Mădălina SCRIPCAR,
Radu CIOBANU
The Bucharest University of Economic Studies, Bucharest, Romania

CAN INCOME INEQUALITY BE REDUCED THROUGH ECONOMIC DEVELOPMENT AND EDUCATION? AN EU-27 PANEL ANALYSIS

Case Study

Abstract

The paper's main objective was to explore the determinant factors of income inequality in the European Union using panel data regression model with data ranging from 2000 to 2019. The study observed that education plays an important role in reducing the value of Gini indicator, a measuring index for income inequality. If the countries` focus would be on increasing the level of education, equal opportunities for all children, both urban and rural and access to resources that allow them to complete the primary and secondary cycle, then we can talk about a halving of Gini, implicitly a substantial reduction of the income inequality gap. This study also agrees with the current belief that urbanization and openness to foreign trade lead to a decrease in the value of the indicator, but not as significant as education. Furthermore, the relationship between Gini and unemployment is positive. A degradation in the unemployment structure contributes to increasing inequality. The income gap is more visible in emerging economies, where the policies are not carefully implemented among the citizens.

INTRODUCTION

The issues of inequality date back centuries and are the root of economic and political conflicts. Based on a very simple terminology, we can say that the central conflict brings to the fore two positions. On the one hand, there is the liberal position which claims that only market forces, increasing productivity and free initiative lead to the long-term improvement of incomes and living conditions. Regarding the redistribution action, in line with this trend, it must be moderate and limited to a virtuous mechanism. For example, an integrated system of levies and transfers (negative income tax) developed by Milton and Rose Friedman (1980). On the other hand, the traditional position supports the idea that social and political struggles can alleviate the suffering of those most in need. Regarding the public redistribution action, the focus must be on the production process and analyze how market forces determine the profits appropriated by capital owners as well as inequality between employees.

Before the French Revolution, in the 1780s, there was an assumption that supports the idea that inequality was divisive and socially corrosive. The present change regarding this phenomenon considers the fact that we can compare different more or less similar countries by quantifying the results and thus the effects of inequality can be observed. The global economic crisis has also launched new panel discussions on the phenomenon of income inequality and the tax burden on taxpayers, especially due to the austerity measures applied in most countries of the world.

In the first part of the study it is presented the theoretical framework in which the notion of inequality was introduced, the factors that contribute to its development, as well as its direct effects on people. Additionally, there are some empirical studies highlighted which explain the Gini indicator based on several variables. The theoretical aspects developed also consider the main indicators used to measure inequality, as well as establishing a link between the discrepancies of social classes and the tax system.

In the applied part of the study it was explored one particular measure of income inequality, Gini Index. In the econometric study designed, Gini is dependent on several other fundamental variables considered important for the sustainable development of a state. The educational sector plays a very important role in stabilizing inequality between social classes. Countries where the employment and schooling level is low and the reforms promoted by the state did not focus on the really important issues will have a higher value of the indicator.

THEORETICAL LITERATURE REVIEW

According to Harvard Business School professors, including David A. Moss, Anant Thaker and Howard Rudnick (2013), income disparities between the poor and the rich are widening because of government regulations and banking failures. In fact, they correlate income inequality with the financial crisis, discovering a causal relationship between these phenomena. Considering the Wall Street environment as an example, it was believed that inequality allows them to promote policies that benefit harmonious development - such as deregulation - that could jeopardize the system. Also, the focus should not only be on people in the first decile in terms of income, but also on people in the last decile, where stricter control and condensed fiscal policies are needed.

Milanovic (2016) analyzes the global phenomenon of income inequality and distinguishes three fundamental concepts. The first refers to the unweighted international inequality which is considered per capita income inequality in all countries of the world. This concept takes the country as a unit of observation, uses in its analysis its income (or GDP) per capita, but does not consider its population. Second, it considers the weighted inequality of the population at the international level, if we assume that everyone receives the same income. As in the first concept, the overview is global because here the average incomes of a country are compared with other regions under analysis. What differs from the first approach is the fact that within the country the distribution is perfectly equal. For example, all Japanese have the same average income from Japan, all Americans have the same average income from the United States. The third concept considers the inequality of individual incomes, so various categories can be distinguished, from poor to rich. As a practical example, Chinese individuals will no longer be analyzed together, but the poorest class in China will be analyzed, compared to the class on the same level in Africa, or Latin America, and the Chinese ranked in the higher category (the richest) they will be analyzed with the middle class, or the rich in America.

Another valuable point of view is presented by the economist Thomas Piketty in his book entitled "The Economics of Inequality" (2015). It deals with the dynamics of inequalities through various international comparisons, focuses on identifying the main causes that lead to income gaps between various social classes and offers solutions to reduce this phenomenon. He considers that a first factor that contributes to accentuating inequalities is human capital. Wage differences occur because employees make different contributions to the production of a company. Piketty believes that a

computer programmer who helps the company by creating easier-to-use databases or, specialized programs tailored to customer needs, brings his employer more money than a clerk who solves several cases a day. As a result, the computer programmer will receive a higher salary than the clerk because his/her human capital and productivity are higher. Another factor analyzed by the French economist that determines inequality is represented by unions and employers. According to the analyzed data, the unions have a very high decision-making power in the process of determining wages. Basically, they participate in establishing the level of salaries that represent the interests of many employees, and in addition to aspects related to its growth, unions are also fighting to reduce the salary hierarchies within the company. The action of the unions determines the companies to use capital in a greater proportion than the labor, as well as the qualified labor force to the detriment of the unskilled one.

In a remarkable study coordinated by Helpman, Itskhoki and Redding (2010) it presented the impact of income inequality on various social issues, emphasizing that this phenomenon can be an unfavorable aspect in the harmonious development of individuals. For example, in a more unequal country life expectancy is lower, illiteracy is higher, the infant mortality rate is on an upward trend, as is the crime rate. Also, the confidence level of people is lower by 50, 55 percentage points than in more equal countries. The authors emphasize the importance of analyzing this phenomenon and the fact that it should not be neglected because it can cause many negative effects on the population.

In other words, Kuznets' (1995) contribution to the literature considers the nonlinear relationship between income inequality and economic growth (inequality increases first, and then decreases during the process of economic development - this phenomenon is known as Kuznets curve) and the analysis of the relationship between these two variables aroused the interest of the authors Eicher and Turnovsky (2003).

In the most recent economic studies conducted by scientists, economists or specialized institutions the relationship between income inequality and fiscal implications was also analysed. Larch (2010) states that a country's fiscal performance is influenced by income inequality. In support of this view, he uses various econometric models to show that countries with greater inequality are prone to government deficits and debt. The progressive taxation system has constraining effects on high-income taxpayers, and such concerns about the tax implications of inequality have led to a reduction in tax rates over the last decade and then an increase in income for the same decade. These aspects have been captured in some studies by (Saez, 2004; Atkinson and

Leigh, 2010; Roine, Vlachos and Waldenstrom, 2009). In other words, existing market opportunities that facilitate tax fraud and evasion, especially for high-income groups, need to be eliminated because they can distort the remuneration structure, especially in terms of progressive taxation.

Income inequality can also be quantified to better understand the standard of living of individuals, to make international comparisons between countries or to identify solutions to combat the social class income gap. Economists have identified various indicators for measuring the phenomenon, and among the best known are: Robin Hood index (Hoover index), Theil index, Atkinson index, Gini index and the Palma index.

Hoover index also known as the Robin Hood Index, was mentioned in a study by Atkinson (1970) and aims to quantify the transfers that should be made between above-average and below-average incomes in order to have perfect equality (taking from the richest and giving to the poorest). Graphically speaking, the index can be represented as the maximum vertical distance between the Lorenz curve and the 45-degree line that represents perfect equality of incomes.

To measure this phenomenon, the Theil indicator is often used, which is part of a family of measures that refers to general entropy and is calculated as a ratio between individual income and the average individual income, all weighted by the logarithm of that report. The Atkinson indicator group is based on a welfare function and is widely used in comparisons between regions. The value of this index is located between parameters 0 and 1; the lower its value, the more equal the distribution of income. This measure also includes a sensitivity parameter, ε, which can range from 0 to infinity. As the value of this parameter increases, the Atkinson indicator becomes more sensitive to changes in lower-income categories. Since ε can take values close to 0, this impacts the Atkinson indicator, making it much more sensitive to changes in high-income groups in a distribution. The sensitivity parameter can take values such as 0.5, 1, 1.5 or 2. For example, an Atkinson value of 0.15 suggests that it could be achieved the same level of social welfare with only 85% (1-0.15) of income. This indicator has applicability in practice being used by many scientists in specialized research.

The most widely used indicator in the specialty literature for measuring income inequality is the Gini index. To understand the concept behind the use of this index, a practical example can support the theoretical part. Imagine a small country with $170 million in assets. Only from this information, it can be deduced that this region has a huge potential and is the right place to live. Five people live in this country, but surprisingly three of them have a net worth of zero dollars / each. What was

surprised by this example is that income distribution is the missing factor in the initial assessment. Gini was designed to quantify this factor which has serious implications for a nation's well-being and government policy. Its values vary between 0 and 1, where 0 refers to perfect equality, in which everyone has the same income, and the maximum allowed value captures perfect inequality, in which one person has all income to the detriment of others. This can be illustrated by the graphical representation of the Lorenz curve.

The Lorenz curve is a graphical representation showing the inequality of a society as a result of unequal distribution of income. The horizontal axis is outlined by the cumulative population - from the poorest to the richest and the vertical axis by the cumulative income. The diagonal is the distribution of income if all beneficiaries have the same level of income. In the first decile is represented 10% of the total income; in the first and second decile, 20% of the total income is cumulated; in the first, second and third, there is 30% of the total income; this method of quantification continues until the last decile. To graph the Lorenz curve, the income per decile left to individuals after tax was used, as well as the cumulative percentage of the population. To obtain the final percentage of income per decile, the first decile was cumulated with the second, then the result obtained was added together with the value related to the third decile. This process was performed up to the tenth decile. Also, the cumulative income for each decile was divided by the total income to obtain the percentage value (Figure 1).

In the figure above, the illustration of the Lorenz curve for two countries was chosen: country 1 and country 2. The orange line shows the perfect equality, an ideal situation, in which all individuals would register the same level of income. This type of equality is not found in economic practice, as it is impossible to achieve-i.e.: 40% of the population to hold 40% of a country's total income or 80% of all individuals to hold 80% of its income. From the graphic illustration, it can be seen that country 2 is characterized by a lower inequality and the Lorenz curve for this region tends towards perfect equality. Country 1 is more unequal than country 2, so income disparities between social classes are more pronounced. It can be considered that in the country represented by the green line, 40% of the poorest population earns 15% of the total income and in the country highlighted by the yellow color, 40% of the individuals obtain 30% of the disposable income at regional level. Using this curve, the Gini indicator for each country can be calculated to observe the corresponding level of inequality.

Palma (2011, 2016) observed in his research that more than half of the national income is captured by the middle class represented by deciles 5-9.

Basically, this class has strong property rights and contributes to the economic stability of a country. The Palma indicator analyses this middle class, while the Gini indicator focuses on the first decile, represented by the poorest 10% individuals in a country and on the last decile - the richest 10%. Palma is a more effective measure, especially for the main decision makers in a country because it explains better the changes that occurred at the level of deciles 5-9. Cobham and Sumner (2013) consider that Palma and Gini indicators to be closely correlated, but the first is superior to the second. The Palma indicator is sensitive to changes in the extremities of the distribution (first and last decile) rather than in the middle of it (deciles 5-9). The stability of the middle class is especially beneficial for the Government or other financially influential institutions.

In the specialized literature there are various empirical analyses that capture the link between an indicator of inequality and explanatory variables, such as: government spending on education, technology exports, tax revenues, economic openness, foreign investment, high tech, unemployment and many others. Furceri and Ostry (2019) analysed a sample of 108 countries using the weighted - average least squares (WALS) method to demonstrate that variables such as unemployment, demographics, level of development and trade integration are the main pillars that directly impact inequality. The study has been conducted taking into account a period of 33 years (1980-2013) and the results show that trade integration leads to a decrease in the inequality of the states included in the analysis and a factor as financial globalization drives to an increase in the income inequality.

Tridico (2018) performed a complex analysis on OECD countries for a period of 23 years (1980-2013) following the panel structure. Based on the analysis, it turned out that inequality is directly impacted by elements connected to the labor force and the welfare of the state. Decrease in the number of unions, labour market deregulation as well as an increase in financialization lead towards income imbalances. Another interesting empirical perspective is presented by Marsh (2015) on a panel of 142 countries. During the 14 years included in the study, it was observed that an increase in the total population level and the local educational gap favor the income inequality. Moreover, components of government income transfers and liberal democracy were found not to have significant impact on the analysed phenomenon. Munir and Sultan (2017) use fixed effect model on India and Pakistan to show that urbanisation, globalisation, GDP per capita, agriculture and government consumption expenditure have a significant contribution on the changes that occur at the income decile level.

Paweenawat and McNown (2014) prepared a study on Thailand based on synthetic cohort data analysis. This method used to establish causality with observational data in the absence of an experiment. A treatment group is compared with group of controls constructed based on a weighted combination of groups. This comparison is performed to estimate what would have happened to the treatment group if it had not received the treatment. The authors chose a 19-year database (1992-2011) and included independent variables such as gender differences, access to finance and GBP per capita which have proven to impact the income inequality in the form of a U-shape.

Vasilescu (2012) worked on a model that explains Gini variable based on foreign investment, trade opening, the level of a country development quantified by GDP indicator and also the level of education. The data introduced in the econometric study were grouped into clusters according to GDP per capita because the simultaneous inclusion of all countries would have led to unsatisfactory results. The results of the analysis showed that foreign investment impacts short-term income inequality in the sense of increasing it, but in the long run there is not such a strong influence between these two variables. Regarding the trade opening, for the developing countries, the coefficient was not statistically significant. For developed countries, this has a direct implication, in the sense that greater trade openness leads to increased inequality. An increase in gross domestic product per capita influences all states in terms of reducing inequality. The last variable analyzed is education. It has a fundamental role in establishing income inequality as one of the powerful levers a country has to reduce it.

DATABASE AND METHODOLOGY

The aim of our study is to analyse if the income inequality be reduced through economic development and education. The study focuses on EU-27 countries because, according to the European Commission, all countries have a joint desire to reduce income inequality and move forward to create a sustainable common market. There are also discussion regarding a common minimum wage across Europe. In order for this measure to be implemented, first, income inequality should be reduced in every EU country. Our database consists of data between 2000-2019 form all EU-27 countries. Based our analysis on the GINI index. In Figure 2, is presented the GINI index for every EU country in 2019 in comparison to 2000 to conduct an analyses on the changes that the last 20 years of economic development in EU, mainly in CEE states, have represented to the income inequality.

As can be seen from the graph, the lowest Gini value for 2019 is recorded in the Slovenia-24.6% which means that in this state the level of inequality is low, there are no major imbalances in terms of income distribution per decile. This value of the indicator can be explained by the extensive system of social measures taken by the Slovenia that lead to the reduction of inequality at the state level. Among the factors that contribute to this performance are education and the labor market while the distributive role of the social security and taxation system maintain absolutely low income inequality and at-risk-of-poverty rates. It can be observed the progress that this state has made in reducing the Gini indicator compared to year 2000; this can be explained by the EU accession and Slovenia's early EU membership which supported the harmonization of social and labor legislation which have had a major impact on this index. More than that, Slovenia maintained a consensual approach to wage negotiations with a successful model of tripartite social partnership. Similar values were reflected in Czech Republic which has been enjoying a steady economic growth, low unemployment and inflation. This state has faced greater inequality in previous years due to some issues identified in the educational system, unequal status of woman and ethnic discrimination. Moreover, the debt enforcement system, with several unregulated companies offering consumer credit to the public, has contributed significantly to income inequality. In the past 19 years Spain come up with a series of measures to reduce the inequality gap. Despite the efforts made, the GI index has a fairly high value, moreover the percentage in 2019 (34.7%) is slightly higher than in 2000-(34.3%). However, at the country level it can be seen that the degree of wealth concentration has decreased, the social benefits package have been extended to several beneficiaries, there is an increase in the incorporation of women in the labor market. The extension of welfare state and other political, economic and social factors have improved the life quality and helped reduce inequality. Italy has faced an intensification of inequality in the past 10 years. The gaps between rich and poor people have increased and more and more people are in poverty. It was observed that lower income groups have not benefited from the slow economic recovery of recent years. There are numerous studies and reports that show that the income of approximately 21 of the richest billionaires in Italy is equal to the level of assets of the poorest 20% of the population. Such high values of the indicator are the consequences of defective policies that have brought major changes in the distribution of social power between urban and rural areas, trade unions and companies. The market lacks a more equitable social model that harmonizes labor rights so that the trade

liberalization and foreign investment should not divide the population into two social classes. For the indicator value to be improved it will be necessary to launch a sustainable plan for the redistribution measures, to create a new model of participation, one more democratic with a focus on education, environment and technological investments. Romania, as a country, is at the bottom of the ranking together with Bulgaria, registering a high value of the indicator. Poverty, low employment and insufficient education are some of the factors contributing to this gap. To reduce this value, Romania`s focus should be directed to education. By allocating 6% of GDP instead of the current 3.7% it would improve the access to quality education, especially for the rural areas through some training program for teachers, school counselling, a better infrastructure and digitalization as part of the learning. Withal, integrated social services should be made available with increased access for rural communities together with the social transfers-particularly for children and women. An important role must also be played by state institutions to address the massive emigration problem (migration of healthcare, teachers, youth "brain-drain", etc.) and to identify solutions on the labor market-fight against undeclared work, implement a minimum wage setting mechanism, target activation policies.

In order to do a complete analysis, a panel model was made in order to find out which are the economic determinants of income inequality. A set of macroeconomic variables were used that can, in our opinion and according to the literature review, influence the level of the GINI index.

The explanatory variables are presented in Table 1. The descriptive statistics for the variables used in the models is presented in Table 2.

Carefully looking to the table 2, it is shown that the mean Gini value for the analyzed period 2000-2019 is 32.05. To improve its value, a main objective on the EU agenda is to strengthen social, economic and territorial cohesion. It is also considering the adoption of measures to improve the activity of enterprises, but also other areas of major interest such as transport, education, research, social inclusion, health. Such support provided by the European Union institutions has a crucial role at local and regional level to improve the quality of life, attract young talent, focus on innovation and technology. Using the same reasoning, GDP/capita records the lowest rate in Estonia, year 2009. The decrease in percentage was due to some local measures applied by the government to combat the financial crisis; It was observed a reduction of the budget expenditures, a decrease in the level of consumer spending and a negative economic growth. The maximum value of this indicator was observed in 2015 for Ireland, a country that had a thriving economy. Many international companies have moved their headquarters to Ireland due to a favorable tax regime. In terms of urban population, it was shown that around 71.9% of EU`s citizens live in urban areas. Considering the increase of this indicator, there must be discipline at the level of state institutions that provide integration of all urban citizens by giving them access to education, transport, housing, energy systems and other infrastructure. Bulgaria registered in 2014 the lowest percentage, 2.32% of government expenditure on education. While Denmark, at the opposite end of the spectrum, allocated around 8.56% for this sector. This field is a key one for the sustainable development of a country, therefore it is necessary a reorientation of government spending to education. A better educated labour force will increase the return on research, development and contribute to the country`s economic progress. Calculating the descriptive statistics for unemployment, it can be observed that the EU mean is 8.74%, a relative high percentage for which numerous measures have been taken at Union level. Some of these measures target young people under the age of 25 years to ensure they receive a good offer of employment, paid internships, international traineeships or continued education. At the European Union level, FDI average is approximately 12.08% of GDP. There is an international regulation which highlights the role of FDI on the economic scene by increasing the legal certainty for investors and by reducing the risk. It`s important to note that FDI also depends on factors such as macroeconomic condition, domestic policies, the local level of bureaucracy, skilled human capital or infrastructure. Human development index summarizes certain aspects that aim to establish a decent standard of living. Ireland`s HDI value for 2019 of 0.96 is considered one of highest values in the world. The main goal they want to achieve through the international development programme is to make a big and tangible impact to the lives of people, improving the quality of life. Ireland can also boast of an impressive value in terms of gross domestic savings for 2019 (57.63%), this being considered a strong economy focused on technology, top financial services, agribusiness or research.

It has also been tested for identifying multi-collinearity. The correlation matrix for this is presented in Table 3. The correlated variables at a level higher than 0.5 in the same regression were not taken into account. This approach is based on the fact that otherwise bias coefficients of the independent variables can be obtained in the regression models upon which the research was conducted. It can be seen from the analysis that the correlation between GDP growth and GDP per capita is 0.97, which indicates that they`re strongly positively correlated. An increase in GDP growth is related to higher GDP per capita. Withal, a weakly

negative correlation of -0.45 can be observed between gross domestic savings and unemployment. In practice, this means that the high number of unemployed in a country will lead to a decrease in savings. Notice that a positive correlation can also be seen between gross domestic savings and human development index. A healthy life together with a decent standard of living will contribute to the growth of savings.

RESULTS

In this section it was tested if the income inequality could be reduced through economic development and education. The results are presented in Table 4. A Panel Regression Model (according to Hausmann Test) was used to highlight whether the income inequality in the EU states can be influenced by macroeconomic factor of development.

The correlated variables at a level higher than 0.5 were not taken into account in the same regression. T-statistics are in parentheses. The symbols *, **, *** represent significance levels of 10%, 5% and 1% (Table 4).

General Model Description

$$GINI = f\ (UPOP,\ GDP/CAPITA,\ EDU,\ UNEMP,\ FDI,\ HDI,\ VR)\ (Equation\ 1)$$

$$GINI = f\ (GDPGR,\ UPOP,\ EDU,\ FDI,\ SAVING,\ VR)\ (Equation\ 2)$$

Literature on determinants of income inequality played a significant role in determining the general model description (equation 1/equation 2), which is then transformed into econometric model (equation 3/equation 4).

$$GINI_{it} = \beta0 + \beta1UPOP_{it} + \beta2GDP/CAPITA_{it} + \beta3EDU_{it} + \beta4UNEMP_{it} + \beta5FDI_{it} + \beta6HDI_{it} + \beta7VR_{it} + \mathcal{E}_{it}\ (Equation\ 3)$$

$$GINI_{it} = \beta0 + \beta1GDPGR_{it} + \beta2\ UPOP_{it} + \beta3EDU_{it} + \beta4\ FDI_{it} + \beta5\ SAVING_{it} + \beta6VR_{it} + \mathcal{E}_{it}\ (Equation\ 4)$$

For the presented models, the explanatory variables used define in proportion of 32.64%, respectively 18.40% the evolution of the Gini indicator. The recorded level of the coefficient R^2 is in the normal parameters because there are other factors not included in the models that can explain the evolution of Gini.

Analysing the econometric models through fixed effects it can be noted that government expenditure on education, human development index and urbanisation have a negative effect on Gini Index (reduced the value of the indicator). The focus for the European Union`s countries should be oriented towards to the educational sector. A good level of education can help reduce poverty, especially in rural areas where opportunities and facilities are often limited for children. There are numerous estimates and statistics that show that poverty can be halved if the primary and secondary education was achieved. A good education can have the power to reduce the income gap, but also other social issues as discrimination and gender disparities. Human development index can be an important pillar in reducing the Gini Index through its multiple and complex dimensions. The differences found in healthy life expectancy imply inequalities in well-being and that leads to some imbalances in the labor market or in the education. As example, high rates of HIV/tuberculosis can prevent some people to activate at work and generate certain income. This, in turn, can affect the educational background of their children, transmitting inequality between generations and social environments. Urbanisation process come with a few benefits that tends to reduce the income gaps and stimulates the access to resources. A positive relationship can be observed between some variables as GDP per capita, unemployment or GDP growth and GINI. An economic imbalance observed in the high number of unemployed may create discrepancies in terms of income inequality.

CONCLUSIONS

The paper's main objective was to explore the factors of income inequality in European Union economies using panel data analysis (fixed effects) with data ranging from 2000 to 2019. To quantify income inequality between social classes, it was used GINI Index.

Considering inequality in the European Union a cause for concern whose effects are observed in social problems include a weak health system, a lower level of economic growth where the spend for education is reduced and even a lower population-wide satisfaction regarding the quality of life. The average Gini index for the analysed period is about 32%, a relatively high value which should be reduced through different state policies. One of the main causes leading to income imbalances is the construction of the tax system. The founding states of the European Union apply a progressive taxation system, and the level of contributions is differentiated according to the income earned, while states such as Romania, Bulgaria or others are based on a proportional system of flat tax. The progressive taxation system contributes to reducing the phenomenon of inequality between social classes and automatically

leads to the reduction of the tax burden for low-income taxpayers.

The econometric estimation through cross-section fixed effects produced results which show that education plays a significative role contributing to reduce income inequality at the country-wide. Investments in education with different programs, trainings, global mobility can increase the worker`s productivity and can develop certain skills sought on the labor market. The allocation of public funds to education must be done equitably for both urban and rural areas. The economic growth is positively correlated with the Gini indicator. An increase in GDP growth or GDP per capita will worsen the gap generated by the income inequality.

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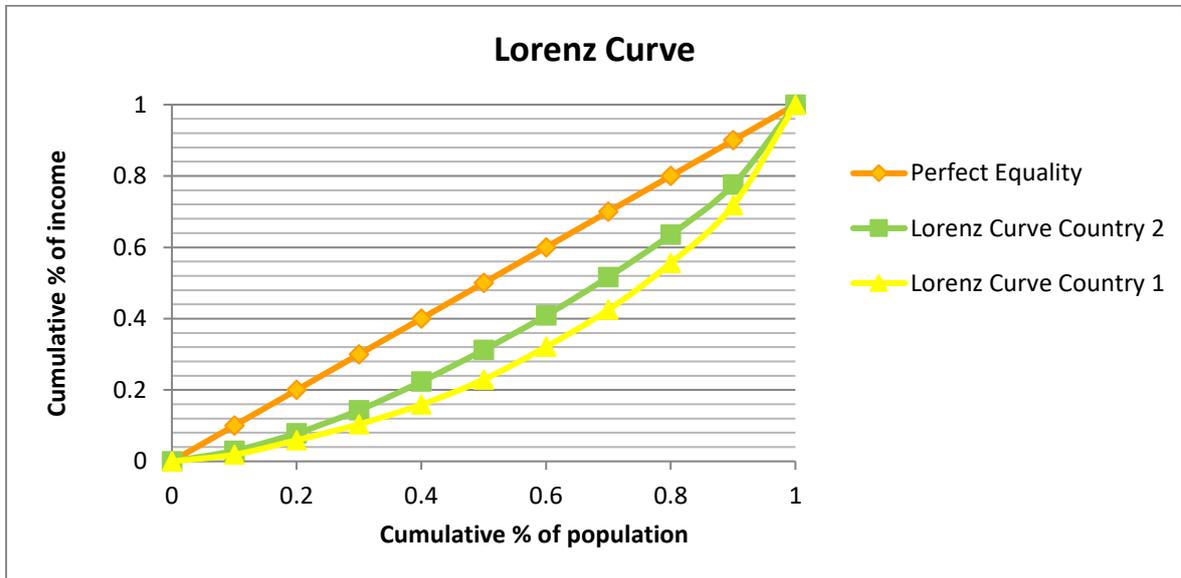
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Figure 1
Graphical representation of Lorenz curve
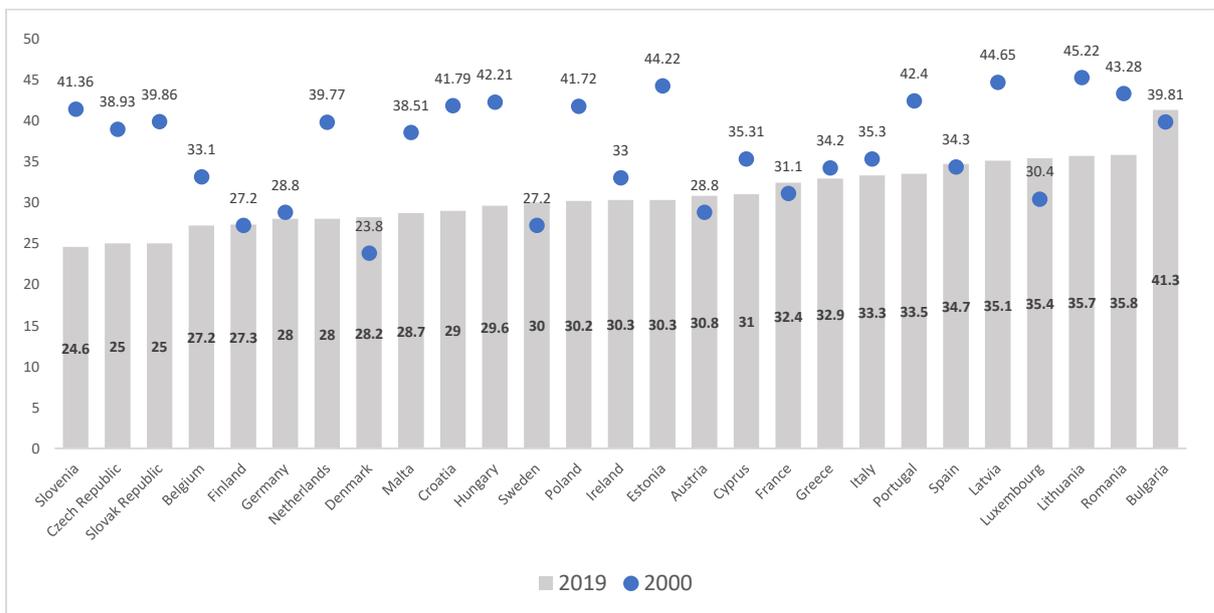*Source: Author`s calculations based on data obtained from Eurostat*

Figure 2
GINI index in EU countries in 2000 vs 2019
Source: Eurostat 2019

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Table 1
Explanatory variables

Symbol	Variable	Explanation
GDPGR	GDP growth %	This indicator measures the economy growth of a country. Zeyao Luan and Ziyi Zhou (2017) argued that there is a direct relationship between the inequality and the annual GDP growth rate. When the rate decreases, the income inequality also decreases.
UPOP	Urban population (% of total population)	Urban percentage is referring to the numbers of persons domiciled in an area defined as "urban" per 100 total population. Wu and Rao (2017) have used a Panel data for 20 of China provinces and showed that a higher level of urbanization had a direct impact in reducing the income inequality.
GDP/capita	GDP per capita	The gross domestic product per capita is a method of measurement for a country`s economic output calculated by dividing the GBP by its population. In a paper published in 1993 by Galor and Zeira it was proposed a model which predicts that the effect of rising inequality on GBP per capita is negative for the rich countries and positive in poor countries.
EDU	Government expenditure on education, total (% of GDP)	This indicator takes into account the public transfers and payments to education as a percentage of total government expenditure. Recent economic crisis has put pressure on the public funds and as a result less allocations have been made to education in some European countries.
UNEMP	Unemployment, total (% of total labor force)	This variable represents the number of unemployed people divided by the number of individuals currently in the labour force. Some studies have revealed that unemployment represents a key factor of economic inequalities for the emerging countries. Ayala et al (2001) presented in a study the idea that the unemployment has a direct impact on the labor market aggravating the social discrepancies-the unemployed are considered to be part of the poor class while the employed are in the most cases "the privileged" one who received a better education and come from a family with good or very good living conditions.
FDI	Foreign direct investment, net inflows (% of GDP)	This indicator is referring to an investment made by foreign investors in a reference country. FDI is very important for an economy in that it creates stable and strong cooperation, brings added value and contributes to social welfare. One empirical study designed by Beer/Boswell (2002) shows some evidence based on which FDI could have negative impact on the income distribution of developing economies. The reason behind these statements is that FDI must be understood in all its complexity, not just as a standard capital transfer, but also as a bundle of new technology, know-how and well-trained specialists.
HDI	Human Development Index (UNDP)	HDI take into account several aspects which are part of the human development as life expectancy, access to education and a normal standard of living. Based on one report presented by Milorad Kovacevic (2010), inequality found in health, education or human development (components of the index) rootedly impact the progress of society.
SAVING	Gross domestic savings (% of GDP)	Gross domestic saving as a calculation formula is represented by GDP minus final consumption expenditure and considers the savings of each individually sector. A research paper of Sharma, Das and Chakraborti (2018) shows an anticorrelation between savings and inequality. It has been observed as in more developed countries people situated in the low-income group has small/insignificant income savings compared with the one framed in the high-income group.
VR	Volume Ratio (Export/Import)	This ratio refers to the value generated by the export of goods and services to import, performed by a country which practices international trade. The high level of foreign trade comes with several benefits for the country especially increases the economic growth-exposing the local companies on the international stage, expansion, creation of new jobs, reduction of social gaps.

Source: Author compilation

Table nr. 2
Descriptive statistics

	Mean	Median	StDev	Min	Max
GINI	32.05	32.00	4.22	23.70	45.22
GDP/capita	2.32	2.17	3.60	-14.27	23.99
GDP growth %	2.55	2.62	3.47	-14.84	25.16
Urban population (% of total population)	71.90	69.54	12.57	50.75	98.04
Government expenditure on education, total (% of GDP)	5.01	4.90	1.12	2.32	8.56
Unemployment, total (% of total labor force)	8.74	7.62	4.41	1.81	27.47
Foreign direct investment, net inflows (% of GDP)	12.08	3.50	38.80	-58.32	449.08
Human Development Index (UNDP)	0.85	0.86	0.05	0.71	0.96
Gross domestic savings (% of GDP)	24.97	24.21	8.23	8.33	57.63
Volume Ratio (Export/Import)	95.10	97.85	22.54	20.60	216.60

Source: Author's calculations based on Eurostat

Table nr. 3
The correlation matrix

	GDP/capita	GDP growth %	Urban Population (% of total population)	Government expenditure on education, total (% of GDP)	Unemployment, total (% of total labor force)	Foreign direct investment, net inflows (% of GDP)	Human Development Index (UNDP)	Gross domestic savings (% of GDP)	Volume Ratio (Export/Import)
GDP/capita	1.00								
GDP growth %	0.97	1.00							
Urban population (% of total population)	-0.19	-0.10	1.00						
Government expenditure on education, total (% of GDP)	-0.21	-0.17	0.39	1.00					
Unemployment, total (% of total labor force)	-0.06	-0.16	-0.17	-0.19	1.00				
Foreign direct investment, net inflows (% of GDP)	-0.03	0.01	0.16	0.10	-0.05	1.00			
Human Development Index (UNDP)	-0.27	-0.16	0.29	0.33	-0.28	-0.03	1.00		
Gross domestic savings (% of GDP)	0.06	0.21	0.25	-0.01	-0.45	-0.04	0.48	1.00	
Volume Ratio (Export/Import)	-0.10	-0.10	0.36	0.09	-0.06	0.27	0.18	0.13	1.00

Source: Author's calculations

Table 4
The model estimated results

Variable	(1)	(2)
GDPGR		**0.06****
		(2.09)
UPOP	-0.03	-0.02
	(-0.73)	(-0.65)
GDP/capita	0.01	
	(0.49)	
EDU	**-0.55*****	**-1.08*****
	(-2.98)	**(-4.88)**
UNEMP	**0.22*****	
	(6.97)	
FDI	-0.003	-0.004
	(-1.38)	(-1.34)
HDI	**-35.80*****	
	(-7.99)	
SAVING		-0.28
		(-7.84)
VR	**-0.02*****	**-0.03*****
	(-2.55)	**(-3.80)**
R-squared	32%	18%
Number of observations	540	540

Source: Author's calculations

Table 5
DESCRIPTION OF ECONOMETRIC TERMS IN ECONOMETRIC MODEL 2

GINIit	GINI Index in country i at time t
UPOPit	Urban population in country i at time t
GDP/CAPITAit	GDP/CAPITA in country i at time t
EDUit	Government expenditure on education in country i at time t
UNEMPit	Unemployment in country i at time t
FDIit	Foreign direct investment in country i at time t
HDIit	Human Development Index in country i at time t
VRit	Volume Ratio in country i at time t
GDPGR it	GDP growth in country i at time t
SAVINGit	Gross domestic savings in country i at time t
β0	Intercept term
β1 to β7	Co-efficient of the independent variables
i country	Country
t time	Time
Ɛit Error term	Error term

Source: Author compilation