ECONOMIC INEQUALITY AND POVERTY IN EUROPEAN UNION

1 Božana Škorić, University of Banja Luka, Economics faculty
2 Jelena Bjelić, Indirect taxation authority of Bosnia and Herzegovina
3 Marijana Nikolić, The Republic of Srpska Investment- Development bank
4 Luis Chirosa, University of Granada, Economics faculty
*Corresponding author E-mail: bozanaskoric@yahoo.com
1 ORCID ID: 0000-0002-5800-0762
2 ORCID ID: 0000-0001-9412-2006
3 ORCID ID: 0000-0003-2211-7085
4 ORCID ID: 0000-0002-1990-4099

ARTICLE INFO

ABSTRACT

Excessive accumulation and raising income inequality reflected on the high rates of poverty in the European Union countries. Economic literature has wide research on the link between income inequality and economic growth. However, knowledge about correlation between income inequality and poverty is scare. In this paper, we have proved that poverty is not synonymous for income inequality, but that is a product of income inequality. Income inequality, measured by the Gini coefficient, reflected the movement of the percentage of the population who are at risk of poverty. The coefficient of simple on correlation showed that income inequality affects the growth risk of poverty in the countries of the European Union. Besides poverty, as a consequence of income inequality, other socio-economic problems also appeared: the suppression of economic growth, the rise in crime rate, the decline in the quality of education and health, the political inequality growth. All these problems should warn governments to take economic policy for reducing economic inequality. The European Union, as an area of 28 member states, needs to carefully select economic policy instruments to reduce income inequality and ensure stable ground for economic growth. The differences between the level of development, the index of democracy, income and living standards in observed countries have influenced the difficulty in observing the problem and computing mathematical and statistical connection. Through equalization of incomes, the European Union could solve problems of poverty, social exclusion and democracy (measured by index of democracy).

1. INTRODUCTION

Inequality is a multidimensional process present in society from the very begin. According to the reports on global inequality of the International Monetary Fund (IMF, 2018) income inequality is the greatest challenge of the 21st century and the main cause of the increasing poverty in the European Union. World inequality report for 2018 (Alvaredo, 2018) points to an increasing problem of poverty in the world and income inequality as a cause. Economic inequality represents an inequitable distribution of money, power, authority and rights. The two basic categories of economic inequality are: income inequality and wealth inequality (Piketty, 2015). Some authors cite a collective inequality: inequality in distribution labor (income inequality) and inequality in distribution capital (wealth inequality). In this paper, we will use income inequality as a main type of economic inequality and we will use it as synonym for economic inequality. Today's income inequality is not justified because it has resulted in increasing stagnation and poverty as a growing socio-economic problem (Aristondo, 2018). During the last decades, income inequality has been rising in most of the countries in the world (Galbraith, 2014). Famous British sociologist Peter Townsend uses concept of social divisions and economic inequality to describe the process of increasing concentration of both wealth and poverty. Poverty is a product of inequality of distribution that causes the creation of a subclass of the economic system that refers to only one group of deprivileged individuals with the absence of any power and influence. The fact that the mechanisms of economic inequality lie at the root of every wealth and poverty lies in the frequently quoted saying of Bertolt Brecht: "The poor and rich man met and looked at each other. And the poor said to the rich: If I were not poor, neither would you be rich." The concept of income inequality shows that resources are incorrectly distributed within community as well as globally. Poverty is a concept of an economic class that arises because of the incorrect allocation of resources (material, financial, personnel, cultural), as groups of people with low income level, property, education, class consciousness and mentality. Factors of uneven regional development are differently interpreted in economic theory (Erić, 2013).

In this paper, we determined one main and three auxiliary hypotheses:

H0: Income inequality affects poverty rate in European Union.

H1: Income inequality causes many socio-economic problems in countries of European Union, such as: the suppression of economic growth, the rise in crime rate, the decline in the quality of education and health, the growth of political inequality.

H2: There is significant difference in income inequality in countries of European Union that affects difficult implementation of economic policy measures.

H3: Economic egalitarianism is in the function of long-term economic growth and social stability.

In this work, the goals are pragmatic for all users: European Union institutions, governments of countries in the European Union, researchers, scientific workers and public. They will have an insight into the problem of income inequality as the cause of many socio-economic problems: poverty, inequality in democracy and social inclusion. Main goal in sustainable development is to reduce income inequality within and among countries (United Nations, 2018). The main importance of income inequality is in solving the problems of poverty and creating a shared prosperity for all European Union countries (World Bank, 2018).

2. LITERARY REVIEW

Having researched the problem of income inequality and poverty, we can conclude that there are a plenty literary materials about these problems. What sets itself as a problem in research is that they are viewed separately. Our homework is correlated with collecting, classifying and bringing in relation data about income inequality and poverty in the European Union.

Durlauf gave seven Theorems which had been proven by mathematical formula. He gave redistributive schemes as mechanism that acts to complete those missing markets whose effects manifest themselves through inequality. The dynamic structure of the model, however, suggests that the equity and efficiency trade off embedded in different policies will be very complex (Durlauf, 1996). For most countries in the world today, growth reduces inequality and rich countries are more egalitarian than poor ones. However, there are exceptions. While global financial forces and changing financial conditions have played a powerful role affecting economic inequalities, there does not appear to be a single permanent trend to inequality (Galbraith, 2014). Studies show a mutual relationship inequality and economic growth and development (Jovanović Gavrilović, 2003, Knowles, 2003 & Piketty, 2015) and in some studies it is pointed out that distribution of income is a precondition for growth sustainability and development (Cornia & Martano, 2012 & Nikiforos, 2014). Piketty gave modern studies about poverty as a global economic problem and correlation between poverty and income inequality (2015). Researching was done on the observed households and their incomes which were randomly selected. The Household survey showed one of the biggest global problems of the concentration of economic power in

the hands of a particular elite that has an impact on all spheres of economic life. Large economic inequality and concentration of power can be reduced in two ways: "benevolent forces" (migration of the population, migration of capital, liberal markets) and "malignant forces" (wars, climatic disasters, diseases). The research on the issue of income inequality and poverty has shown a high degree of correlation and a long-term major problem for all countries of the world (Milanović, 2015). Critical review of Piketty's work was about what to do against the rise of economic inequality which is highly controversy and about agreement with Piketty's policy proposals such as higher taxation on income, wealth and inheritances dropped significantly (Rieder & Theine, 2019).

A growing number of research studies confirm global socio-economic problem about income inequality, poverty and other socio-economic problems. Wide research about income inequality in countries of European Union and there are research about income inequality between countries of European Union. The Gini coefficient for the 15 EU countries showed higher incomes inequality within countries and subregions than between countries themselves (Cowell, 2015). In comparison with income, wealth is substantially more unequally distributed than income in each country in European Union (Jantti, Sierminaska & Kerm, 2015). If we take Spain and Germany out of the picture for a moment, we see that the inequality ranking of wealth follows that of income. In line with previous studies, researchers find lower poverty rates when wealth is incorporated in the measurement of poverty compared to the traditional income poverty headcount but the impact differs largely between countries (Kuypers & Marx, 2016). The problem of poverty and social exclusion, as a product of economic inequality, researched by Finish economist´s Törmälehto and Säylä. As an empirical illustration, we augmented the current EU poverty indicator with an asset-based poverty measure. The wealth-augmented at risk of poverty and social exclusion measure (AROPE) changed levels of poverty, but yielded little surprises in the relative deprivation profiles by lifting the retired and the self-employed out of poverty relatively more. In their work, wealth included (Törmälehto & Säylä, 2013). In Spain, we have so many researches about income inequality and poverty (such as García-Sánchez et al., 2018, as state Caselli, Fracassi and Traveso, 2018). Perception of income inequality is also really important characteristic of inequality (García-Castro et al., 2018).

Beside Milanović (2015), Molnar researched problems with internal inequality and inequality between countries. These studies refer to the introduction of reliable indicators for measuring inequality, while the empirical research is based on an example of economic inequality and poverty in Serbia (Molnar, 2013). Research focusing on specific key aspects of economic inequality, as well as

economic inequality, by analyzing numerous theoretical, methodological and empirical views concerning the socio-economic phenomena aims to identify the following related and relevant aspects that affect the efficiency modern economy: a). economic inequality that has a stimulating effect on the creative, productive and innovative use of all production factors positively affects the functioning of the economy and is socially justifiable; b). high level of economic inequality which shows a tendency to further increase has a negative effect on the economic system indicators, as well as the stability of the society and the political environment, therefore resulting in weaker economic performance and lower economic growth rate; c). economic equality (certainly, not egalitarianism) by contributing to greater social and political stability, which in turn reflects positively on the economic stability and efficiency, is basic for greater modern economy and dynamic growth rates (Leković, 2015). The basic of the cause-effect relationship between inequality and the level of social well-being has shown that such connection exist only in the fulfillment of a very large number assumptions, starting from the independence of the functions of individual well-being, to the complete symmetry of the relationship between the individual's well-being and well-being of all others. Also, behaviors of people point to the existence of a strong asymmetry of this kind, and that individual respond far more to someone else's poverty than to the inequality (Begović, 2015). Income inequality and tax changes in European Union during financial crises 2009 was a study which shows from comparative analysis of implemented taxation reforms that the increase in the highest rates of income tax, which have increasing in the most EU member states, an indicator of cargo shifting crises to the highest income classes or re-updating the use of taxes on income for purpose of reducing income inequality (Šimurina & Barbić, 2016).

2.1. Quantitative measurement of inequality

If we want to have a relevant and rewarding research, the phenomenon of economic inequality needs to be quantified. It is necessary for it to be assigned a mathematical character in order to be able to observe connections and to purpose solutions to the problems that have arisen. Economic inequality is usually measured by several coefficients or indexes (Molnar, 2013): Gini coefficient, Theil's inequality index, coefficient S80/20, coefficient of variation and Atkinson's index of inequality.

Gini coefficient is the most popular measure of economic inequality. Its value ranges from 0 to 1, observed in absolute terms[1]. If we multiply the obtain index with 100, we get a percentage of the economic inequality of the given observation units (national state, region or globally). If its value is 0, we found ourselves in a state of complete equality. In the second, value 1 shows absolute inequality when one person has absolute full income or wealth. Formula for its calculation:

$$G = \frac{1}{2n^2 \bar{y}} \sum_{i=1}^{n} \sum_{j=1}^{n} \left[y_i - y_j \right] \tag{1}$$

that means: y_i is the income of the i-th individual (observation units), y_j is the income of the j-th individual (observation units), n sample size or number of income recipients, ȳ average income, $|y_i-y_j|$ the sum of absolute values of measured differences between income (each income pair of the i-th and j-th individual). Since the absolute difference in income is accounted twice $|y_i-y_j|$ and $|y_j-y_i|$ the total sum is divided by number 2. Also, as we can see in the directory, the sum of the absolute differences of income is divided by the square of the number of units of observation and the average income. In real life, the value of this index is never extreme (0 or 1), but ranges between these two numbers on a scale[2]. This index will be presented practically on the example of the European Union in the second part of the paper. Value 0 would show the absolute egalitarianism of the observation unit, which does not exist in the real economic life (nor existed, even in communist societies advocating the idea of economic equality).

Theil's inequality index starts from the idea of entropy[3] in the theory of information. When an event is completely predictable then the quality of the information it carries is low (the information has no value). A reversal is a conclusion in the case of a low probability outcome. If the income is evenly distributed between observation units, the income of each observation unit[4] is predictable. On the other hand, if there is economic inequality in the distribution of income, it is

---

[1] It was named by its inventor, the Italian statistician Corrado Gini, who created it 1912. It can be carried out directly from Lorenz's curve.

[2] Value 0 would show the absolute egalitarianism of the observation unit, which does not exist in the real economic life (not existed, even in communist societies advocating the idea of economic equality).

[3] Entropy is a measure of uncertainty associated with a random variable. Each independent variable $x_1, x_2,…, x_n$ is assigned a certain probability value. The independent variable that has the lowest probability of outcome contains the most valuable information. The concept was introduced by Claude Shannon in 1948. in the book Mathematical Communication Theory.

[4] Observation units can be individuals or groups within a particular economy, country, region or the whole world.

more difficult to predict the income of the observed sample. On the other hand, if there is economic inequality in the distribution of income, it is more difficult to predict the income of the observed sample. This index was formulated by Henry Theil at the Erasmus University in Rotterdam. With its use, total inequality can be divided into three parts: inequalities within the region (inequality), inequality among regions (interdependence) and inequality within the subregion (between the subregion municipalities).

Coefficient S20/80 shows the ratio of total equivalent income of the 20% of the highest income population with respect to the total equivalent income of the 20% of the lowest income population. In this way a number is obtained indicating how many times the richest one-fifth of the population earns in comparison to one-fifth of the poorest. If multiplied by 100, we get the percentage or relative ratio of the specified sizes. This indicator is always higher than 1[5]because the top of any population always has and earns more than the lower classes in all countries of the world. It is most often used to determine inequality in revenue distribution (although it can be used as an indicator of inequality in the distribution of wages, wealth, inheritance and living standards). This index is often used in combination with the Gini coefficient.

The coefficient of variation CV is calculated as the standard deviation ρ and the arithmetic mean of the income for the observed population $\bar{y}$. It is calculated according to the formula:

$$CV = \frac{1}{\bar{y}} \sqrt{\frac{1}{n} \sum_{i=1}^{n} \left(y_i - \overline{y} \right)^2} \tag{2}$$

where are: y_i income of the i-th individual (observation units), n sample size ie the number of recipients of income and $\bar{y}$ average incomes. The value of this indicator ranges from 0 to the infinity. If there is complete equality in the distribution of income it is 0. If total economic inequality or all incomes are absorbed by one person, then he strives for infinity (increases without limit). If total economic inequality or all incomes are absorbed by one person, then it strives for infinity (increases without limit). It can also decompose on intragroup and intergroup inequality.

Atkinson's inequality index is the result of the belief that any measure of inequality implicitly reflects certain valuation estimates. It is necessary to determine

---

[5]   And in the more charitable societies (such as the Scandinavian countries) coefficient S20/80> 1, if it would amount to ≤1 it would mean that the richest citizens of the country earn the same or less than the poorest 20% of the country's citizens.

the wrong of social well-being (social well-being in the function of individual incomes) and the degree of aversion to inequality. It is necessary to determine the curve of social well-being (ie social well-being in the function of individual incomes) and the degree of aversion to inequality. Aversion to inequality is a numerically expressed price that a company is willing to pay for reducing inequality. The lost growth is the price paid by society for economic inequality. As its value is higher, disparity in distribution is higher. Formula for calculating the Atkinson index:

$$A = 1 - \left[\frac{1}{n} \sum_{i=1}^{n} \left(\frac{y_i}{\bar{y}} \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

where are: y_i is the income of the individual (observation units), n the size of the sample or the number of recipients of income, $\bar{y}$ the average income, ε the degree of society's aversion to inequality, ranges from 0 to ∞. Difficult understanding and interpretation of this index is the main underlying of this index, which is why it is least used to express economic inequality in literature and practice. Due to the limited scope of work, the detailed disclosure of these indicators will be left to the interpretation of the reader. As a measurement unit of economic inequality in the European Union we will use the Gini coefficient.

2.2. Qualitative measurement of inequality

The terms of inequality and poverty are related but do not have the same meaning[6]. Inequality has a descriptive character that can always be discussed, while poverty has a prescriptive character, meaning that it carries a moral imperative of action (Šućur, 2001). Poverty is determined by economic inequality of distribution. Therefore, economic inequality is the cause (independent variable) and poverty is a consequence (dependent variable). Poverty is defined as a social phenomenon where a certain population of people lives below the appropriate line of disposable income or below the value of the average basket of goods needed for a normal human life. Consumer basket contains the value of goods and services necessary on a monthly basis to meet the minimum social needs (food, clothing, housing, cultural events and the like). The comparability of consumer spending between countries is a major problem for statisticians when compared to poverty. The consumer basket in Europe, which necessarily contains meat, is

---

[6] In numerous philosophical and political literature these terms are used as synonyms. However, in the economy there is a big difference between poverty and economic inequality. Poverty is the function of improper allocation of income and wealth, ie economic inequality.

not representative for India where animal meat is almost un-consumed. Differences in mentality, consciousness and culture make the basket of goods different and the very structure and the way of measuring poverty. Poverty and economic inequality are not in a perfect linear direct relationship. This means that if economic inequality increases by 1%, it does not have to mean that poverty grows for the same amount (coefficient of correlation is greater than one). If economic inequality grows, it does not have to mean the worse position of the poor in the same extent. Two countries may have the same degree of inequality in distribution and income and wealth, and have a different degree of poverty. Poverty is to a large extent correlated with economic inequality, but is the result of other factors (social policy, country development, social awareness, social transfers and so on). Strategies for reducing inequality in income distribution are significant for total poverty reduction, but they are not the only ones. Poverty is directly reduced by redistribution of income, ie by redeploying part of rich income to poor (through health, pension and social system). Reduction of poverty is also affected by redistribution, ie whether the redistributive value is effectively targeted at target categories[7]. Efficiency of income distribution can be depicted with the help of Lorenz's fault (Graph
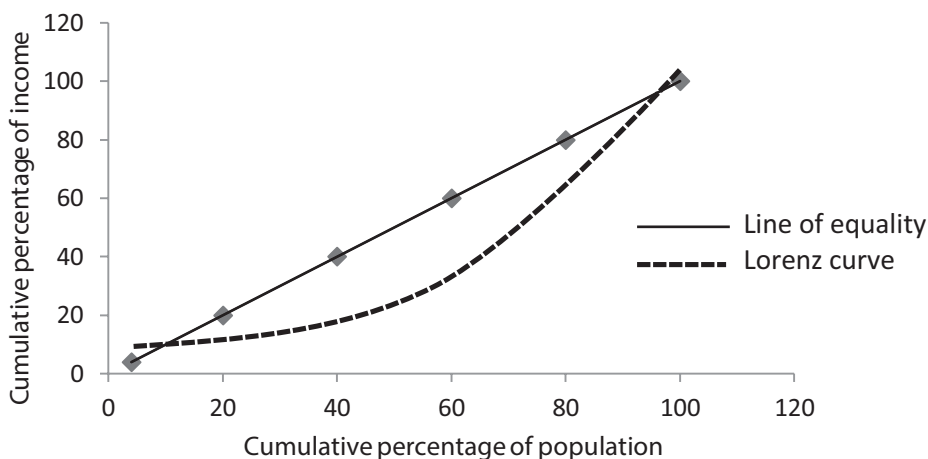
Graph 1. Lorenz´s curve. Source: Authors.

Data on cumulative percentage of a country's population are available on the X axis and cumulative data on the percentage of income with which population of

---

[7] Abuse of rights is common in countries that do not have a strong legal system. Hiding real income through the "gray" economy and undeclared work enables individuals to absorb state social transfers and inefficient allocation of resources. In this way, the redistributive effect of the state is ineffective.

the country is available on the Y axis. If there was a perfect equality than each member of the population would have absorbed the same percentage of income, the line of equality would be a straight line at an angle of 45 degrees. In economic reality this case never happens. Every citizen gets a different income share, so she has a slightly convex positive slope. As the slope of the curve is bigger ie curve has more convex, the economic inequality of the distribution is higher. By taxing income, the state distributes the accumulation value and thereby affects the reduction of inequality. Extra-profit tax[8] moves Lorenz's slope to the left or towards the line of equality.

3. RESEARCH RESULTS

3.1. Economic inequality in the European Union

In the previous section, we have described the most widely used inequality measurement indices used in the world. These indexes are used in the European Union by international financial institutions such as the World Bank, the International Monetary Fund, the European Statistics Institute and others. Data, research and work on disparities in distribution for the European Union are contained in the Annual Reports and reviews of International Financial Institutions. Because of the limited work scope, the research job will be reduced to observing the inequality of distribution through the Gini coefficient. The reasons why we have decided to use this index are: the widespread use of this coefficient and the ease of interpretation. It was formulated by the Italian statistician and sociologist Gini Corrado in 1912. in his work "Variability and Changeability". Organized by the Organization for European Co-operation and Security (shortened OECD), its usage as a tool for the statistical and economic analyzes that relate to XX. centuries. It is important for keeping the taxation and social benefits policy in Europe in order to direct the funds in proper way and to stimulate economic sustainability and growth. There are a lot of mathematical derivations of the Gini coefficient formula that we will not deal with because it is not a subject of the research. We will only emphasize that its value can be to the interval [0, 1]. In case of complete economic equality its value would be 0. This would mean that every member of the community has an equal share of wealth and income. In economic reality this case does not exist because it would mean born with the same possibilities and without inheritance. On the other hand, full economic inequality would bring this index to 1. This would mean that the total wealth and all revenues are owned by one person, which is again impossible in real economic

---

[8] Extra profit represents the profit of the most successful companies that have in the monopoly of pricing and operating conditions. That are a global transnational companies whose total revenue exceeds the budgets of some countries where they are doing business.

life. We began the research by observing the Gini coefficient movement in the European Union as one of the most appropriate indicators of inequality distribution. The period of observation refers to the decade (2008 - 2017). Data for the previous 2018. did not available on the official EUROSTAT site, which is why they were not included in the analysis.

Table 1. Gini coefficient for the countries of the European Union for the period 2008.-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Belgium	0,275	0,264	0,266	0,263	0,265	0,259	0,259	0,262	0,263	0,26	-
Bulgary	0,359	0,334	0,332	0,35	0,336	0,354	0,354	0,37	0,383	0,402	-
Chezch Rep.	0,247	0,251	0,249	0,252	0,249	0,246	0,251	0,25	0,251	0,245	-
Denmark	0,251	0,269	0,269	0,266	0,265	0,268	0,277	0,274	0,277	0,276	0,279
Germany	0,302	0,291	0,293	0,29	0,283	0,297	0,307	0,301	0,295	0,291	-
Estonia	0,309	0,314	0,313	0,319	0,325	0,329	0,356	0,348	0,327	0,316	-
Ireland	0,299	0,288	0,307	0,298	0,305	0,307	0,311	0,298	0,295	0,306	-
Grecee	0,334	0,331	0,329	0,335	0,343	0,344	0,345	0,342	0,343	0,334	-
Spain	0,324	0,329	0,335	0,34	0,342	0,337	0,347	0,346	0,345	0,341	-
France	0,298	0,299	0,298	0,308	0,305	0,301	0,292	0,292	0,293	0,293	-
Croatia	0,308	0,315	0,316	0,312	0,309	0,309	0,302	0,304	0,298	0,299	-
Italy	0,312	0,318	0,317	0,325	0,324	0,328	0,324	0,324	0,331	0,327	-
Cyprus	0,29	0,295	0,301	0,292	0,31	0,324	0,348	0,336	0,321	0,308	-
Latvia	0,375	0,375	0,359	0,351	0,357	0,352	0,355	0,354	0,345	0,345	0,356
Lithuania	0,345	0,359	0,37	0,33	0,32	0,346	0,35	0,379	0,37	0,376	-
Luxembourg	0,277	0,292	0,279	0,272	0,28	0,304	0,287	0,285	0,31	0,309	-
Hungary	0,252	0,247	0,241	0,269	0,272	0,283	0,286	0,282	0,282	0,281	0,287
Malta	0,281	0,274	0,286	0,272	0,271	0,279	0,277	0,281	0,285	0,282	-
Netherlands	0,276	0,272	0,255	0,258	0,254	0,251	0,262	0,267	0,269	0,271	-
Austria	0,277	0,275	0,283	0,274	0,276	0,27	0,276	0,272	0,272	0,279	-
Poland	0,32	0,314	0,311	0,311	0,309	0,307	0,308	0,306	0,298	0,292	-
Portugal	0,358	0,354	0,337	0,342	0,345	0,342	0,345	0,34	0,339	0,335	-
Romania	0,359	0,345	0,335	0,335	0,34	0,346	0,35	0,374	0,347	0,331	-
Slovenia	0,234	0,227	0,238	0,238	0,237	0,244	0,25	0,245	0,244	0,237	-
Slovakia	0,237	0,248	0,259	0,257	0,253	0,242	0,261	0,237	0,243	0,232	-
Finland	0,263	0,259	0,254	0,258	0,259	0,254	0,256	0,252	0,254	0,253	0,259
Sweeden	0,251	0,263	0,255	0,26	0,26	0,26	0,269	0,267	0,276	0,28	-
UK	0,339	0,324	0,329	0,33	0,313	0,302	0,316	0,324	0,315	0,331	-
EU 28	0,31	0,306	0,305	0,308	0,305	0,305	0,31	0,31	0,308	0,307	-

Source: EUROSTAT´s database, Gini coefficient of equivalised disposable income-EU- SILC survey, (2019). Aviliable at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12&lang=en.

EUROSTAT collected data from the Household Survey conducted every year in the countries of the European Union. Most of the issue is based on total household income or part of household income that is not included in tax claims. The sample ranges from 20-30% of the population, and emphasis is placed on a uniform distribution of respondents on a variety of grounds: place of residence, gender, age, class affiliation and the like. Analyzing the table it can be concluded that the highest average inequalities[9] in the distribution of total income were observed in the following countries: Bulgaria (0.3574), Latvia (0.3568), Romania (0.3568), Portugal (0.3437) and Greece (0.3380). On the other hand, countries which are not egalitarian in Europe and are average for the past 10 years are: Slovenia (0.2394), Slovakia (0.2469), Czech Republic (0.2491), Sweden (0.2641) and Denmark (0.2692). Based on Table 1, data can be presented using Graph 3.
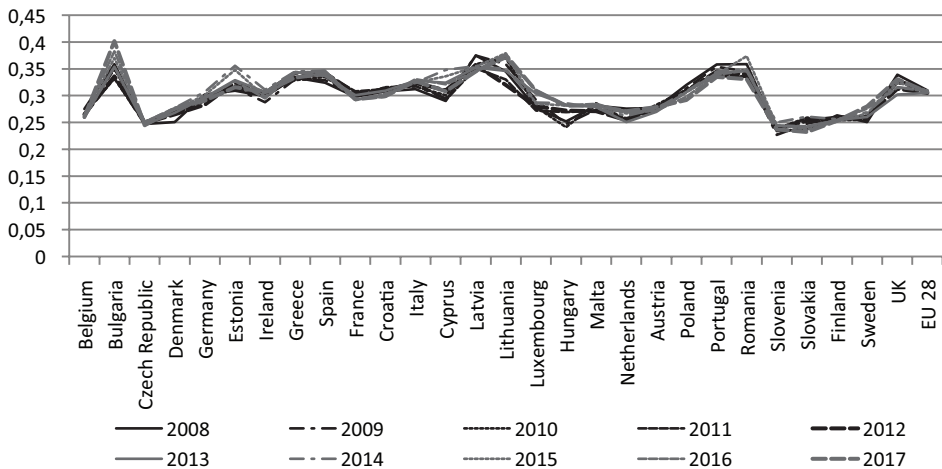
Graph 2. Gini Coefficient Movement in EU Countries 2008 – 2017.
Source: Author's illustration.

3.2. Poverty in the European Union

We have seen the movement of income inequality in the European Union for the period 2008-2017. We will now share the economic inequality of distribution income with poverty in the European Union and how it affects the phenomenon of poverty. On the one hand, inequality in income distribution may encourage citizens to improve their situation through work, additional efforts, innovations or the acquisition of new skills. On the other hand, income inequality is associated with poverty and social exclusion. The creators of economic policy, the govern-

---

[9] The average Gini coefficient is obtained as a sum of all coefficients in the observed period divided by the number of years (ie the aggregate is divided by 10).

ment and society as a whole could not fight with poverty and social exclusion without analyzing economic inequality in society. Data on inequality in income distribution are important for assessing real poverty, because the distribution of resources can affect the breadth and scale of poverty. Poverty is defined as a social phenomenon where a certain population of people lives below the appropriate line of disposable income or below the value of the average basket of goods needed for a normal human life. Every year, the European Union's statistical site collects data on the percentage of the population on the poverty line ie on the border which provides the consumer with the necessary goods for a decent life.

Table 2. Movement of the population at risk of poverty in EU countries in the period 2008.-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018.
Belgium	0,147	0,146	0,146	0,153	0,153	0,151	0,155	0,149	0,155	0,159	-
Bulgary	0,214	0,218	0,207	0,222	0,212	0,210	0,218	0,220	0,229	0,234	-
Chezch Rep.	0,090	0,086	0,090	0,098	0,096	0,086	0,097	0,097	0,097	0,091	-
Denmark	0,012	0,013	0,013	0,012	0,012	0,012	0,012	0,012	0,012	0,012	0,013
Germany	0,152	0,155	0,156	0,158	0,161	0,161	0,167	0,167	0,165	0,161	-
Estonia	0,195	0,197	0,158	0,175	0,175	0,186	0,218	0,216	0,217	0,210	-
Ireland	0,155	0,150	0,152	0,152	0,166	0,157	0,164	0,163	0,168	0,156	-
Grecee	0,201	0,197	0,201	0,214	0,231	0,231	0,221	0,214	0,212	0,202	-
Spain	0,198	0,204	0,207	0,206	0,208	0,204	0,222	0,221	0,223	0,216	-
France	0,125	0,129	0,133	0,140	0,141	0,137	0,133	0,136	0,136	0,133	-
Croatia	-	-	0,206	0,209	0,204	0,195	0,194	0,200	0,195	0,200	-
Italy	0,189	0,184	0,187	0,198	0,195	0,193	0,194	0,199	0,206	0,203	-
Cyprus	0,159	0,159	0,156	0,148	0,147	0,153	0,144	0,162	0,161	0,157	-
Latvia	0,259	0,264	0,209	0,190	0,192	0,194	0,212	0,225	0,218	0,221	0,233
Lithuania	0,209	0,203	0,205	0,192	0,186	0,206	0,191	0,222	0,219	0,229	-
Luxemb.	0,134	0,149	0,145	0,136	0,151	0,159	0,164	0,153	0,165	0,187	
Hungary	0,124	0,124	0,123	0,141	0,143	0,150	0,150	0,149	0,145	0,134	0,128
Malta	0,153	0,149	0,155	0,156	0,151	0,158	0,158	0,166	0,165	0,167	-
Netherlands	0,105	0,111	0,103	0,110	0,101	0,104	0,116	0,116	0,127	0,132	-
Austria	0,152	0,145	0,147	0,145	0,144	0,144	0,141	0,139	0,141	0,144	-
Poland	0,169	0,171	0,176	0,177	0,171	0,173	0,170	0,176	0,173	0,150	-
Portugal	0,185	0,179	0,179	0,180	0,179	0,187	0,195	0,195	0,190	0,183	-
Romania	0,236	0,221	0,216	0,223	0,229	0,230	0,251	0,254	0,253	0,236	-
Slovenia	0,123	0,113	0,127	0,136	0,135	0,145	0,145	0,143	0,139	0,133	-
Slovakia	0,109	0,110	0,120	0,130	0,132	0,128	0,126	0,123	0,127	0,124	-
Finland	0,136	0,138	0,131	0,137	0,132	0,118	0,128	0,124	0,116	0,115	0,120
Sweeden	0,135	0,144	0,148	0,154	0,152	0,160	0,156	0,163	0,162	0,158	-
UK	0,187	0,173	0,171	0,162	0,160	0,159	0,168	0,166	0,159	0,170	-
EU 28	-	-	0,165	0,169	0,168	0,167	0,172	0,173	0,173	0,169	-

Source: Author´s calculation, single data from EUROSTAT.

Those data EUROSTAT obtained the Household Survey conducted every year in the countries of the European Union. Most of the issues are based on total family employment, income, a way of meeting basic and "higher" needs, the way of living, nutrition and education. The living conditions of respondents have a significant impact on the formation of poverty, as well as investment in education and health care. Analyzing the table, it can be concluded that the highest average poverty risk in the European Union is observed in the following countries: Romania (0.2349), Bulgaria (0.2184), Latvia (0.2184), Greece (0.2124) and Lithuania (0.2062). On the other hand, the average population for the past 10 years which have the lowest risk of poverty, living in the EU, lives in the following countries: Denmark (0.0122), Czech Republic (0.0928), Netherlands (0.1125), Slovakia (0.1229) and Slovenia (0.1339). Based on Table 2, data can be presented with the Graph 4.. Since data for 2008. and 2009. do not exist for Croatia and EU-28, the graph will present data for 2010.-2017.
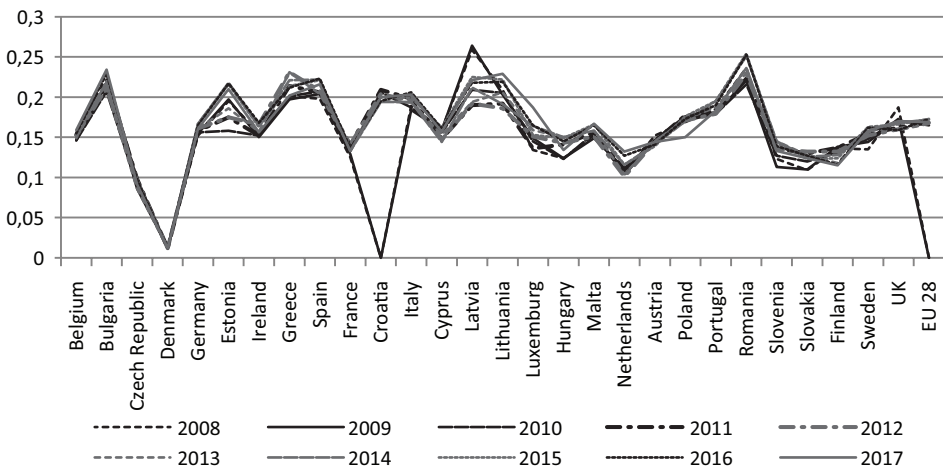
Graph 3. Movement of the population at risk of poverty in the European Union countries in the period 2010-2017. Source: Author's illustration.

3.3. Impact of income inequality on poverty and other socio-economic problems

A large number of economists have shown that there is a direct link between economic inequality and economic growth. Kuznets drew the curve that referred to the fact that the economic inequality is the product of economic growth. Economic inequality is in function of economic growth and any economic growth affects the increase in inequality to a certain

point, after which it falls. These cycles are known as Kuznets cycles. We will start from this assumption that poverty is in the function of economic inequality. The coefficient correlation will find out how much extent income inequality explains poverty. With the help of the 3B STAT, we will introduce economic inequality as the independent variable X ie the Gini coefficient from Table 1. Poverty, measured by the index of population in risk of poverty is placed as a dependent variable Y (data from Table 2). Due to huge amounts of data, this statistic program is unable to process data for all countries. That is why we pooled the data for each country individually and found that there is correlation in the movement of inequality and poverty. Here we will present data for Bulgaria with a high degree of income inequality, but also a high percentage of population exposed to risk of poverty. The results are given in the following table.

Table 3. The coefficient of correlation between income inequality and poverty in Bulgaria

10.05.2019. 18:23 Analyse number: 1, econometrics		
Variables		
X: Gini coefficient		Y: Risk of poverty
Standard error of correlation coefficient	0,1982	P 0,0024544
F test statistics	4,3472	
Ho: In the basic set there is NO linear correlation		
H1: In the basic set there is linear correlation		
Conclusion:		
In testing the zero hypothesis that in the basic set there is no linear correlation the obtained p-value of 0.0025 shows		
that in the basic set there is a linear link at the significance level of 0.01 since the p-value is <0.01		
We conclude that the coefficient of correlation r IS statistically significant.		

Source: Author's calculation in 3B STAT.

Data of other countries are also easily counted in the software program. The results for some countries will not show any statistical significance of correlation because the percentage of the population at risk of poverty is near the figures referring to the Gini score. Mathematical formulas will get a p-value that is larger than the tabular value because proximity of numbers and duplication of operations. For technical reasons, the hypothesis is partially proven if we rely on processing in this program. However, if we logically consider the movement of economic inequality and poverty in the countries of the European Union, the conclusion is unique. Countries with large income inequality (such as Romania

0.3568 and Bulgaria 0.3574) have a high percentage of the population at risk of poverty (in Romania, 23.49% and Bulgaria 21.84% on average for the previous 10 years). Countries with economic equality (such as Czech-0.2491 and Denmark-0.2692) have the lowest percentage of the population exposed to poverty (in Denmark, 1.22% and 9.28% in the Czech Republic over the past ten years). The data from Tables 1 and 2 clearly show that income inequality affects growth of poverty in European Union countries, leading to the main hypothesis of research which is partly proven. Apart from direct impacts of economic partially on poverty, disparities in the distribution of incomes and wealth also affect other socio-economic problems in the country. Socio-economic problems are the result of poverty, economic inequality and social exclusion of individual groups and we formulate them in a couple of theses useful for research:1. Inequality stifles economic growth; 2. Inequality reduces the security of the country and affects the growth of crime; 3. Inequality affects the falling quality of health and quality of life; 4. Inequality decreases the quality and the rate of education; 5. Economic inequality increases political inequality.

4. DISCUSSIONS

The results we have come across show that there is a correlation between income inequality and poverty. The main hypothesis about the direct impact of economic inequality on poverty and other socio-economic problems is proved partially. The restriction in this study refers to the 3B STAT statistical program which does not recognize in the formulas real economic life. In some cases (countries) it has shown that there is no correlation between economic inequality and poverty. This happened because of the proximity of dependent and independent variables. This was the biggest limitation in the overall research. Economic logic has been countered by mathematical principles and we have confirmed that mathematics can help and illuminate some problems in the economy (not all). The main aim was to show that countries facing poverty have to pay more attention to the problem of economic inequality. Poverty and socio-economic problems have the root in the improper distribution of income. This was shown by the data and movement of the graph of the Gini coefficient and the percentage of the population at risk of poverty. The aim is to point to income inequality as the cause of many socio-economic problems. The governments of the member states should adopt economic policies that affect the greater egalitarianism of society. The governments of these countries would have to devote the issue of income inequality to avoid socio-economic problems such as poverty, social exclusion and political instability. The question arises: What are the steps and measures that should be taken? The problem could be solved in a number of ways, such as: redistribu-

tion of income through the social system, taxation of wealth or limitation of maximum income. These measures could be the subject of research in the future. Also, this research has shown that economically developed countries (Denmark, Sweden, the Czech Republic) have an egalitarian system of income distribution and do not have socio-economic problems with unemployment, poverty, living standards and democracy. The democracy index that shows the country's political stability has shown in these countries the complete stability of democracy and the political system. It has provided a high rate and quality of education, nutrition, security and economic growth.

The aim of this study was to compare this research with other studies in the field of economic inequality. In history, economic inequality was synonymous with poverty. Poor societies are societies with pronounced income inequality. However, we have proven that economic inequality is the cause of poverty and the consequence of the problem. Research in economic literature has linked economic inequality with economic growth. Simon Kuznjec has pointed to the economic growth gap that has emerged as a result of economic inequality. In the short term, income inequality affects economic growth. In the long run, economic growth stagnates and then economic activity falls. The socio-economic dimension of the problem is not seen in the old economic research. This problem is a newer date and only in the 21st century economists are beginning to deal with it. We have based this research on the real data of the European Union, so that could make certain conclusions and confirm links. This work could be a good basis for more advanced research in the area of economic inequality and the socio-economic consequences of this problem

5. CONCLUSIONS

Inequality of income in the European Union, measured by Gini coefficient, shows the difference between the member states. When we brought it into relation with the percentage of population at risk of poverty, the results showed that there is statistically significant impact of economic inequality on the growth of poverty in most of the European countries. Observing the curves of the movements of these two parametars (Gini index from 0,2692 to 0,3574 and the absolute share of the population at risk of poverty from 0,0122 to 0,2349) we can conclude that a direct linear conection between the observed parameters which have proved the impact of income inequality on the growth poverty in the countries of the European Union.

The unequal distribution of income, wealth and value in the national economy is the source of the other socio- economic problems. Problems are reflected in

suppressing economic growth, reducing the level of security and increasing the percentage of crimes, reducing health and quality of life, reducing the rate and quality of education and increasing political inequality. Index of democracy, on the example of the European Union, has shown that there are differences in conducting of the electoral process and democracy. When it comes to the economic inequality of the countries and regions of the European Union, a direct linear link is established between the growth of economic inequality and the existence of socio-economic problems in the implementation of democratic process in the observed countries. The direct impact of economic inequality on the growth of socio-economic problems (such as the implementation of full democracy) has been identified in the observed countries.

Recommendations for the countries of the European Union, which Bosnia and Herzegovina itself aims at, are based on economic egalitarianism as a concept of sustainable development and stable development. A stable and sustainable development in long term is not possible determinant of any economic policy unless it is based on equality income, wealth or other values as well as on other values that exist in society: cultural, scientific, technological, safety and health.

REFERENCES

Alvaredo, F., Chancel, L., Piketty, T., Saez, E., & Zucman, G. (Eds.). (2018). *World inequality report 2018*. Belknap Press. doi.org/10.3386/w23119

Aristondo, O. (2018). Poverty decomposition in incidence, intensity and inequality. A review. *Hacienda Pública Española*, *225*(2), 109-130. doi.org/10.7866/hpe-rpe.18.2.4

Begović, B. (2015). O ekonomskoj nejednakosti i društvenom blagostanju. *Anali Pravnog fakulteta u Beogradu*, *63*(1), 23-40. doi.org/10.5937/analipfb1501023b

Caselli, M., Fracasso, A., & Traverso, S. (2018). Globalization and Electoral Outcomes: Evidence from Italy. doi.org/10.2139/ssrn.3194705.

Cornia, G. A., & Martorano, B. (2012). *Development policies and income inequality in selected developing regions, 1980–2010* (No. 210). United Nations Conference on Trade and Development. Available at: https://unctad.org/en/PublicationsLibrary/osgdp20124_en.pdf

Cowell, F. A., & Van Kerm, P. (2015). Wealth inequality: A survey. *Journal of Economic Surveys*, 29(4), 671-710. doi.org/10.1111/joes.12114

Durlauf, S. N. (1996). A theory of persistent income inequality. *Journal of Economic growth*, *1*(1), 75-93. doi.org/10.1007/bf00163343.

Erić, O. (2013). Factors of economic unevenness in theory and the European practice. *Ekonomski vidici*, *18*(2-3), 287-300.

EUROSTAT, *Statistics Database: Income inequality in countries in European Union,* avaliable at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12&lang=en.

Galbraith, J. K., & Garcilazo, E. (2014). Unemployment, Inequality and the Policy of Europe: 1984- 2000. *In empirical post Keynesian Economics* (pp. 56-81), Routleddge. https://econpapers.repec.org/article/pslbnlaqr/2004_3a11.htm

García-Sánchez, E., Willis, G. B., Rodríguez-Bailón, R., García-Castro, J. D., Palacio-Sañudo, J., Polo, J., & Rentería-Pérez, E. (2018). Perceptions of economic inequality in Colombian daily life: More than unequal distribution of economic resources. Frontiers in psychology, 9, 1660. doi.org/10.3389/fpsyg.2018.01660.

Greenwood, J., Guner, N., & Knowles, J. A. (2003). More on marriage, fertility, and the distribution of income. *International Economic Review*, *44*(3), 827-862. doi.org/10.1111/1468-2354.t01-1-00091.

Jäntti, M., Sierminska, E. M., & Van Kerm, P. (2015). Modeling the joint distribution of income and wealth. In *Measurement of Poverty, Deprivation, and Economic Mobility* (pp. 301-327). Emerald Group Publishing Limited. doi.org/10.1108/s1049-258520150000023010.

Jovanović Gavrilović, B. (2003). Nejednakost i razvoj. *Economic Annals 44(159)*, 21-61.doi.org/10.2298/eka0359021j.

Kuypers, S., & Marx, I. (2019). The truly vulnerable: integrating wealth into the measurement of poverty and social policy effectiveness. *Social Indicators Research*, *142*(1), 131-147. doi.org/10.1007/s11205-018-1911

Leković, V. (2015). DETERMINANTE EKONOMSKE (NE) JEDNAKOSTI I NJENE IMPLIKACIJE ZA ODRŽIVI EKONOMSKI RAZVOJ. doi.org/10.5937/ekon-hor15020811

Milanović, B. (2016). *Globalna nejednakost: Novi pristup za doba globalizacije*. Akademska knjiga.

Molnar, D. (2013). Dinamika i struktura regionalnih dispariteta u Srbiji tokom perioda 2001-2010. godina'. *Ekonomski vidici*, *18*(2-3), 175-189. https://fedorabg.bg.ac.rs/fedora/get/o:8334/bdef:Content/get

Molnar, D. (2013). *Regionalne nejednakosti i privredni rast: primer Srbije* (Doctoral dissertation, Универзитет у Београду, Економски факултет). https://fedorabg.bg.ac.rs/fedora/get/o:8334/bdef:Content/get

Nikiforos, M. (2016). Distribution-led growth in the long run. *Review of Keynesian Economics*, *4*(4), 391-408. doi.org/10.2139/ssrn.2491094.

Piketty, T. (2015). Kapital u XXI veku. *Beograd: Akademska knjiga.* doi.org/10.22182/spm.4932015.13

Popović, G. (2009). Ekonomija Evropske unije: makroekonomski aspekti i zajedničke politike. *Banja Luka: Ekonomski fakultet*.

Rieder, M., & Theine, H. (2019). 'Piketty is a genius, but…': an analysis of journalistic delegitimation of Thomas Piketty's economic policy proposals. *Critical Discourse Studies*, *16*(3), 248-263. doi.org/10.1080/17405904.2019.1573148

Šimurina, N., & Barbić, D. (2017). Porezne promjene i dohodovne nejednakosti u Europskoj uniji tijekom financijske krize. *Revija za socijalnu politiku*, *24*(2), 123-142. doi.org/10.1080/17405904.2019.1573148.

Šućur, Z. (2001*). Siromaštvo: teorije, koncepti i pokazatelji*. Pravni fakultet. doi.org/10.3935/rsp.v8i3.208

Törmälehto, V. M., Kannas, O., & Säylä, M. (2013). Integrated measurement of household-level income, wealth and non-monetary well-being in Finland. *Statistics Finland working paper*. http://www.stat.fi/tup/julkaisut/tiedostot/julkaisuluettelo/ywrp1_201300_2013_10518_net.pdf

ЕКОНОМСКА НЕЈЕДНАКОСТ И СИРОМАШТВО У ЕВРОПСКОЈ УНИЈИ

1 Божана Шкорић, Универзитет у Бањој Луци, Економски факултет
2 Јелена Бјелић, Управа за индиректно опорезивање БиХ
3 Маријана Николић, Инвестиционо- развојна банка Републике Српске
4 Luis Chirosa, Универзитет у Гранади, Економски факултет

САЖЕТАК

Прекомјерна акумулација и растућа неједнакост у расподјели дохотка одразиле су се на високе стопе сиромаштва у земљама Европске уније. У економској литератури постоје обимна истраживања на тему утицаја економске неједнакости на привредни раст. Међутим, знање о смјеру корелације између сиромаштва и економске неједнакости је скромно. У раду смо доказали да сиромаштво није синоним за економску неједнакост него је производ исте. Неједнакост у расподјели дохотка мјерена Gini коефицијентом одразила се на кретање постотка популације изложене ризику од сиромаштва. Коефицијент просте корелације показао је да је неједнакост у расподјели дохотка утицала на раст ризика од сиромаштва у земљама Европске уније. Поред сиромаштва, као посљедица неједнакости у расподјели дохотка, долази и до других социо-економских проблема: гушење економског раста, раста стопе криминалитета, смањење квалитета образовања и здравља, раста политичке неједнакости. Набројани проблеми би требали да буду упозоравајући за Владе земаља да предузму мјере економске политике за смањење економске неједнакости. Европска Унија, као заједница од 28 земаља чланица, треба пажљиво да бира инструменте економске политике како би смањила неједнакост у расподјели дохотка и осигурала стабилно тло за економски раст. Разлике између нивоа развоја, индекса демократичности, прихода и животним стандардима у посматраним земљама су утицале на потешкоће у посматрању проблема и рачунању математичке и статистичке везе. Кроз уједначеност расподјеле прихода, Европска унија би могла ријешити проблеме сиромаштва, социјалне искључености и демократије (мјерено индексом демократичности).

Кључне ријечи:

економска неједнакост, сиромаштво, *Gini* коефицијент, ризик од сиромаштва, *ЕУ*.