, A. G. and Ostry, J. D. (2011). Inequality and Unsustainable Growth: Two Sides of the Same Coin? [online]. Available at: <https://www.imf.org/external/pubs/ft/sdn/2011/sdn1108.pdf> [Accessed 27th of July, 2020]
10. Bergson, A. (1984). Income Inequality under Soviet Socialism. Journal of Economic Literature, 22, pp. 1052-1099.
11. Bernhard, M., & Jung, D. J. (2017). Civil society and income inequality in post-communist Eurasia. Comparative Politics, 49(3), 373–397.
12. Blažienė, I. (2002). Gyventojų pajamos ir jų normalizavimas Lietuvoje: doctoral dissertation. Vilnius Gediminas Technical University.
13. Brooks, C. (2008). Introductory econometrics for finance [online]. Available at: < http://catdir.loc.gov/catdir/samples/cam033/2001037930.pdf> [Accessed 15th of July, 2020]

14. Bukowski, P. and Novokmet, F. (2017). Top Incomes during Wars, Communism and Capitalism: Poland 1892-2015 [online]. Available at: < https://www.lse.ac.uk/International-Inequalities/Assets/Documents/Working-Papers/Working-Paper-17-Top-Incomes-during-Wars-Communism-and-Capitalism-Poland-1892-2015-Pawel-Bukowski-and-Filip-Novokmet.pdf > [Accessed 21st of August, 2020]
15. Bönisch, P., & Schneider, L. (2010). Informal social networks and spatial mobility: The enduring impact of communist history in Eastern Germany. Post-Communist Economies, 22(4), 483–497.
16. Bönisch, P., & Schneider, L. (2013). The social capital legacy of communism: Results from the Berlin Wall experiment. European Journal of Political Economy, 32, 391–411.
17. Castells-Quintana, D. and Royuela, V. (2014). Tracking positive and negative effects of inequality on long-run growth [online]. Available at: < http://www.ub.edu/irea/working_papers/2014/201401.pdf > [Accessed 24th of July]
18. Cingano, F. (2014). Trends in Income Inequality and its Impact on economic Growth [online]. Available at: < http://www.oecd.org/els/soc/trends-in-income-inequality-and-its-impact-on-economic-growth-SEM-WP163.pdf > [Accessed 18th of July]
19. Cline, W. (2002). Financial Crises and Poverty in Emerging Market Economics. Working Paper No. 8. Washington, D.C.: Center for Global Development.
20. Corak, M. (2013). Income Inequality, Equality of Opportunity, and Intergenerational Mobility [online]. Available at: < https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.27.3.79 > [Accessed 17th of July]
21. De Nardi, M. (2004). Wealth Inequality and Intergenerational Links. The Review of Economic Studies, Volume 71, Issue 3, pg. 743-768. Available at: < https://academic.oup.com/restud/article-abstract/71/3/743/1536436?redirectedFrom=fulltext > [Accessed 23rd of July]
22. Durbin-Watson Significance tables (2014). Durbin-Watson Significance tables [online]. Available at: < http://www.dm.unibo.it/~simoncin/Durbin_Watson_tables.pdf > [Accessed 24th of August, 2020]
23. Encyclopedia Britannica (2018). Commonwealth of Independent States [online]. Available at: <https://www.britannica.com/topic/Commonwealth-of-Independent-States> [Accessed 14th of December, 2020]
24. Encyclopedia Britannica (2018). The Russian Revolution [online]. Available at: < https://www.britannica.com/place/Soviet-Union/The-Russian-Revolution> [Accessed 23rd of July]

25. Encyclopedia Britannica (2020). Cold War [online]. Available at: < https://www.britannica.com/event/Cold-War> [Accessed 23rd of July]
26. Eurostat. EU statistics on income and living conditions (EU-SILC) methodology – Europe 2020 target on poverty and social exclusion [online]. Available at: < https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_-_Europe_2020_target_on_poverty_and_social_exclusion#Description > [Accessed 17th of July]
27. Eurostat (2019). Smarter, greener, more inclusive? Indicators to support the Europe 2020 strategy, 2019 edition [online]. Available at: < https://ec.europa.eu/eurostat/documents/3217494/10155585/KS-04-19-559-EN-N.pdf/b8528d01-4f4f-9c1e-4cd4-86c2328559de > [Accessed 20th of July, 2020]
28. Goda, T. (2013). Changes in income inequality from a global perspective [online]. Available at: < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2486888> [Accessed 29th of July]
29. Granger, C. W. J. (1969). Investigating casual relations by econometric methods and cross-spectral methods. Econometrica, Nr. 37, 1969, 424-438.
30. Habibov, N. (2013). Who wants to redistribute? An analysis of 14 post-Soviet nations. Social Policy & Administration, 47(3), 262–286.
31. Hsieh, C.C. and Pugh, M.D. (1993). Poverty, Income Inequality, and Violent Crime: A Meta-Analysis of Recent Aggregate Data Studies [online]. Available at: < https://journals.sagepub.com/doi/10.1177/073401689301800203> [Accessed 24th of July]
32. IBAN [online]. Available at: < https://www.iban.com/country-codes > [Accessed 12th of December, 2020]
33. IMF (2014). International Monetary Fund, Policy paper, Fiscal policy and Income inequality [online]. Available at: < https://www.imf.org/external/np/pp/eng/2014/012314.pdf> [Accessed 24th of July, 2020]
34. IMF (2015). Causes and Consequences of Income Inequality: A Global Perspective. Dabla-Norris, Kochhar, Suphaphiphat, Ricka, Tsounta. [online]. Available at: <https://www.imf.org/~/media/Websites/IMF/imported-full-text-pdf/external/pubs/ft/sdn/2015/_sdn1513.ashx> [Accessed 14th of July, 2020]

35. IMF (2017). IMF Fiscal Monitor: Tackling Inequality. [online]. Available at: <https://www.imf.org/en/publications/fm/issues/2017/10/05/fiscal-monitor-october-2017> [Accessed 16th of July, 2020]
36. Inequality.org. Wealth Inequality in the United States [online]. Available at: <https://inequality.org/facts/wealth-inequality/ > [Accessed 24th of August, 2020]
37. J Epidemiol Community Health (2007) [online]. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2652960/> [Accessed 20th of August 2020]
38. Jain-Chandra, S. (2015). Why gender and income inequality are linked [online]. Available at:< https://www.weforum.org/agenda/2015/10/why-gender-and-income-inequality-are-linked/> [Accessed 24th of August, 2020]
39. Karagiannaki, E. (2017). The empirical relationship between income poverty and income inequality in rich and middle income countries [online]. Available at:< http://sticerd.lse.ac.uk/dps/case/cp/casepaper206.pdf> [Accessed 16th of August, 2020]
40. Kelly, M. (2000). Inequality and Crime. Review of Economics and Statistics 82(4):530-539 [online]. Available at: < https://www.researchgate.net/publication/24095661_Inequality_And_Crime > [Accessed 24th of July]
41. Kohl, R. (2003). Globalization, Poverty and Inequality [online]. Available at: < https://read.oecd-ilibrary.org/development/globalisation-poverty-and-inequality_9789264101852-en#page1 > [Accessed 24 of July]
42. Kufenko, V. (2014). Economic growth and inequality: Empirical analysis for the Russian regions. Heidelberg, Germany: Springer.
43. Libman, A. and Obydenkova, A. (2019). Inequality and historical legacies: evidence from post-communist regions [online]. Available at: < https://doi.org/10.1080/14631377.2019.1607440 > [Accessed 16th of July, 2020]
44. Lydall, H. F. (1979). Some Problems in Making International Comparisons of inequality. In Income Inequality: trends and International Comparisons (ed. J.R. Moroney), pp. Lexington, Mass; D C Health.
45. Malisauskaite, G., & Klein, A. (2018). Drinking under communism: Why do alcohol consumption habits in Eastern Europe differ from the west in the long-run? Journal of Comparative Economics, 46(3), 821–837.
46. Matthews, M. (1978). Privilege in the Soviet Union. A Study of Elite Life-Styles under Communism [online]. Available at: < https://tidsskrift.dk/historisktidsskrift/article/view/52287> [Accessed 18th of July]

47. McAuley, A. N. D. (1979). Economic Welfare in the Soviet Union. Madison; University of Wisconsin Press.
48. McAuley, A. (2008). Country Overview Paper No. 3 Development Strategy, Welfare Regime and Poverty Reduction in the Former Soviet Union [online]. Available at: https://www.unrisd.org/unrisd/website/document.nsf/(httpPublications)/7CE9C17E762E9685C1257AE7006097C2?OpenDocument> [Accessed 17th of July 2020]
49. McCauley, M. (2007). The Rise and Fall of the Soviet Union. Taylor & Francis Ltd, London.
50. Milanovic, B. (1998). Income, Inequality, and Poverty during the Transition from Planned to Market Economy [online]. Available at: <http://documents1.worldbank.org/curated/en/229251468767984676/pdf/multi-page.pdf> [Accessed 18th of July, 2020]
51. Milanovic, B. (2006). Global Income Inequality: What It Is And Why It Matters? [online]. Available at: < https://www.un.org/esa/desa/papers/2006/wp26_2006.pdf> [Accessed 12th of July, 2020]
52. Milanovic, B. (2012). Global Income Inequality by the Numbers: in History and Now [online]. Available at: <http://documents1.worldbank.org/curated/en/959251468176687085/pdf/wps6259.pdf > [Accessed 26th of August]
53. Millar, W. (1994). The social legacy of communism. Cambridge, UK: Cambridge University Press.
54. Morrisson, C. (1984). Income distribution in East European and Western Countries. Journal of Comparative Economics, 8, pp. 121-138.
55. Naschold, F. (2002). Why Inequality Matters for Poverty [online]. Available at: < https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3876.pdf> [Accessed 18th of July]
56. OECD. Income Inequality [online]. Available at: < https://data.oecd.org/inequality/income-inequality.htm> [Accessed 17th of July]
57. OECD (2016). OECD Regions at a Glance 2016 [online]. Available at: <https://www.oecd-ilibrary.org/docserver/reg_glance-2016-50-en.pdf?expires=1598378073&id=id&accname=guest&checksum=9DAA2C280F1DD4608F314FDFE17E0C63> [Accessed 14th of July, 2020]
58. OECD (2018). Equity in Education: Breaking Down Barriers to Social Mobility, PISA [online]. Available at: < https://www.oecd-ilibrary.org/education/equity-in-education_9789264073234-en > [Accessed 18th of July]

59. Ortiz, I. and Cummins, M. (2011). Global Inequality: Beyond the Bottom Billion [online]. Available at: < https://ssrn.com/abstract=1805046 > [Accessed 11th of August]
60. Ostry, J. D., Berg, A. and Tsangarides C. G. (2014). Redistribution, Inequality, and Growth [online]. Available at: https://www.imf.org/external/pubs/ft/sdn/2014/sdn1402.pdf >[Accessed 17th of July, 2020]
61. Pop-Eleches, G., & Tucker, J. A. (2011). Communism's shadow: Postcommunist legacies, values, and behavior. Comparative Politics, 43(4), 379–408.
62. Pryor, F. L. (1973). Property and Industrial Organization in Communist and Capitalist Nations. Bloomington; Indiana University Press.
63. SESRIC (2015). Measurement if Poverty in OIC Member Countries: Enhancing national statistical capacities [online]. Available at: <https://sesric.org/imgs/news/1187_POVERTY_2015_FINAL_DGediting_ENG.pdf> [Accessed 24th of August, 2020]
64. Slay, B. (2009). Poverty, Inequality, and Social Policy Reform in the Former Soviet Union [online]. Available at: <https://www.eurasia.undp.org/content/rbec/en/home/library/poverty/Poverty_inequality_social_policy_reform_former_Soviet_Union.html > [Accessed 20th of August, 2020]
65. Spence, M. (2013). Technology and the employment challenge [online]. Available at: < https://www.project-syndicate.org/commentary/global-supply-chains-on-the-move-by-michael-spence?barrier=accesspaylog> [Accessed 24th of August]
66. The World Bank. LAC Equity Lab: Income Inequality – Income distribution [online]. Available at:< https://www.worldbank.org/en/topic/poverty/lac-equity-lab1/income-inequality/income-distribution > [Accessed 24th of August, 2020]
67. The World Bank (2019). Inequality of Opportunity: New Measurements Reveal the Consequences of Unequal Life Chances [online]. Available at: <https://www.worldbank.org/en/news/feature/2019/03/28/inequality-of-opportunity-new-measurements-reveal-the-consequences-of-unequal-life-chances > [Accessed 24th of August, 2020]
68. UN [online]. Available at: < https://www.un.org/sustainabledevelopment/sustainable-development-goals/> [Accessed 16th of July, 2020]
69. Watts, W. H. (1968). An Economic Definition of Poverty. On Understanding Poverty, New York: Basic Books.
70. Weatherburn, D. (2001). What Causes Crime? BOCSAR NSW Crime and Justice Bulletin No. 54 [online]. Available at: <

https://www.bocsar.nsw.gov.au/Pages/bocsar_publication/Pub_Summary/CJB/cjb54-What-causes-crime.aspx> [Accessed 26th of August]

71. Wiles, P. J. D. (1978). Our Shaky Data Base. In Personal Income Distribution (ed. W. Krelle and A. F. Shorrocks), pp. 167-192. Amsterdam; North-Holland.
72. Wilkinson, R. and Pickett, K. (2010). The Spirit Level: Why Equality is Better for Everyone, London: Penguin.
73. Yang, L. (2017). The relationship between poverty and inequality: Concepts and measurement [online]. Available at: < http://sticerd.lse.ac.uk/dps/case/cp/CASEpaper205.pdf> [Accessed 26th of August, 2020]
74. Yang, L. and Vizard, P. (2017). Multidimensional poverty and income inequality in EU [online]. Available at: < http://sticerd.lse.ac.uk/dps/case/cp/CASEpaper207.pdf> [Accessed 24th of August, 2020]

SUMMARY

Justina Mataitytė

INEQUALITY AND POVERTY IN POST-SOVIET COUNTRIES

Master thesis

Academic supervisor: Assoc. Prof. Dr. A. Laužadytė-Tutlienė

Vilnius University, Faculty of Economics and Business Administration

Global Business and Economics

Vilnius, 2021

96 pages, 3 tables, 28 figures, 74 references

Inequality and poverty topics are at the centre of many social, political and economic debates. In recent decades income inequality and poverty topics are gaining traction with recognition from many international organizations and goals set to reduce them. The main goal of this thesis is to determine if inequality and poverty are impacted by former belonging to Soviet Union. Furthermore, the efforts are made to determine whether membership in international organizations like European Union and Commonwealth of Independent State have any influence on the phenomena. Additionally, ten other factors are checked for their contribution to the dynamics of inequality and poverty.

In theoretical part of the thesis extensive analysis of the literature has been done for better understanding of the phenomena and clarifying the causes and consequences of it. To decipher differences of inequality among selected countries multiple tools can be used with the most common being Gini coefficient, Theil index, Lorenz curve and Atkinson's index which also brings social welfare factor to the spotlight. Poverty is usually measured by Foster-Greer-Thorbecke indexes as well as Watts poverty index and AROPE indicator. Also, the overview of the planned economy traits in USSR and the transition from it to market economy is done. Overview of policies that new countries have adopt to address inequality and poverty is performed.

In order to test the raised hypotheses and achieve the goal of the thesis 4 distinct steps are introduced in methodology part: grouping of countries, analysis of inequality and poverty trends dynamics throughout the selected timeframe within the identified groups, applying Granger test to realize the causality between the variables, and performing panel data regression analysis.

After the applied tests it was identified that former belonging to SU, EU and CIS have no impact on inequality and poverty. Gender pay gap, import, export, general government consumption expenditure and unemployment contribute to deepening income inequality, while higher levels of globalisation, final consumption expenditure, labour productivity and inflation

tend to decrease Gini coefficient which represents inequality. Gender pay gap, import, export, final consumption expenditure and inflation contributes to deepening poverty, while globalisation, general government consumption expenditure, unemployment and labour productivity contribute to decreasing it.

SANTRAUKA

Justina Mataitytė

NELYGYBĖ IR SKURDAS POSOVIETINĖSE ŠALYSE

Magistrinis darbas

Darbo vadovė: doc. dr. A. Laužadytė-Tutlienė

Vilniaus universitetas, Ekonomikos ir verslo administravimo fakultetas

Globalus verslas ir ekonomika

Vilnius, 2021

96 puslapiai, 3 lentelės, 28 grafikai, 74 informaciniai šaltiniai

Nelygybės ir skurdo temos vis dar yra dažnas reiškinys socialinėse, politinėse ir ekonominėse diskusijose. Pastaraisiais dešimtmečiais tarptautinės organizacijos skiria didelį dėmesį nelygybės ir skurdo mažinimo iniciatyvoms. Pagrindinis šio darbo tikslas yra nustatyti, ar nelygybė ir skurdas šalyje yra įtakojami buvusio priklausymo Sovietų Sąjungai. Be to, stengiamasi išsiaiškinti, ar narystė tarptautinėse organizacijose, tokiose kaip Europos Sąjunga ir Nepriklausomų valstybių sandrauga, taip pat turi įtakos nagrinėjamiems reiškiniams. Taip pat, tikrinami kiti veiksniai, kurie gali daryti įtaką nelygybės ir skurdo dinamikai šalyse.

Teorinėje darbo dalyje atliekama literatūros analizė, kurios metu yra išaiškinamos pagrindinės sąvokos ir nelygybės tipai. Atliekamas nelygybės priežasčių ir pasekmių identifikavimas. Dažniausiai naudojami matavimo vienetai nelygybei įvertinti Gini indeksas, Teilo matas, Lorenco kreivė, Atkinsono indeksas, kuris taip pat nurodo šalies socialinės geroves lygį. Aptariamos tokios skurdo matavimo priemonės kaip Foster-Greer-Thorbecke indeksai, taip pat Watts skurdo indeksas ir AROPE rodiklis. Apžvelgiama istorinė regiono ekonominė situacija nuo planinės iki rinkos ekonomikos ir kokia įtaką tai turėjo nelygybės kitimui regione. Aptariamos svarbiausios įstatyminės priemonės, į kurias šalys koncentravosi, mažinančias skurdo ir nelygybės lygį.

Norint patikrinti iškeltas hipotezes, metodinėje darbo dalyje aptariami 4 žingsniai tam pasiekti: šalių grupavimas, nelygybės ir skurdo tendencijų dinamikos analizė per pasirinktą laikotarpį nustatytose grupėse, Granger testo atlikimas nustatant priežastinius ryšius tarp kintamųjų ir atlikti 2 panelinių modelių analizės.

Po atliktų testų buvo nustatyta, kad priklausymas SU, ES ir NVS neturi įtakos nelygybei ir skurdui. Lyčių darbo užmokesčio skirtumas, importas, eksportas, valdžios sektoriaus išlaidos ir nedarbas didina pajamų nelygybę, o didesnis globalizacijos lygis, galutinio vartojimo išlaidos, darbo našumas ir infliacija mažina Gini koeficientą, kuris reprezentuoja nelygybę. Lyčių darbo

užmokesčio skirtumas, importas, eksportas, galutinio vartojimo išlaidos ir infliacija prisideda prie skurdo gilėjimo, o globalizacija, vyriausybės išlaidos, nedarbas ir darbo našumas prisideda prie jo mažinimo.

ANNEXES

Annex 1. Gini pairwise Granger causality test, lag 1

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:08
Sample: 2004 2017
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	156	0.12078	0.7287
GINI does not Granger Cause EXP01		1.11241	0.2932
FCE does not Granger Cause GINI	156	0.33767	0.5620
GINI does not Granger Cause FCE		0.49935	0.4809
LOG(FDI+140000000000) does not Granger Cause GINI	156	0.02886	0.8653
GINI does not Granger Cause LOG(FDI+140000000000)		0.07744	0.7812
GGCE does not Granger Cause GINI	156	0.00616	0.9376
GINI does not Granger Cause GGCE		1.70111	0.1941
GLOB does not Granger Cause GINI	156	0.08930	0.7655
GINI does not Granger Cause GLOB		0.51894	0.4724
LOG(GPG) does not Granger Cause GINI	156	0.03139	0.8596
GINI does not Granger Cause LOG(GPG)		0.21506	0.6435
IMP does not Granger Cause GINI	156	0.02582	0.8726
GINI does not Granger Cause IMP		0.31147	0.5776
INFLATION does not Granger Cause GINI	156	0.49447	0.4830
GINI does not Granger Cause INFLATION		0.16262	0.6873
LOG(LPROD) does not Granger Cause GINI	156	0.15981	0.6899
GINI does not Granger Cause LOG(LPROD)		7.43519	0.0071
UNEMPL does not Granger Cause GINI	156	5.45680	0.0208
GINI does not Granger Cause UNEMPL		3.49878	0.0633

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 2. Gini pairwise Granger causality test, lag 2

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:09
Sample: 2004 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	144	0.07822	0.9248
GINI does not Granger Cause EXP01		0.46975	0.6261
FCE does not Granger Cause GINI	144	1.54352	0.2173
GINI does not Granger Cause FCE		1.52854	0.2205
LOG(FDI+140000000000) does not Granger Cause GINI	144	0.97045	0.3815
GINI does not Granger Cause LOG(FDI+140000000000)		0.23152	0.7936
GGCE does not Granger Cause GINI	144	1.84383	0.1621
GINI does not Granger Cause GGCE		2.06291	0.1310
GLOB does not Granger Cause GINI	144	0.06476	0.9373
GINI does not Granger Cause GLOB		0.38580	0.6806
LOG(GPG) does not Granger Cause GINI	144	1.92583	0.1496
GINI does not Granger Cause LOG(GPG)		0.00841	0.9916
IMP does not Granger Cause GINI	144	0.33591	0.7153
GINI does not Granger Cause IMP		1.08763	0.3399
INFLATION does not Granger Cause GINI	144	4.29791	0.0154
GINI does not Granger Cause INFLATION		0.00243	0.9976
LOG(LPROD) does not Granger Cause GINI	144	2.03492	0.1346
GINI does not Granger Cause LOG(LPROD)		2.04917	0.1327
UNEMPL does not Granger Cause GINI	144	4.89712	0.0088
GINI does not Granger Cause UNEMPL		7.77522	0.0006

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 3. Gini pairwise Granger causality test, lag 3

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:10
Sample: 2004 2017
Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	132	1.37280	0.2542
GINI does not Granger Cause EXP01		1.58507	0.1963
FCE does not Granger Cause GINI	132	0.66634	0.5743
GINI does not Granger Cause FCE		0.77999	0.5073
LOG(FDI+140000000000) does not Granger Cause GINI	132	0.77590	0.5096
GINI does not Granger Cause LOG(FDI+140000000000)		0.12376	0.9459
GGCE does not Granger Cause GINI	132	1.56667	0.2008
GINI does not Granger Cause GGCE		0.97133	0.4086
GLOB does not Granger Cause GINI	132	0.87028	0.4585
GINI does not Granger Cause GLOB		0.19007	0.9030
LOG(GPG) does not Granger Cause GINI	132	3.35635	0.0211
GINI does not Granger Cause LOG(GPG)		0.16148	0.9221
IMP does not Granger Cause GINI	132	0.43068	0.7314
GINI does not Granger Cause IMP		0.73690	0.5319
INFLATION does not Granger Cause GINI	132	2.56878	0.0574
GINI does not Granger Cause INFLATION		0.16796	0.9178
LOG(LPROD) does not Granger Cause GINI	132	2.84999	0.0401
GINI does not Granger Cause LOG(LPROD)		2.56854	0.0574
UNEMPL does not Granger Cause GINI	132	3.56053	0.0163
GINI does not Granger Cause UNEMPL		3.98883	0.0094

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 4. Gini pairwise Granger causality test, lag 4

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:10
Sample: 2004 2017
Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	120	0.75727	0.5553
GINI does not Granger Cause EXP01		2.44355	0.0508
FCE does not Granger Cause GINI	120	0.29547	0.8804
GINI does not Granger Cause FCE		2.44308	0.0508
LOG(FDI+140000000000) does not Granger Cause GINI	120	0.58029	0.6775
GINI does not Granger Cause LOG(FDI+140000000000)		1.14354	0.3399
GGCE does not Granger Cause GINI	120	3.02179	0.0208
GINI does not Granger Cause GGCE		1.09546	0.3624
GLOB does not Granger Cause GINI	120	0.81142	0.5205
GINI does not Granger Cause GLOB		0.52700	0.7161
LOG(GPG) does not Granger Cause GINI	120	2.03465	0.0944
GINI does not Granger Cause LOG(GPG)		0.14645	0.9642
IMP does not Granger Cause GINI	120	0.95795	0.4336
GINI does not Granger Cause IMP		0.99588	0.4130
INFLATION does not Granger Cause GINI	120	1.52026	0.2012
GINI does not Granger Cause INFLATION		1.34947	0.2562
LOG(LPROD) does not Granger Cause GINI	120	1.58204	0.1841
GINI does not Granger Cause LOG(LPROD)		1.82420	0.1292
UNEMPL does not Granger Cause GINI	120	2.15590	0.0786
GINI does not Granger Cause UNEMPL		4.76892	0.0014

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 5. Gini pairwise Granger causality test, lag 5

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:10
Sample: 2004 2017
Lags: 5

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	108	1.16419	0.3324
GINI does not Granger Cause EXP01		1.82638	0.1148
FCE does not Granger Cause GINI	108	0.64766	0.6639
GINI does not Granger Cause FCE		2.05626	0.0775
LOG(FDI+140000000000) does not Granger Cause GINI	108	0.61535	0.6884
GINI does not Granger Cause LOG(FDI+140000000000)		0.20919	0.9579
GGCE does not Granger Cause GINI	108	2.35133	0.0464
GINI does not Granger Cause GGCE		1.40520	0.2292
GLOB does not Granger Cause GINI	108	1.54905	0.1819
GINI does not Granger Cause GLOB		0.45762	0.8068
LOG(GPG) does not Granger Cause GINI	108	2.43665	0.0399
GINI does not Granger Cause LOG(GPG)		0.18860	0.9663
IMP does not Granger Cause GINI	108	1.92183	0.0976
GINI does not Granger Cause IMP		0.01528	0.9999
INFLATION does not Granger Cause GINI	108	1.49952	0.1971
GINI does not Granger Cause INFLATION		1.75552	0.1293
LOG(LPROD) does not Granger Cause GINI	108	1.47726	0.2043
GINI does not Granger Cause LOG(LPROD)		1.60038	0.1672
UNEMPL does not Granger Cause GINI	108	2.61054	0.0293
GINI does not Granger Cause UNEMPL		2.44490	0.0393

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 6. Gini pairwise Granger causality test, lag 6

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:11
Sample: 2004 2017
Lags: 6

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	96	1.73063	0.1240
GINI does not Granger Cause EXP01		0.95403	0.4615
FCE does not Granger Cause GINI	96	1.23982	0.2946
GINI does not Granger Cause FCE		2.75256	0.0173
LOG(FDI+140000000000) does not Granger Cause GINI	96	0.18765	0.9795
GINI does not Granger Cause LOG(FDI+140000000000)		0.33284	0.9178
GGCE does not Granger Cause GINI	96	2.68189	0.0198
GINI does not Granger Cause GGCE		2.25944	0.0454
GLOB does not Granger Cause GINI	96	2.10866	0.0608
GINI does not Granger Cause GLOB		0.54077	0.7758
LOG(GPG) does not Granger Cause GINI	96	1.68419	0.1351
GINI does not Granger Cause LOG(GPG)		0.59246	0.7355
IMP does not Granger Cause GINI	96	2.22591	0.0485
GINI does not Granger Cause IMP		0.46257	0.8341
INFLATION does not Granger Cause GINI	96	2.03401	0.0701
GINI does not Granger Cause INFLATION		0.72547	0.6303
LOG(LPROD) does not Granger Cause GINI	96	1.15728	0.3372
GINI does not Granger Cause LOG(LPROD)		0.68046	0.6658
UNEMPL does not Granger Cause GINI	96	2.68679	0.0196
GINI does not Granger Cause UNEMPL		0.32867	0.9201

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 7. Gini pairwise Granger causality test, lag 7

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:11
Sample: 2004 2017
Lags: 7

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	84	2.26886	0.0387
GINI does not Granger Cause EXP01		1.16415	0.3347
FCE does not Granger Cause GINI	84	2.43634	0.0272
GINI does not Granger Cause FCE		1.45958	0.1963
LOG(FDI+140000000000) does not Granger Cause GINI	84	0.15229	0.9931
GINI does not Granger Cause LOG(FDI+140000000000)		0.04763	0.9998
GGCE does not Granger Cause GINI	84	1.57300	0.1581
GINI does not Granger Cause GGCE		1.43283	0.2064
GLOB does not Granger Cause GINI	84	2.07313	0.0581
GINI does not Granger Cause GLOB		0.88706	0.5215
LOG(GPG) does not Granger Cause GINI	84	1.90959	0.0811
GINI does not Granger Cause LOG(GPG)		0.97698	0.4551
IMP does not Granger Cause GINI	84	2.27659	0.0381
GINI does not Granger Cause IMP		0.27723	0.9608
INFLATION does not Granger Cause GINI	84	1.59268	0.1522
GINI does not Granger Cause INFLATION		0.92686	0.4915
LOG(LPROD) does not Granger Cause GINI	84	1.94896	0.0749
GINI does not Granger Cause LOG(LPROD)		0.76403	0.6192
UNEMPL does not Granger Cause GINI	84	1.99613	0.0680
GINI does not Granger Cause UNEMPL		0.90781	0.5057

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 8. Gini pairwise Granger causality test, lag 8

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:12
Sample: 2004 2017
Lags: 8

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	72	1.36715	0.2315
GINI does not Granger Cause EXP01		1.74924	0.1076
FCE does not Granger Cause GINI	72	1.92050	0.0752
GINI does not Granger Cause FCE		3.25471	0.0042
LOG(FDI+140000000000) does not Granger Cause GINI	72	0.19605	0.9903
GINI does not Granger Cause LOG(FDI+140000000000)		0.19376	0.9907
GGCE does not Granger Cause GINI	72	1.14770	0.3472
GINI does not Granger Cause GGCE		1.91750	0.0757
GLOB does not Granger Cause GINI	72	1.43872	0.2015
GINI does not Granger Cause GLOB		1.60570	0.1445
LOG(GPG) does not Granger Cause GINI	72	1.85419	0.0864
GINI does not Granger Cause LOG(GPG)		0.83736	0.5740
IMP does not Granger Cause GINI	72	1.70585	0.1177
GINI does not Granger Cause IMP		0.83464	0.5762
INFLATION does not Granger Cause GINI	72	1.01591	0.4351
GINI does not Granger Cause INFLATION		1.12658	0.3604
LOG(LPROD) does not Granger Cause GINI	72	0.88307	0.5366
GINI does not Granger Cause LOG(LPROD)		0.60569	0.7691
UNEMPL does not Granger Cause GINI	72	1.45438	0.1954
GINI does not Granger Cause UNEMPL		0.67170	0.7140

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 9. Gini pairwise Granger causality test, lag 9

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:12
Sample: 2004 2017
Lags: 9

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	60	1.17722	0.3348
GINI does not Granger Cause EXP01		0.74840	0.6630
FCE does not Granger Cause GINI	60	1.55617	0.1612
GINI does not Granger Cause FCE		1.66729	0.1286
LOG(FDI+140000000000) does not Granger Cause GINI	60	0.38991	0.9331
GINI does not Granger Cause LOG(FDI+140000000000)		0.35177	0.9511
GGCE does not Granger Cause GINI	60	2.08208	0.0539
GINI does not Granger Cause GGCE		1.69698	0.1210
GLOB does not Granger Cause GINI	60	1.48245	0.1869
GINI does not Granger Cause GLOB		1.47451	0.1899
LOG(GPG) does not Granger Cause GINI	60	2.64774	0.0162
GINI does not Granger Cause LOG(GPG)		0.88212	0.5488
IMP does not Granger Cause GINI	60	2.43393	0.0255
GINI does not Granger Cause IMP		2.23770	0.0387
INFLATION does not Granger Cause GINI	60	1.82779	0.0922
GINI does not Granger Cause INFLATION		0.58205	0.8039
LOG(LPROD) does not Granger Cause GINI	60	0.79191	0.6253
GINI does not Granger Cause LOG(LPROD)		0.73878	0.6714
UNEMPL does not Granger Cause GINI	60	2.54720	0.0200
GINI does not Granger Cause UNEMPL		0.40101	0.9273

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 10. Gini pairwise Granger causality test, lag 10

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:12
Sample: 2004 2017
Lags: 10

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	48	0.82034	0.6126
GINI does not Granger Cause EXP01		1.07835	0.4115
FCE does not Granger Cause GINI	48	1.09743	0.3986
GINI does not Granger Cause FCE		1.54494	0.1776
LOG(FDI+140000000000) does not Granger Cause GINI	48	0.35021	0.9575
GINI does not Granger Cause LOG(FDI+140000000000)		0.47392	0.8923
GGCE does not Granger Cause GINI	48	1.76158	0.1175
GINI does not Granger Cause GGCE		1.33771	0.2611
GLOB does not Granger Cause GINI	48	0.91311	0.5355
GINI does not Granger Cause GLOB		1.22589	0.3192
LOG(GPG) does not Granger Cause GINI	48	1.88686	0.0923
GINI does not Granger Cause LOG(GPG)		1.69587	0.1332
IMP does not Granger Cause GINI	48	1.95140	0.0814
GINI does not Granger Cause IMP		1.14785	0.3658
INFLATION does not Granger Cause GINI	48	3.59701	0.0039
GINI does not Granger Cause INFLATION		1.54714	0.1769
LOG(LPROD) does not Granger Cause GINI	48	1.58564	0.1644
GINI does not Granger Cause LOG(LPROD)		0.38388	0.9428
UNEMPL does not Granger Cause GINI	48	2.44573	0.0315
GINI does not Granger Cause UNEMPL		0.90596	0.5412

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 11. Gini pairwise Granger causality test, lag 11

Pairwise Granger Causality Tests
Date: 12/16/20 Time: 04:13
Sample: 2004 2017
Lags: 11

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause GINI	36	2.28002	0.0798
GINI does not Granger Cause EXP01		0.57285	0.8193
FCE does not Granger Cause GINI	36	1.43323	0.2656
GINI does not Granger Cause FCE		0.62457	0.7796
LOG(FDI+140000000000) does not Granger Cause GINI	36	0.46817	0.8924
GINI does not Granger Cause LOG(FDI+140000000000)		0.41566	0.9235
GGCE does not Granger Cause GINI	36	2.43468	0.0649
GINI does not Granger Cause GGCE		0.83418	0.6138
GLOB does not Granger Cause GINI	36	3.09973	0.0281
GINI does not Granger Cause GLOB		0.80908	0.6333
LOG(GPG) does not Granger Cause GINI	36	2.03693	0.1115
GINI does not Granger Cause LOG(GPG)		1.69000	0.1828
IMP does not Granger Cause GINI	36	4.50432	0.0062
GINI does not Granger Cause IMP		0.74100	0.6870
INFLATION does not Granger Cause GINI	36	2.44060	0.0644
GINI does not Granger Cause INFLATION		3.20583	0.0248
LOG(LPROD) does not Granger Cause GINI	36	1.41733	0.2719
GINI does not Granger Cause LOG(LPROD)		0.81770	0.6265
UNEMPL does not Granger Cause GINI	36	1.42090	0.2704
GINI does not Granger Cause UNEMPL		0.87086	0.5859

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 12. Watts pairwise Granger causality test, lag 1

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:13
Sample: 2004 2017
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	156	1.29505	0.2569
WATTS does not Granger Cause EXP01		0.23017	0.6321
FCE does not Granger Cause WATTS	156	0.63350	0.4273
WATTS does not Granger Cause FCE		1.79758	0.1820
LOG(FDI+140000000000) does not Granger Cause WATTS	156	0.02246	0.8811
WATTS does not Granger Cause LOG(FDI+140000000000)		0.01823	0.8928
GGCE does not Granger Cause WATTS	156	0.05154	0.8207
WATTS does not Granger Cause GGCE		0.07574	0.7835
GLOB does not Granger Cause WATTS	156	1.30821	0.2545
WATTS does not Granger Cause GLOB		1.28525	0.2587
LOG(GPG) does not Granger Cause WATTS	156	0.10539	0.7459
WATTS does not Granger Cause LOG(GPG)		0.00447	0.9468
IMP does not Granger Cause WATTS	156	0.66837	0.4149
WATTS does not Granger Cause IMP		2.43829	0.1205
INFLATION does not Granger Cause WATTS	156	1.12792	0.2899
WATTS does not Granger Cause INFLATION		0.96065	0.3286
LOG(LPROD) does not Granger Cause WATTS	156	0.14710	0.7019
WATTS does not Granger Cause LOG(LPROD)		9.45005	0.0025
UNEMPL does not Granger Cause WATTS	156	4.63344	0.0329
WATTS does not Granger Cause UNEMPL		7.61139	0.0065

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 13. Watts pairwise Granger causality test, lag 2

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:15
Sample: 2004 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	144	0.42633	0.6538
WATTS does not Granger Cause EXP01		0.54937	0.5786
FCE does not Granger Cause WATTS	144	0.23828	0.7883
WATTS does not Granger Cause FCE		0.75388	0.4725
LOG(FDI+140000000000) does not Granger Cause WATTS	144	0.02026	0.9799
WATTS does not Granger Cause LOG(FDI+140000000000)		0.01709	0.9831
GGCE does not Granger Cause WATTS	144	0.91135	0.4044
WATTS does not Granger Cause GGCE		3.05179	0.0505
GLOB does not Granger Cause WATTS	144	0.58079	0.5608
WATTS does not Granger Cause GLOB		1.71196	0.1843
LOG(GPG) does not Granger Cause WATTS	144	0.44881	0.6393
WATTS does not Granger Cause LOG(GPG)		0.32074	0.7262
IMP does not Granger Cause WATTS	144	2.98359	0.0539
WATTS does not Granger Cause IMP		2.21407	0.1131
INFLATION does not Granger Cause WATTS	144	2.54784	0.0819
WATTS does not Granger Cause INFLATION		4.03232	0.0198
LOG(LPROD) does not Granger Cause WATTS	144	0.65539	0.5208
WATTS does not Granger Cause LOG(LPROD)		7.67184	0.0007
UNEMPL does not Granger Cause WATTS	144	6.41279	0.0022
WATTS does not Granger Cause UNEMPL		8.76658	0.0003

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 14. Watts pairwise Granger causality test, lag 3

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:15
Sample: 2004 2017
Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	132	0.81617	0.4872
WATTS does not Granger Cause EXP01		0.91993	0.4334
FCE does not Granger Cause WATTS	132	3.82675	0.0116
WATTS does not Granger Cause FCE		0.23805	0.8697
LOG(FDI+140000000000) does not Granger Cause WATTS	132	0.02571	0.9944
WATTS does not Granger Cause LOG(FDI+140000000000)		0.03819	0.9900
GGCE does not Granger Cause WATTS	132	4.93617	0.0028
WATTS does not Granger Cause GGCE		1.11482	0.3458
GLOB does not Granger Cause WATTS	132	0.71925	0.5423
WATTS does not Granger Cause GLOB		1.13531	0.3375
LOG(GPG) does not Granger Cause WATTS	132	0.54122	0.6549
WATTS does not Granger Cause LOG(GPG)		0.65692	0.5801
IMP does not Granger Cause WATTS	132	1.58071	0.1974
WATTS does not Granger Cause IMP		1.52563	0.2111
INFLATION does not Granger Cause WATTS	132	0.84633	0.4710
WATTS does not Granger Cause INFLATION		1.06564	0.3663
LOG(LPROD) does not Granger Cause WATTS	132	0.48718	0.6918
WATTS does not Granger Cause LOG(LPROD)		4.93694	0.0028
UNEMPL does not Granger Cause WATTS	132	3.91245	0.0104
WATTS does not Granger Cause UNEMPL		5.67708	0.0011

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 15. Watts pairwise Granger causality test, lag 4

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:15
Sample: 2004 2017
Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	120	0.44487	0.7759
WATTS does not Granger Cause EXP01		1.58630	0.1829
FCE does not Granger Cause WATTS	120	2.57162	0.0417
WATTS does not Granger Cause FCE		0.13267	0.9701
LOG(FDI+140000000000) does not Granger Cause WATTS	120	0.03165	0.9980
WATTS does not Granger Cause LOG(FDI+140000000000)		0.35043	0.8433
GGCE does not Granger Cause WATTS	120	6.16723	0.0002
WATTS does not Granger Cause GGCE		3.19951	0.0158
GLOB does not Granger Cause WATTS	120	0.97493	0.4243
WATTS does not Granger Cause GLOB		1.63978	0.1693
LOG(GPG) does not Granger Cause WATTS	120	0.33959	0.8507
WATTS does not Granger Cause LOG(GPG)		0.50334	0.7333
IMP does not Granger Cause WATTS	120	2.45546	0.0498
WATTS does not Granger Cause IMP		1.38897	0.2424
INFLATION does not Granger Cause WATTS	120	1.14640	0.3386
WATTS does not Granger Cause INFLATION		2.25964	0.0672
LOG(LPROD) does not Granger Cause WATTS	120	1.21629	0.3080
WATTS does not Granger Cause LOG(LPROD)		5.33116	0.0006
UNEMPL does not Granger Cause WATTS	120	2.80165	0.0293
WATTS does not Granger Cause UNEMPL		4.85357	0.0012

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 16. Watts pairwise Granger causality test, lag 5

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:16
Sample: 2004 2017
Lags: 5

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	108	0.71025	0.6172
WATTS does not Granger Cause EXP01		1.76323	0.1276
FCE does not Granger Cause WATTS	108	6.63323	2.E-05
WATTS does not Granger Cause FCE		1.33972	0.2541
LOG(FDI+140000000000) does not Granger Cause WATTS	108	0.02743	0.9996
WATTS does not Granger Cause LOG(FDI+140000000000)		0.11737	0.9883
GGCE does not Granger Cause WATTS	108	5.97313	7.E-05
WATTS does not Granger Cause GGCE		3.54942	0.0054
GLOB does not Granger Cause WATTS	108	0.50844	0.7693
WATTS does not Granger Cause GLOB		1.68287	0.1459
LOG(GPG) does not Granger Cause WATTS	108	0.30812	0.9070
WATTS does not Granger Cause LOG(GPG)		0.61453	0.6890
IMP does not Granger Cause WATTS	108	1.84347	0.1115
WATTS does not Granger Cause IMP		1.12465	0.3525
INFLATION does not Granger Cause WATTS	108	0.36040	0.8744
WATTS does not Granger Cause INFLATION		2.18636	0.0619
LOG(LPROD) does not Granger Cause WATTS	108	1.54413	0.1833
WATTS does not Granger Cause LOG(LPROD)		3.15260	0.0111
UNEMPL does not Granger Cause WATTS	108	2.05935	0.0771
WATTS does not Granger Cause UNEMPL		3.76202	0.0037

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 17. Watts pairwise Granger causality test, lag 6

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:16
Sample: 2004 2017
Lags: 6

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	96	0.48796	0.8156
WATTS does not Granger Cause EXP01		1.08339	0.3792
FCE does not Granger Cause WATTS	96	10.3379	2.E-08
WATTS does not Granger Cause FCE		2.13440	0.0578
LOG(FDI+140000000000) does not Granger Cause WATTS	96	0.04294	0.9997
WATTS does not Granger Cause LOG(FDI+140000000000)		0.15163	0.9882
GGCE does not Granger Cause WATTS	96	5.22154	0.0001
WATTS does not Granger Cause GGCE		3.00859	0.0104
GLOB does not Granger Cause WATTS	96	0.34752	0.9095
WATTS does not Granger Cause GLOB		0.75086	0.6105
LOG(GPG) does not Granger Cause WATTS	96	0.48770	0.8158
WATTS does not Granger Cause LOG(GPG)		1.09070	0.3748
IMP does not Granger Cause WATTS	96	1.84711	0.0999
WATTS does not Granger Cause IMP		0.42936	0.8574
INFLATION does not Granger Cause WATTS	96	0.20755	0.9735
WATTS does not Granger Cause INFLATION		0.89010	0.5061
LOG(LPROD) does not Granger Cause WATTS	96	0.58973	0.7376
WATTS does not Granger Cause LOG(LPROD)		1.40868	0.2211
UNEMPL does not Granger Cause WATTS	96	1.16359	0.3337
WATTS does not Granger Cause UNEMPL		2.65137	0.0211

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 18. Watts pairwise Granger causality test, lag 7

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:16
Sample: 2004 2017
Lags: 7

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	84	0.28139	0.9592
WATTS does not Granger Cause EXP01		2.03577	0.0627
FCE does not Granger Cause WATTS	84	7.25665	2.E-06
WATTS does not Granger Cause FCE		4.10669	0.0008
LOG(FDI+140000000000) does not Granger Cause WATTS	84	0.13817	0.9949
WATTS does not Granger Cause LOG(FDI+140000000000)		0.09830	0.9983
GGCE does not Granger Cause WATTS	84	6.11540	1.E-05
WATTS does not Granger Cause GGCE		1.53455	0.1703
GLOB does not Granger Cause WATTS	84	0.16167	0.9918
WATTS does not Granger Cause GLOB		0.37263	0.9152
LOG(GPG) does not Granger Cause WATTS	84	0.40054	0.8988
WATTS does not Granger Cause LOG(GPG)		0.60842	0.7470
IMP does not Granger Cause WATTS	84	0.43322	0.8781
WATTS does not Granger Cause IMP		0.46434	0.8570
INFLATION does not Granger Cause WATTS	84	1.21669	0.3056
WATTS does not Granger Cause INFLATION		1.36956	0.2322
LOG(LPROD) does not Granger Cause WATTS	84	0.66479	0.7009
WATTS does not Granger Cause LOG(LPROD)		1.16036	0.3369
UNEMPL does not Granger Cause WATTS	84	0.93439	0.4859
WATTS does not Granger Cause UNEMPL		3.03499	0.0077

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 19. Watts pairwise Granger causality test, lag 8

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:17
Sample: 2004 2017
Lags: 8

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	72	2.15903	0.0452
WATTS does not Granger Cause EXP01		1.37014	0.2301
FCE does not Granger Cause WATTS	72	2.20752	0.0407
WATTS does not Granger Cause FCE		5.95394	2.E-05
LOG(FDI+140000000000) does not Granger Cause WATTS	72	0.31318	0.9578
WATTS does not Granger Cause LOG(FDI+140000000000)		0.02889	1.0000
GGCE does not Granger Cause WATTS	72	1.63389	0.1364
WATTS does not Granger Cause GGCE		2.02073	0.0608
GLOB does not Granger Cause WATTS	72	1.35012	0.2391
WATTS does not Granger Cause GLOB		0.57247	0.7959
LOG(GPG) does not Granger Cause WATTS	72	1.44501	0.1990
WATTS does not Granger Cause LOG(GPG)		0.74359	0.6529
IMP does not Granger Cause WATTS	72	1.14233	0.3506
WATTS does not Granger Cause IMP		0.53826	0.8226
INFLATION does not Granger Cause WATTS	72	1.78484	0.0999
WATTS does not Granger Cause INFLATION		1.28027	0.2728
LOG(LPROD) does not Granger Cause WATTS	72	0.75654	0.6419
WATTS does not Granger Cause LOG(LPROD)		1.43274	0.2039
UNEMPL does not Granger Cause WATTS	72	5.70643	3.E-05
WATTS does not Granger Cause UNEMPL		1.77936	0.1011

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 20. Watts pairwise Granger causality test, lag 9

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:17
Sample: 2004 2017
Lags: 9

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	60	0.75447	0.6578
WATTS does not Granger Cause EXP01		0.85439	0.5720
FCE does not Granger Cause WATTS	60	4.54579	0.0003
WATTS does not Granger Cause FCE		1.40432	0.2180
LOG(FDI+140000000000) does not Granger Cause WATTS	60	0.53658	0.8392
WATTS does not Granger Cause LOG(FDI+140000000000)		0.42979	0.9112
GGCE does not Granger Cause WATTS	60	1.32696	0.2532
WATTS does not Granger Cause GGCE		2.70701	0.0143
GLOB does not Granger Cause WATTS	60	0.66292	0.7369
WATTS does not Granger Cause GLOB		1.13890	0.3587
LOG(GPG) does not Granger Cause WATTS	60	1.27780	0.2780
WATTS does not Granger Cause LOG(GPG)		0.86430	0.5637
IMP does not Granger Cause WATTS	60	1.78961	0.0998
WATTS does not Granger Cause IMP		1.61043	0.1444
INFLATION does not Granger Cause WATTS	60	2.24598	0.0381
WATTS does not Granger Cause INFLATION		1.57424	0.1554
LOG(LPROD) does not Granger Cause WATTS	60	0.77404	0.6408
WATTS does not Granger Cause LOG(LPROD)		1.45314	0.1981
UNEMPL does not Granger Cause WATTS	60	4.56745	0.0003
WATTS does not Granger Cause UNEMPL		1.15712	0.3472

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 21. Watts pairwise Granger causality test, lag 10

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:17
Sample: 2004 2017
Lags: 10

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	48	1.83060	0.1028
WATTS does not Granger Cause EXP01		1.38089	0.2412
FCE does not Granger Cause WATTS	48	3.38053	0.0056
WATTS does not Granger Cause FCE		1.90910	0.0884
LOG(FDI+140000000000) does not Granger Cause WATTS	48	1.25230	0.3046
WATTS does not Granger Cause LOG(FDI+140000000000)		0.48919	0.8822
GGCE does not Granger Cause WATTS	48	1.79931	0.1092
WATTS does not Granger Cause GGCE		0.95074	0.5055
GLOB does not Granger Cause WATTS	48	1.75310	0.1194
WATTS does not Granger Cause GLOB		1.16418	0.3556
LOG(GPG) does not Granger Cause WATTS	48	0.78518	0.6427
WATTS does not Granger Cause LOG(GPG)		0.84572	0.5911
IMP does not Granger Cause WATTS	48	1.88190	0.0931
WATTS does not Granger Cause IMP		0.79837	0.6313
INFLATION does not Granger Cause WATTS	48	0.84503	0.5917
WATTS does not Granger Cause INFLATION		1.36611	0.2479
LOG(LPROD) does not Granger Cause WATTS	48	0.47175	0.8937
WATTS does not Granger Cause LOG(LPROD)		0.69729	0.7184
UNEMPL does not Granger Cause WATTS	48	1.86388	0.0964
WATTS does not Granger Cause UNEMPL		0.38163	0.9439

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 22. Watts pairwise Granger causality test, lag 11

Pairwise Granger Causality Tests
Date: 12/19/20 Time: 20:17
Sample: 2004 2017
Lags: 11

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP01 does not Granger Cause WATTS	36	1.18850	0.3788
WATTS does not Granger Cause EXP01		1.36646	0.2928
FCE does not Granger Cause WATTS	36	1.80874	0.1541
WATTS does not Granger Cause FCE		1.10415	0.4270
LOG(FDI+140000000000) does not Granger Cause WATTS	36	2.06254	0.1076
WATTS does not Granger Cause LOG(FDI+140000000000)		0.64828	0.7610
GGCE does not Granger Cause WATTS	36	2.00130	0.1173
WATTS does not Granger Cause GGCE		0.70153	0.7186
GLOB does not Granger Cause WATTS	36	1.38337	0.2857
WATTS does not Granger Cause GLOB		0.96257	0.5192
LOG(GPG) does not Granger Cause WATTS	36	1.70794	0.1781
WATTS does not Granger Cause LOG(GPG)		0.96771	0.5156
IMP does not Granger Cause WATTS	36	1.15613	0.3967
WATTS does not Granger Cause IMP		0.34824	0.9559
INFLATION does not Granger Cause WATTS	36	1.24023	0.3516
WATTS does not Granger Cause INFLATION		4.40845	0.0068
LOG(LPROD) does not Granger Cause WATTS	36	0.97537	0.5103
WATTS does not Granger Cause LOG(LPROD)		0.41536	0.9236
UNEMPL does not Granger Cause WATTS	36	1.42452	0.2690
WATTS does not Granger Cause UNEMPL		0.74903	0.6806

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 23. Panel Least squares method with dependent Gini and dummy variable SU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXP01(-2))	0.437805	0.227691	1.922800	0.0689
D(EXP01(-4))	0.495818	0.165154	3.002162	0.0070
D(EXP01(-5))	-0.062092	0.028004	-2.217240	0.0384
D(FCE)	0.167275	0.048550	3.445442	0.0026
D(FCE(-1))	-0.178161	0.055615	-3.203466	0.0045
D(FCE(-2))	-0.255177	0.058005	-4.399211	0.0003
D(FCE(-4))	-0.065777	0.041619	-1.580476	0.1297
D(FCE(-6))	-0.125043	0.041372	-3.022436	0.0067
D(GGCE(-4))	0.370238	0.107348	3.448949	0.0025
D(GGCE(-6))	0.257417	0.092164	2.793047	0.0112
D(GLOB(-1))	-0.092862	0.047224	-1.966410	0.0633
D(GLOB(-2))	-0.563889	0.231482	-2.435998	0.0243
D(GLOB(-4))	-0.552030	0.175387	-3.147498	0.0051
DLOG(GPG)	3.189450	1.168176	2.730282	0.0129
DLOG(GPG(-1))	3.961326	1.462298	2.708974	0.0135
DLOG(GPG(-4))	-1.877654	1.012070	-1.855262	0.0784
DLOG(GPG(-5))	-2.848841	1.134176	-2.511817	0.0207
D(IMP(-1))	0.273893	0.090319	3.032522	0.0066
D(IMP(-2))	0.696469	0.227364	3.063231	0.0061
D(IMP(-4))	0.561274	0.174846	3.210105	0.0044
D(INFLATION)	0.104419	0.019106	5.465121	0.0000
D(INFLATION(-3))	-0.129746	0.021654	-5.991816	0.0000
D(INFLATION(-5))	-0.056492	0.020762	-2.720984	0.0132
D(UNEMPL(-3))	-0.306543	0.078177	-3.921130	0.0008
D(UNEMPL(-4))	0.072930	0.076851	0.948977	0.3540
D(UNEMPL(-6))	0.136924	0.060206	2.274240	0.0341
DLOG(LPROD(-2))	-9.170176	4.061091	-2.258057	0.0353
DLOG(LPROD(-3))	-4.995075	5.424675	-0.920806	0.3681
SU	0.210934	0.167598	1.258572	0.2227

Root MSE	0.384441	R-squared	0.885157
Mean dependent var	-0.020408	Adjusted R-squared	0.724377
S.D. dependent var	1.146186	S.E. of regression	0.601746
Akaike info criterion	2.109622	Sum squared resid	7.241960
Schwarz criterion	3.229271	Log likelihood	-22.68574
Hannan-Quinn criter.	2.534415	Durbin-Watson stat	1.741664

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 24. Panel Least squares method with dependent Gini and dummy variable EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXP01(-2))	0.558530	0.592846	0.942116	0.3545
D(EXP01(-4))	0.771925	0.435570	1.772218	0.0876
D(EXP01(-5))	-0.077422	0.035013	-2.211208	0.0357
D(FCE)	0.201091	0.128759	1.561760	0.1300
D(FCE(-1))	-0.112237	0.132335	-0.848131	0.4038
D(FCE(-2))	-0.311752	0.119331	-2.612499	0.0145
D(FCE(-4))	-0.215465	0.101151	-2.130128	0.0424
D(FCE(-6))	-0.004340	0.095095	-0.045643	0.9639
D(GGCE(-4))	0.371316	0.230956	1.607737	0.1195
D(GGCE(-6))	0.077935	0.199010	0.391612	0.6984
D(GLOB(-1))	-0.070926	0.075296	-0.941965	0.3546
D(GLOB(-2))	-0.772779	0.579553	-1.333406	0.1935
D(GLOB(-4))	-0.762808	0.423381	-1.801708	0.0828
DLOG(GPG)	3.012279	1.716475	1.754922	0.0906
DLOG(GPG(-1))	5.014816	1.591942	3.150125	0.0040
DLOG(GPG(-4))	-0.922646	0.914734	-1.008649	0.3221
DLOG(GPG(-5))	-1.208800	0.810855	-1.490773	0.1476
D(IMP(-1))	0.201331	0.143845	1.399640	0.1730
D(IMP(-2))	0.933723	0.569601	1.639257	0.1128
D(IMP(-4))	0.688677	0.414004	1.663456	0.1078
D(INFLATION)	0.145139	0.138021	1.051575	0.3023
D(INFLATION(-3))	-0.090347	0.049071	-1.841140	0.0766
D(INFLATION(-5))	-0.072825	0.041824	-1.741252	0.0930
D(UNEMPL(-3))	-0.144847	0.120386	-1.203184	0.2393
D(UNEMPL(-4))	0.026407	0.121934	0.216565	0.8302
D(UNEMPL(-6))	0.146603	0.100128	1.464158	0.1547
DLOG(LPROD(-2))	-5.476099	6.954107	-0.787463	0.4379
DLOG(LPROD(-3))	-5.696909	6.757203	-0.843087	0.4066
EU	0.296800	0.194163	1.528610	0.1380

Root MSE	0.425504	R-squared	0.741893
Mean dependent var	0.032143	Adjusted R-squared	0.474226
S.D. dependent var	0.845116	S.E. of regression	0.612796
Akaike info criterion	2.164629	Sum squared resid	10.13900
Schwarz criterion	3.213472	Log likelihood	-31.60962
Hannan-Quinn criter.	2.571263	Durbin-Watson stat	2.213849

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 25. Panel Least squares method with dependent Gini and dummy variable CIS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXP01)	-0.030537	0.077371	-0.394686	0.7093
D(EXP01(-2))	0.999874	0.747929	1.336857	0.2389
D(EXP01(-3))	-0.423636	0.594256	-0.712884	0.5078
D(FCE(-2))	-0.071421	0.085117	-0.839090	0.4397
D(FCE(-6))	-0.080717	0.045068	-1.790993	0.1333
D(GGCE(-4))	0.465724	0.234009	1.990197	0.1032
D(GLOB(-2))	-0.981568	0.748193	-1.311919	0.2465
D(GLOB(-3))	0.417472	0.563945	0.740271	0.4924
D(GLOB(-4))	-0.085334	0.039063	-2.184510	0.0807
DLOG(GPG)	-0.796101	3.005632	-0.264870	0.8017
DLOG(GPG(-1))	0.636536	2.001163	0.318083	0.7633
D(IMP(-2))	1.049694	0.745957	1.407177	0.2184
D(IMP(-3))	-0.390920	0.564763	-0.692184	0.5196
D(INFLATION)	0.093473	0.028045	3.332950	0.0207
D(INFLATION(-3))	-0.121254	0.038742	-3.129779	0.0260
D(INFLATION(-5))	-0.045233	0.024972	-1.811304	0.1299
D(UNEMPL(-3))	-0.287812	0.348329	-0.826265	0.4463
D(UNEMPL(-4))	0.242629	0.418754	0.579407	0.5874
D(UNEMPL(-6))	0.185711	0.237790	0.780989	0.4702
DLOG(LPROD(-2))	-9.827907	7.226171	-1.360044	0.2319
DLOG(LPROD(-3))	-17.35622	6.268185	-2.768939	0.0394
DLOG(LPROD(-4))	17.65258	6.150463	2.870122	0.0350
CIS	-0.089203	0.484723	-0.184028	0.8612

Root MSE	0.238065	R-squared	0.948412
Mean dependent var	-0.132143	Adjusted R-squared	0.721425
S.D. dependent var	1.067379	S.E. of regression	0.563365
Akaike info criterion	1.610312	Sum squared resid	1.586899
Schwarz criterion	2.704623	Log likelihood	0.455636
Hannan-Quinn criter.	1.944853	Durbin-Watson stat	2.781963

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 26. Panel Least squares method with dependent Watts and dummy variable SU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.111307	0.030359	3.666420	0.0005
D(EXP01)	0.088742	0.019350	4.586067	0.0000
D(EXP01(-1))	0.061467	0.011958	5.140388	0.0000
D(EXP01(-4))	-0.062092	0.012318	-5.040742	0.0000
D(FCE)	0.138930	0.014623	9.500630	0.0000
D(FCE(-2))	0.053272	0.006738	7.906147	0.0000
D(FCE(-4))	-0.017370	0.008002	-2.170644	0.0341
D(FCE(-6))	-0.046133	0.007174	-6.430962	0.0000
D(GGCE)	-0.184575	0.033401	-5.525973	0.0000
D(GGCE(-5))	-0.081979	0.020491	-4.000632	0.0002
D(GLOB)	-0.040606	0.010034	-4.046659	0.0002
D(GLOB(-1))	-0.032897	0.007148	-4.602199	0.0000
D(GLOB(-4))	0.032751	0.006296	5.201664	0.0000
D(GLOB(-5))	-0.020166	0.006100	-3.305682	0.0016
DLOG(GPG(-1))	0.830406	0.262262	3.166324	0.0025
DLOG(GPG(-2))	0.492016	0.153040	3.214954	0.0021
DLOG(GPG(-3))	0.549876	0.138677	3.965142	0.0002
D(IMP(-5))	0.026029	0.009363	2.779938	0.0073
D(INFLATION(-2))	0.022476	0.003640	6.174378	0.0000
D(INFLATION(-4))	0.008973	0.003974	2.258050	0.0277
D(INFLATION(-6))	0.015942	0.003729	4.275482	0.0001
D(UNEMPL)	-0.100262	0.023794	-4.213673	0.0001
D(UNEMPL(-2))	-0.051978	0.015230	-3.412917	0.0012
D(UNEMPL(-3))	0.053981	0.011623	4.644469	0.0000
DLOG(LPROD(-6))	-3.486897	0.605848	-5.755403	0.0000
SU	-0.050811	0.040466	-1.255651	0.2143

Root MSE	0.124617	R-squared	0.860605
Mean dependent var	-0.069881	Adjusted R-squared	0.800520
S.D. dependent var	0.335780	S.E. of regression	0.149970
Akaike info criterion	-0.708090	Sum squared resid	1.304476
Schwarz criterion	0.044305	Log likelihood	55.73979
Hannan-Quinn criter.	-0.405634	F-statistic	14.32330
Durbin-Watson stat	2.070105	Prob(F-statistic)	0.000000

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 27. Panel Least squares method with dependent Watts and dummy variable EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXP01)	0.015610	0.033755	0.462441	0.6470
D(EXP01(-1))	0.013583	0.034689	0.391581	0.6980
D(EXP01(-4))	-0.018928	0.029007	-0.652517	0.5189
D(FCE)	0.042912	0.043647	0.983161	0.3331
D(FCE(-2))	0.014691	0.016926	0.867944	0.3921
D(FCE(-4))	-0.023011	0.018049	-1.274908	0.2118
D(FCE(-6))	-0.019708	0.017086	-1.153481	0.2575
D(GGCE)	-0.070889	0.085561	-0.828520	0.4137
D(GGCE(-5))	-0.050135	0.031255	-1.604063	0.1188
D(GLOB)	-0.003598	0.016950	-0.212249	0.8333
D(GLOB(-1))	-0.006905	0.017963	-0.384410	0.7033
D(GLOB(-4))	0.011256	0.014031	0.802196	0.4285
D(GLOB(-5))	-0.025546	0.012031	-2.123370	0.0418
DLOG(GPG(-1))	0.600225	0.341541	1.757406	0.0887
DLOG(GPG(-2))	0.283931	0.157259	1.805498	0.0807
DLOG(GPG(-3))	0.205960	0.171505	1.200902	0.2389
D(IMP(-5))	0.040479	0.020807	1.945476	0.0608
D(INFLATION(-2))	0.032388	0.009878	3.278914	0.0026
D(INFLATION(-4))	0.010731	0.009947	1.078834	0.2890
D(INFLATION(-6))	0.010965	0.006849	1.601057	0.1195
D(UNEMPL)	-0.021560	0.033534	-0.642937	0.5250
D(UNEMPL(-2))	-0.038601	0.025718	-1.500954	0.1435
D(UNEMPL(-3))	0.022170	0.020282	1.093089	0.2828
DLOG(LPROD(-6))	-1.117846	1.089111	-1.026384	0.3127
EU	0.060285	0.041540	1.451251	0.1568

Root MSE	0.096366	R-squared	0.647212
Mean dependent var	-0.020179	Adjusted R-squared	0.374087
S.D. dependent var	0.163713	S.E. of regression	0.129521
Akaike info criterion	-0.948460	Sum squared resid	0.520044
Schwarz criterion	-0.044285	Log likelihood	51.55689
Hannan-Quinn criter.	-0.597914	Durbin-Watson stat	2.520038

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database

Annex 28. Panel Least squares method with dependent Watts and dummy variable CIS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXP01)	0.127215	0.039404	3.228439	0.0483
D(EXP01(-1))	0.031082	0.030330	1.024801	0.3809
D(EXP01(-4))	-0.161043	0.062412	-2.580343	0.0818
D(FCE)	0.175469	0.025648	6.841420	0.0064
D(FCE(-2))	0.067656	0.012087	5.597584	0.0113
D(FCE(-4))	-0.062683	0.038897	-1.611520	0.2055
D(FCE(-6))	-0.067497	0.019009	-3.550759	0.0381
D(GGCE)	-0.110146	0.072390	-1.521555	0.2255
D(GGCE(-5))	-0.013774	0.060706	-0.226900	0.8351
D(GLOB)	-0.042214	0.026536	-1.590811	0.2099
D(GLOB(-1))	-0.021563	0.016653	-1.294867	0.2860
D(GLOB(-4))	0.100332	0.048701	2.060159	0.1315
D(GLOB(-5))	-0.061828	0.052326	-1.181597	0.3225
DLOG(GPG(-1))	-0.321686	1.542600	-0.208535	0.8482
DLOG(GPG(-2))	1.075310	0.858855	1.252027	0.2993
DLOG(GPG(-3))	-1.109388	1.461631	-0.759007	0.5030
D(IMP(-5))	0.093340	0.064006	1.458297	0.2408
D(INFLATION(-2))	0.035557	0.009605	3.701843	0.0342
D(INFLATION(-4))	-0.010017	0.023346	-0.429056	0.6968
D(INFLATION(-6))	-0.012534	0.028485	-0.440009	0.6897
D(UNEMPL)	-0.095137	0.105432	-0.902352	0.4334
D(UNEMPL(-2))	0.070365	0.095183	0.739260	0.5133
D(UNEMPL(-3))	-0.121802	0.105574	-1.153721	0.3322
DLOG(LPROD(-6))	-0.542691	2.736762	-0.198297	0.8555
CIS	-0.042603	0.113161	-0.376483	0.7316

Root MSE	0.049001	R-squared	0.990999
Mean dependent var	-0.169286	Adjusted R-squared	0.918987
S.D. dependent var	0.525955	S.E. of regression	0.149702
Akaike info criterion	-1.408223	Sum squared resid	0.067232
Schwarz criterion	-0.218755	Log likelihood	44.71513
Hannan-Quinn criter.	-1.044591	Durbin-Watson stat	1.142612

Source: Author‘s (2020) by EViews using data from the World Bank and UNECE Statistical Division Database