

Income inequality in Romania: a comprehensive assessment¹

Andrei-Florin CREȚU

*MSc, Doctoral School of Finance and Banking (DOFIN)
Faculty of Finance, Insurance, Banking and Stock Exchange*

andreiflorincretu@gmail.com

Abstract

It is starting to become widely known that Romania is one of the most unequal states of the European Union in terms of population's income. Romania occupies the first position in the ranking of the ratio between the highest and the lowest income deciles across all member states of the European Union. Moreover, research showed that since 2000, national income inequality increased at a considerably fast pace, contributing to the current state of high discrepancy between the earnings of residents. This fact acted contrary to the economic convergence at a regional level. Assessing the existence of both Sigma and Beta-convergence using a county level analysis, the results infirmed the appearance of any of the two aforementioned notions, concluding that regional disparities actually rose. This paper aims to provide a comprehensive view on the status of income inequality in Romania, analyzing past and current evolutions of numerous indicators, specially designed to evaluate the intensity of the phenomenon. In addition, the paper proposes various measures of reducing the major differences between the richest and the poorest members of the population on both short-term and long-term. Considering that education plays a pivotal role in the earnings of a person, these measures include investing in the education of people from the low-income deciles, as well as offering different incentives to businesses to employ the low-income population.

Keywords: income inequality, Lorenz curve, Gini coefficient, Beta convergence

JEL classification: C63, E17, O21

¹ This paper contains 22 pages (including the Appendix section)

1. Introduction

Looking from an international perspective, income distribution is one of the most important and actual topics debated by economists, heads of states, macroeconomic policy makers and by every person separately. All individuals are affected by discrepancies recorded in income distribution to a lesser or a greater extent. It is clear that global economy is more prosperous now than it used to be few decades ago, but is it more equal than it was in the past? Empirical studies refute this theory. Currently, according to data provided by the World Bank, the two strongest economies in the world, the United States and China, have a cumulated GDP that accounts for 36% of the global GDP². If other top economies are added to this pool, then the first five states ranked by GDP cover more than half of world's gross domestic product. Top 10 economies produce 66% of the global GDP, while top 20 capture more than 80% of the GDP recorded by all states. Analyzing the most commonly used indicator for welfare (i.e., GDP per capita), discrepancies are conspicuous. For example, the small European country, Luxembourg, had in 2014 a gross domestic product per capita that exceeded USD 100,000, while Somalia reported only USD 131 per capita. Furthermore, these differences are not only limited to a comparison between countries, but they are also evident within countries, at county level for example. These will be later discussed and exemplified in case of Romania.

Another indicator that is often used when studying income inequality is the Gini coefficient. It measures how much the distribution of individuals / households' income deviates within a state compared to a perfect distribution of income. Thus, a lower Gini index is preferred to a higher value. The Gini indicator measured at a regional level concluded that Europe has the lowest value (i.e., 32). In contrast, income inequality is very pronounced in Central America, South America and southern Africa, regions that recorded Gini indicators over 50. Measures of income inequality between countries or regions are not limited to the aforementioned indicators, the economic literature being extremely generous in this regard. Other measures of inequality include, but are not

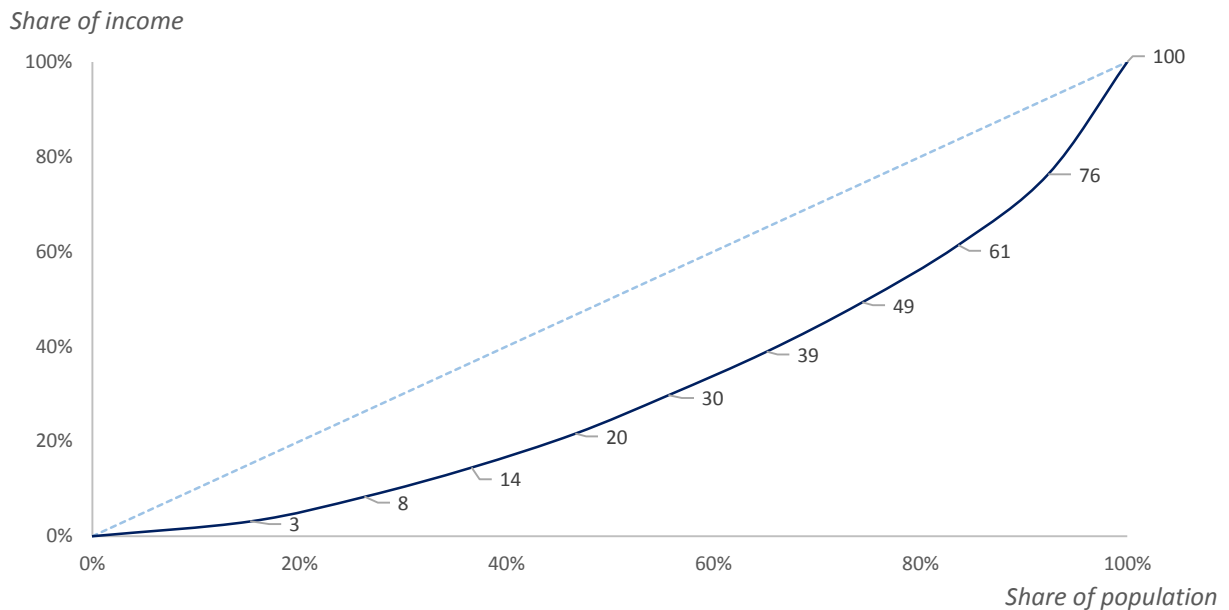
² Data was extracted from the statistical database provided by the World Bank

limited to, wage inequality by occupation and gender, distribution of income per quintiles, deciles or percentiles, the Lorenz curve, the 20/20 and 10/10 ratios, Palma, Hoover and Theil indices.

This article aims to provide an overview on Romania's current position in terms of income inequality. Current literature in this region is scarce, thus the task of offering a well-organized and comprehensive view on the matter being more difficult than it would have been otherwise. By implementing a simple regression model using data at county level, it will be shown that in the last decade, lower income counties did not converged to the economic advancement of the higher income counties. Therefore, the theory of Sigma and Beta convergence will be refuted.

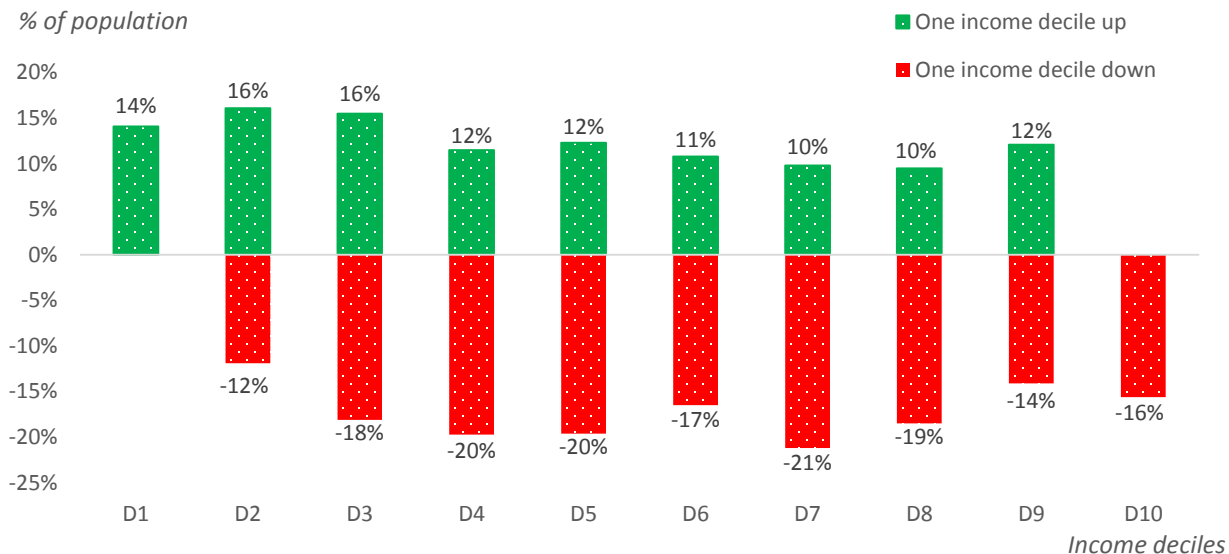
According to statistics, Romania is the most unequal state of the European Union. Considering the ratio between the average income earned by the top 10% wealthiest individuals and the poorest 10% individuals, Romania records a factor of 6, which means that the top 10% of the population earns six times more than the lowest 10%. The EU average performs better, standing at 3.8. In addition, Romania also has the highest Gini coefficient in the Central and Eastern Europe, recording a value of 35, which is, at the same time, one of the highest across all European Union countries.

In case of Romania, the Lorenz curve situates considerably far from the 45 degrees line, which would show a perfect distribution of income, as shown in Figure 1. The 10th decile, which accounts for the richest 10% Romanian residents, captures 24% of national income, while the poorest 10% of the population earn only 3% of the national income.

Figure 1: Lorenz Curve – the Romanian case, 2014

Source: Author's calculations based on data provided by National Statistics Institute

Another indicator with a high practical applicability is the transition deciles. It shows what percentage of the population moves towards a higher decile over a period of one year and how much of the population lowers its current decile ranking. Calculating the net deciles transition as the difference between those who advance to a higher decile and those who get into a lower decile every year, all these values are negative, with an exception in case of the second decile, as it can be noticed in Figure 2. This means that more people are going to lower deciles than to higher ones, which demonstrates that an increased number of people are considered poorer compared to the previous year. If this trend will maintain, income distribution will become highly unequal, so that fewer people will eventually capture actually a higher share of the national income.

Figure 2: Net transition by decile

Source: Eurostat

What is even worse is that income inequality affects mostly the low-income population. A worrying statistic provided by the National Statistics Institute shows that approximately 25% of the population is considered part of the national relative poverty rate. The relative poverty rate is defined as the percentage of people who record a disposable income per adult lower than the poverty threshold, which is defined on an annual basis. In Romania, in 2014, the poverty threshold was calculated at RON 5,823. Corroborating these findings, the conclusion that could be reached is that 25% of Romanians, which in fact represent almost 5 million people, have an annual disposable income lower than RON 5,823. If this value is calculated on a daily basis, then five million people earn less than RON 16 per day. Moreover, 22% of the population is classified under the material deprivation rate, which means that they cannot afford one of the following: due payments, without arrears, of utilities and other current liabilities, going to holiday away from their residence for one week once a year, eating meat, chicken, fish (or equivalent proteins) at least once every two days, access to adequately heated housing and other mundane facilities. In addition, approximately 6% of the country's inhabitants can afford none of the previously mentioned facilities. The problems of income inequality continue, 26% of the population being included among the severe material deprivation rate. This rate includes the share of

people in total population who, due to lack of financial resources, cannot afford at least four of the following: due payments, without arrears, of utilities and other current liabilities, going to holiday for one week away from home once per year, eating meat, chicken, fish (or equivalent protein) at least once every two days, the possibility to live with their own resources, several unplanned expenses (i.e., equivalent to 1/12 of the national poverty threshold), owning a landline or a mobile phone, owning a color television or a washing machine, owning a personal car, affording to adequately heat their homes.

As it can be easily inferred from the data, income inequality is a serious problem in Romania. The goal of this paper is to provide a comprehensive view on the actual issue and to propose eventual measures of limiting this unfavorable situation. The paper is organized as follows: section 2 provides a short overview of the income inequality literature, while the third section includes more statistics and the quantitative model used to assess the convergence of Romania at a county level. The fourth section presents possible measures of reducing the income inequality in Romania and the fifth section states the conclusions of this paper.

2. Literature review

As income inequality accentuated and economists started to realize the great impact it might have to the global economy, an increased number of well renowned authors started to address different aspects of the issue into their papers.

Piketty (2014) conducted one of the most important works in the economic field offering a comprehensive assessment of the problem of income inequality, at a global scale. The author demonstrates, based on economic data calculated historically, that the growth rate of wealth has outperformed the economic growth rate, which automatically contributed to higher inequalities among individuals. Under *ceteris paribus* conditions, an economy that will grow faster than wealth will diminish the importance of the latter, while an economy with a lower growth rate will increase the importance of wealth within a country.

Jones (2014) studied several representative works on this topic in the last decade, written by Thomas Piketty, Emmanuel Saez and other important authors and showed how income inequality is connected to the Pareto distribution and what are the main drivers of income inequality.

Galor (2011) argues that in the early stages of industrialization, when capital plays a very important role in ensuring economic development, economic inequality emphasizes the process of economic improvement toward those individuals with a higher marginal propensity for savings. However, in more advanced stages of economic development, as human capital is becoming an engine of economic growth, equality, in the presence of credit constraints, stimulates human capital formation and its growth.

Jones and Kim (2014) have questioned why inequality has grown at a faster pace in the United States than it has in France or Japan. Their arguments are that innovation has played an important role in this equation. The authors argue that the accelerated development of the Internet and fiscal incentives provided to the upper class help entrepreneurial development but, at the same time, increase income inequality. In contrast, policies that stimulate the so-called 'creative destruction', a concept introduced decades ago by Joseph Schumpeter, helps reducing the inequality of incomes.

Aghion et al. (2015) conducted a study with the same theme as that of Jones and Kim (2014) using a model with panel data across multiple countries, and their results have concluded that there has been a positive and statistically significant correlation between various measures of innovation and inequality in case of the United States' upper class in recent decades.

De Nardi (2015) studied several approaches used in the income inequality literature and, in particular, the mechanism of savings used in each. Her conclusions maintained that further studies are required to better understand what exactly are the determinants of income inequality registered between the top and the bottom of the society.

Gabaix et al. (2015) showed that the standard theories used until present, which are based on a mechanism of random increase generates a transition with a magnitude too slow relative to that shown by the data. Then, the authors suggested biased deviations from the basic models that can explain these inconsistencies, such as heterogeneity among average growth rates or deviations from Gibrat's law.

Kearney and Levine (2014) studied the relationship between income inequality and social mobility. They showed that a higher level of income inequality adversely affects social mobility and may lead to low expectations in terms of return on human capital among the young generation.

Using several approaches, Atanasio, Hurst and Pistaferri (2012) analyzed the changes in consumption inequality in the United States. They concluded that between 1980 and 2010, consumption inequality has increased by approximately the same extent as income inequality.

Papay, Murnane and Willet (2014) conducted a study on the state of Massachusetts and analyzed the relationship between the income level and the attained level of education. They point out that in recent decades, differences in the level of population's education and income have reduced.

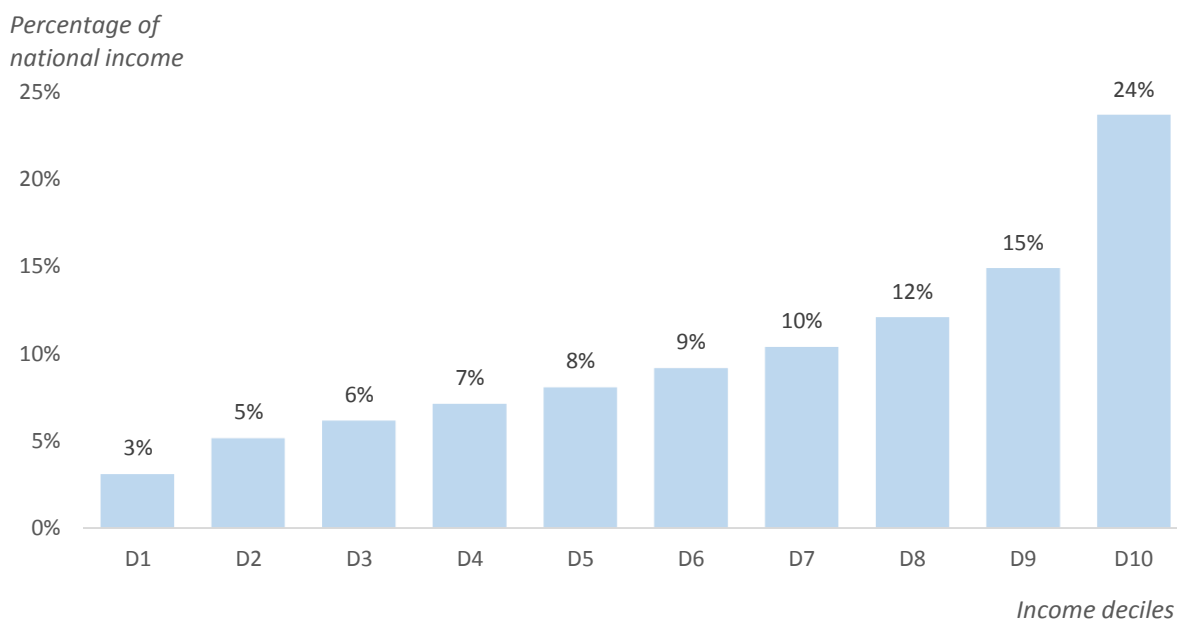
The work of Burkhauser et al. (2016) studied the dynamics of income inequality in the United Kingdom and showed that using different statistical measures of this process lead to significantly different results. The authors also showed that inequality in the analyzed region has increased considerably since 2000, but estimates do not reliably record this.

3. Measures of income inequality

3.1 Inequality distribution in Romania

Income distribution in Romania, by deciles, is one of the most insightful measures of income inequality. As stated earlier in the paper, in 2014, data provided by the National Institute of Statistics showed that the 10th decile population, who are the richest 10% of Romanians held 24% of all income recorded in the country. Meanwhile, the poorest 10% of people held only 3% of total income. Given a perfectly equal distribution of income, each of the 10 deciles should hold 10% of total income. Because this does not happen, the Lorenz curve moves to the right of the first bisector, as observed in Figure 1. Distribution of income per decile is represented in Figure 3.

Figure 3: Income distribution per deciles, 2014



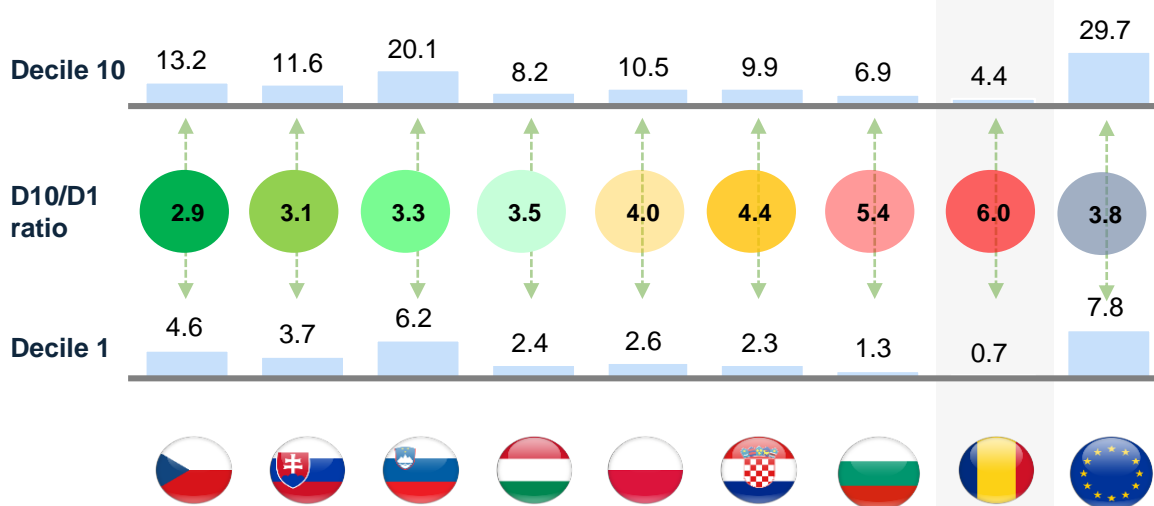
Source: National Statistics Institute

Another widely used indicator in analyzing income inequality is the 10/10 ratio. This indicator calculates the ratio between the income earned by the richest 10% men and 10% of the poorest people. By calculating this value at the CEE level, the results show

that Romania registers the highest value: 6.0, while in the Czech Republic the value stands at just 2.9, as shown in Figure 4. Romania is well above the EU average of 3.8. This shows that the richest 10% of Romanians earn 6 times more than the poorest 10% of Romanians, this figure also being the highest in the entire European Union. In other words, this proves that Romania is the most unequal country in the European Union.

Figure 4: 10/10 ratio at CEE level

EUR thousands, 2014




















Source: Author's calculations based data provided by Eurostat

3.2 Earnings discrepancies by gender and economic activities

Net earnings, by gender and economic activities, classified by the NACE Rev. 2 code, represents another indicator that validates the phenomenon of income inequality in Romania. As expected, there are considerable differences between the average levels of net wages by economic activity. The highest net salary is recorded in the financial and insurance activities sector, while the lowest salaries can be found in the accommodation and food services sector. What is important to notice is that there are major difference between average net wages earned by men and those earned by women. As it can be seen in Figure 5, the largest difference between the salaries of men and women is reflected in the sector that also records the highest earnings (i.e., financial and insurance

activities). In this case, men earn on average 41% more than women do. Other differences worth mentioning are recorded in manufacturing, wholesale and retail trade, but also in administrative and support service activities, a sector where women earn on average 21% more than men do but, within this sector, average wages are considerably lower compared to other activities.

Figure 5: Earnings gaps by gender and economic activities

NACE Rev. 2 main class	Average net wages, RON thousands, 2014		Difference between men and women average net wages
	Men	Women	
 A. Agriculture, Forestry And Fishing	1.3	1.2	3%
 B. Mining And Quarrying	3.2	3.4	-5%
 C. Manufacturing	1.8	1.4	28%
 D. Electricity, Gas, Steam And Air Conditioning Supply	3.1	3.0	4%
 E. Water Supply; Sewerage, Waste Management And Remediation Activities	1.5	1.5	-3%
 F. Construction	1.2	1.5	-18%
 G. Wholesale And Retail Trade; Repair Of Motor Vehicles And Motorcycles	1.5	1.3	20%
 H. Transportation And Storage	1.7	1.8	-7%
 I. Accommodation And Food Service Activities	1.0	0.9	10%
 J. Information And Communication	3.5	3.1	13%
 K. Financial And Insurance Activities	4.7	3.3	41%
 L. Real Estate Activities	1.3	1.3	0%
 M. Professional, Scientific And Technical Activities	2.5	2.4	6%
 N. Administrative And Support Service Activities	1.2	1.5	-21%
 O. Public Administration And Defense; Compulsory Social Security	2.6	2.9	-9%
 P. Education	1.9	1.7	10%
 Q. Human Health And Social Work Activities	1.7	1.5	14%

Source: Author's calculations based on data provided by National Statistics Institute

By calculating the average net wage at county level, as shown in Table 1 in Appendix, the unequal distribution of gains is obvious. As it can be easily observed in the aforementioned source, there are only 5 counties (i.e., Arges, Cluj, Gorj, Ilfov and Timis) and Bucharest, which record a higher net wage than the national average. Moreover, Bucharest records the highest average salary, with significant differences compared to other counties, as it can also be seen in Table 1.

3.3 How income inequality affects life satisfaction

Income inequality can also affect the life satisfaction of the population. In a survey that aimed to measure the satisfaction level at quintiles level (i.e., a quintile represents the population that holds 20% of total income – e.g., quintile 1 represents the poorest 20% of people, while quintile 5 the richest 20% of the population), the data showed that there are considerable differences between the life satisfaction level felt by the first quintile, compared to the results for the fifth quintile. The results published by Eurostat show the mean recorded by each of the considered indicators to measure life satisfaction. Scores that were used to calculate this mean ranged from 1 (least satisfied) to 10 (most satisfied) and the results can be seen in Table 2 in Appendix.

A simple regression model between the 10/10 ratio, which was discussed earlier, and overall satisfaction of quintile 1 in all 28 member states of the European Union (plus Iceland), was estimated. The equation of the model is represented as:

$$y_i = \alpha + \beta x_i + \varepsilon_i, \quad i = \overline{1,28} \quad (1)$$

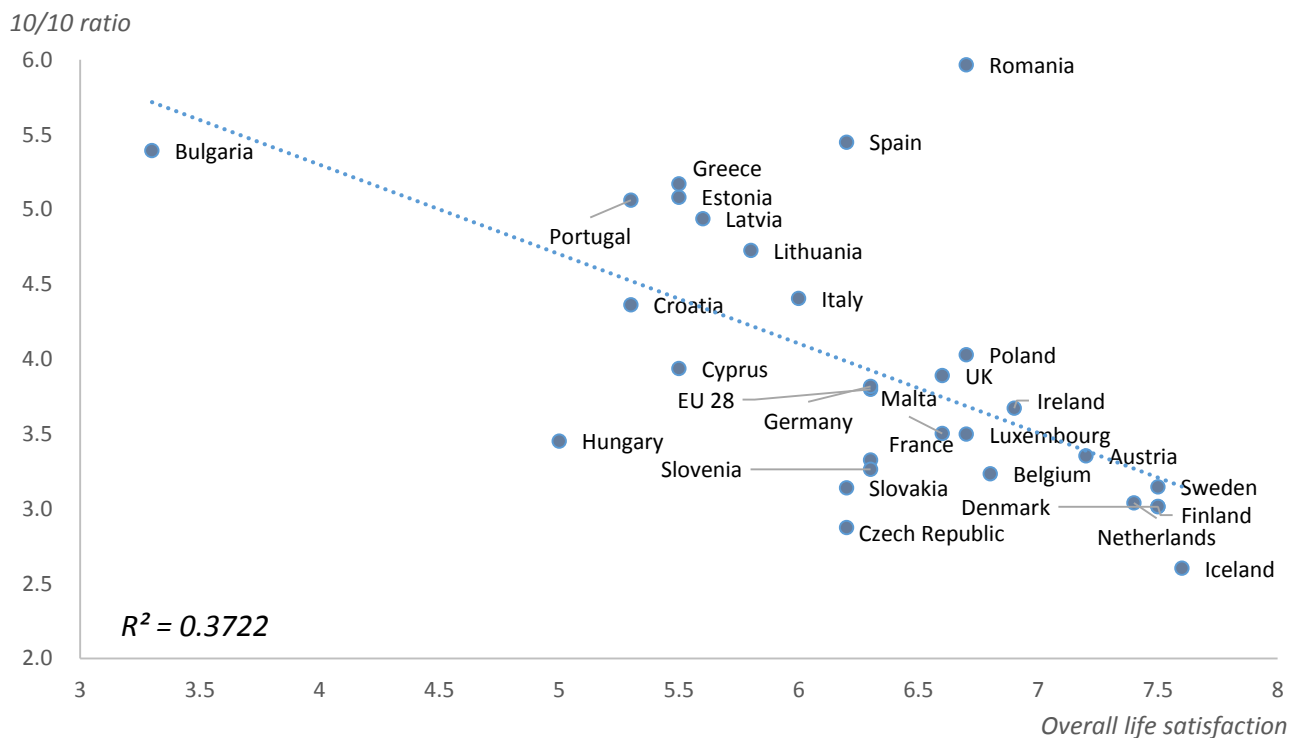
, where the dependent variable, y , is the 10/10 ratio, the independent variable, x , represents the level of overall life satisfaction, and ε is the residual variable, while i is an index used for the 28 EU member states (plus Iceland).

Estimating this simple regression model, the results show that there is a negative relationship between the independent and the dependent variable:

$$y_i = 7.6877 - 0.5973x_i, \quad i = \overline{1,28} \quad (2)$$

The value of the parameter β from relation (1) is -0.5973 and is statistically significant, and the value of R^2 , the coefficient of determination, is 0.3722. This relationship shows that as the level of the 10/10 ratio is higher (i.e., the differences between the earnings of the richest 10% of the population and the poorest 10% are greater), the overall life satisfaction felt by quintile 1 is lower. In other words, the greater the inequality, the more negatively affected are the poor, who are experiencing a lower overall life satisfaction. This negative relationship can be observed at country level in Figure 6.

Figure 6: Relationship between 10/10 ratio and overall life satisfaction



Source: Author's calculations based on data provided by Eurostat

It can be seen in Figure 6 that the states with the lowest differences between the population's income (e.g., Iceland, Finland, Sweden, and Denmark) are recording high levels of overall life satisfaction. On the other hand, states with major income

discrepancies (e.g., Bulgaria, Greece, Spain, and Romania) are recording low levels of overall life satisfaction.

3.4 Economic convergence in Romania – a county-level analysis

This section will test if there is evidence for Sigma and Beta convergence processes, using data registered at the level of Romanian counties.

Sigma convergence tests if the disparities across regions are reduced given a certain period. The most widely used indicator to measure the Sigma convergence is the coefficient of variation, calculated as the ratio between the standard deviation of a sample of data and its mean. Thus, the Sigma convergence process occurs if the standard deviation of income across regions is reduced, meaning that those regions evolved to a more equal distribution of income, compared to the starting point of the analysis.

To test the Sigma convergence in Romania, county level GDP per capita at PPS was used, and the coefficient of variation was calculated both in 2001 and 2013, as being the latest data available at county level at the time of the analysis. In 2013, the coefficient of variation of GDP per capita at county level was 42%, one of the highest in the region. What is important to point out is that this value increased compared to the one recorded in 2001 by 11 percentage points, the second highest increase after the one registered by Bulgaria, case in which the coefficient of variation increased by 17 percentage points, but needs to be mentioned that Bulgaria started in 2001 from a lower value of the coefficient, compared to Romania. These findings contradict the theory of the Sigma convergence in case of the Romanian counties. In other words, the differences between the welfare of poorer counties compared to the richer counties increased, this being also a proof of the high inequality in the country.

Another important process that is regularly used to analyze convergence is Beta convergence. Beta convergence occurs when poorer regions grow faster than richer ones, thus recording a “catch-up” process, which is meant to reduce regional inequalities.

To test if the Romanian counties experienced the process of Beta convergence in the previous decade, a simple regression model was used, whose equation is shown below:

$$\ln \left[\frac{y_i}{y_{i-1}} \right] = \alpha + \beta \ln(y_{i-1}) + \varepsilon_i, \quad i = \overline{1,42} \quad (3)$$

, where $\ln \left[\frac{y_i}{y_{i-1}} \right]$ represents the GDP per capita growth rate in case of county i , while $\ln(y_{i-1})$ represents the starting point of the GDP per capita. ε is the residual variable that captures the impact of all the other factors that were not included in the model.

To validate the process of Beta convergence, the value of parameter β from relation (3) must be negative. This would mean that there is an inverse relationship between the rate of growth of GDP per capita at the county level and the starting level of GDP per capita. In other words, the counties that have started from a lower level of GDP per capita grew faster than richer counties and thus regional inequalities were reduced.

However, the results for Romania, after calculating the growth rate of GDP per capita in 2013 compared to 2001 show the opposite. They contradict the hypothesis of Beta convergence, as can be seen in equation (4):

$$\ln \left[\frac{y_i}{y_{i-1}} \right] = -0.5239 + 0.1624 \ln(y_{i-1}), \quad i = \overline{1,42} \quad (4)$$

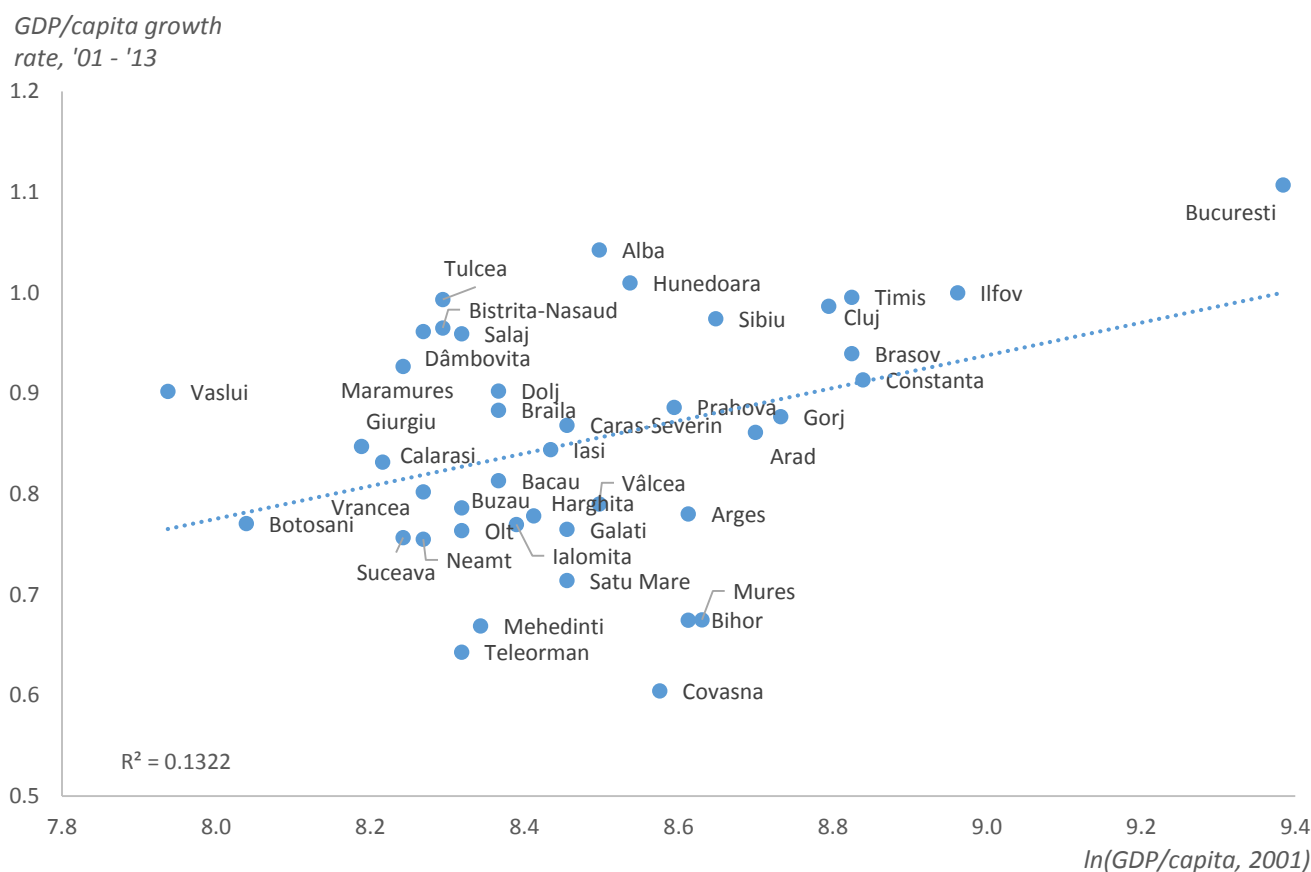
Because the associated probability of parameter α in equation (3) was 0.3531, well above the 5% significance level, the model was estimated again and the results can be found in relation (5):

$$\ln \left[\frac{y_i}{y_{i-1}} \right] = 0.1038 \ln(y_{i-1}), \quad i = \overline{1,42} \quad (5)$$

As previously stated, the results contradict the appearance of the Beta convergence in case of Romania's counties because the parameter in equation (3) is 0.1038. This value

is positive, which indicates that there is a direct relationship between the starting level of GDP per capita (i.e., GDP per capita in 2001) and its growth rate. In other words, the counties that were originally wealthier grew faster than those that were poorer, thereby increasing regional disparities. Figure 7 shows the results obtained, for each county, including also the positive slope regression line.

Figure 7: Testing the β – convergence for Romanian counties



Source: Author's calculations based on data provided by Eurostat

4. Measures of reducing income inequality in Romania

It has been seen that there are large inequalities across population's income, both in case of the income distribution by deciles and earnings by gender.

One of the most important initiatives that could be taken by Romania is investing more in the education of the poor. It is known that those with higher education earn, on average, more than those with a lower education. According to the statistics, Romanians who have a Masters or a Doctoral degree earn, on average, EUR 1,004 per month, while those with less than primary, primary and lower secondary education earn, on average, only EUR 309 per month³. Furthermore, in Romania the ratio between the income of those who have completed a Masters or a PhD and those with less than primary, primary and lower secondary education records the highest value in comparison with other countries in the region. This reaffirms the high degree of inequality in Romania.

It is important to note that the Romanians with tertiary education represent only 15% of the entire population of the country. Meanwhile, Romania has some of the lowest literacy rates and one of the highest rates of school dropout in Europe. These statistics contribute to the increased income inequality in Romania. Therefore, one of the measures proposed in this paper to reduce income inequality is investing in the education of the poor. If more investments will be directed to educate the low-income population, on medium and long term, their earnings would most likely increase and this would reduce the intensity of income inequality.

Another measure that could be taken in order to reduce income inequality in Romania would be the alignment of women's salaries to comparable levels to those of men. Currently, females account for 51% of Romania's population, but at the same time, women earn, on average, 8% less than men. Given the large share of women in total population, reducing earnings disparities between men and women would contribute significantly to reducing disparities of incomes, thus Romania will tend toward an equal status.

One of the measures that could increase the efficiency of the convergence process of income earned by the low-income class to that of the upper class could be implemented by offering economic incentives to employers that seek to increase their labor force with

³ Based on monthly earnings by educational attainment data provided by Eurostat

people from disadvantaged social classes or low-income population. One factor that contributes to the pervasiveness of the income inequality phenomenon in Romania is that people with low-income do not have a stable monthly revenue because they do not work full-time or do not have a stable job on the long term.

There are undoubtedly a myriad of measures, either economic or social, that could be taken to reduce income inequality in Romania, in addition to the ones that were previously presented in this paper. However, they should be subject to rigorous examination before being implemented. On top of an in-depth analysis, it is important that authorities adopt several measures as soon as possible because, as it was presented in this paper, the income inequality in Romania is on an ascendant trend.

5. Conclusions

This paper intends to be a starting point in the study of income inequality in Romania. It is currently one of the few academic papers on this topic.

In the following decades, income inequality in Romania will either increase or decrease. What is certain is that today, Romania is one of the most unequal countries in Europe and the least equal in the European Union. Demographic forecasts show that the country will be considerably impacted by the population-aging phenomenon, which will most likely affect the country as it will further increase the level of income inequality.

In Romania, the richest 10% of people own 24% of total income, while the poorest 10% own only 3% of it. The top 10% earn, on average, 6 times more than the poorest Romanians, the largest difference in the European Union. In addition, the transition deciles are mostly negative, which means that each year more people are included into a lower decile than vice versa. Should this continue, the richest 10% of people would get to capture more than 24% of total income, while the poorest 10% will own less than 3% of the total income. Meanwhile, it has been observed that there are also considerable discrepancies between the salaries of men and women and between economic activities.

Into this paper, there were tested two simple regression models. The first model demonstrated that income inequality has a negative influence on overall life satisfaction. Consequently, the higher the differences between the earnings of rich and poor, the lower the overall life satisfaction experienced by the poor.

The second regression model tested the hypothesis of Beta convergence using GDP per capita data from 2001 and 2013, in a county level analysis. The results contradicted the existence of the Beta convergence, as the independent variable parameter recorded a positive value. This showed that in the richer counties (i.e., those with a per capita GDP higher in 2001), the GDP per capita grew faster than it did in case of poorer counties. This has led to a higher income inequality between counties, thus there is no sign of any “catch-up” process. Also, the Sigma convergence hypothesis was tested and it was seen that the coefficient of variation calculated for GDP per capita at the level of the Romanian counties increased by 11 percentage points during 2001 - 2013, finally reaching a value of 42%, one of the highest in the European Union.

Decision-making authorities are obliged to recognize that there is a great inequality of incomes in Romania and that in the coming years appropriate solutions must be implemented to limit the expansion of this unfavorable phenomenon.

References

Aghion, P., Akcigit, U., Bergeaud, A., Blundell R., Hémous, D. (2015), *Innovation and top income inequality*, NBER Working Paper No. 02138, Cambridge, Massachusetts

Altăr, M., Necula, C., Bobeică, G. (2009), *A robust assessment of the Romanian business cycle*, No 28, Advances in Economic and Financial Research - DOFIN Working Paper Series, Bucharest University of Economics, Center for Advanced Research in Finance and Banking – CARFIB

Attanasio, O., Hurst, E., Pistaferri, L. (2012), *The evolution of income, consumption, and leisure inequality in the US, 1980-2010*, NBER Working Paper No. 17982, Cambridge, Massachusetts

Auerbach, A., Kotlikoff, L. (1987), *Dynamic fiscal policy*, Cambridge University Press, Cambridge, Massachusetts

Burkhauser, R. V., Nicolas, H., Jenkins, S., Wilkins, R. (2016), *What has happened to UK income inequality since the mid-1990s? Answers from reconciled and combined household survey and tax return data*, NBER Working Paper No. 21991, Cambridge, Massachusetts

De Nardi, M. (2015), *Quantitative models of wealth inequality: a survey*, NBER Working Paper No. 21106, Cambridge, Massachusetts

Diamond, P. (1965), *National debt in a neoclassical growth model*, American Economic Review, 55: 1126–1150

Gabaix, X., Lasry, J. M., Lions, P. L., Moll, B. (2015), *The dynamics of inequality*, NBER Working Paper No. 21363, Cambridge, Massachusetts

Galor, O. (2011), *Inequality, human capital formation and the process of development*, NBER Working Paper No. 17058, Cambridge, Massachusetts

Jones, C. (2014), *Pareto and Piketty: The macroeconomics of top income and wealth inequality*, NBER Working Paper No. 20742, Cambridge, Massachusetts

Jones, C., Kim, J. (2014), *A Schumpeterian model of top income inequality*, NBER Working Paper No. 20637, Cambridge, Massachusetts

Kearney, M. S., Levine, P. B. (2014), *Income inequality, social mobility, and the decision to drop out of high school*, NBER Working Paper No. 20195, Cambridge, Massachusetts

Papay, J. P., Murnane, R. J., Willett, J. B. (2014), *Income-based inequality in educational outcomes: learning from state longitudinal data systems*, NBER Working Paper No. 20802, Cambridge, Massachusetts

Piketty, T. (2014), *Capital in the twenty-first century*, Harvard University Press, Cambridge, Massachusetts London

Rasif, A., Sadka, E. (2016), *How migration can change income inequality?*, NBER Working Paper No. 22191, Cambridge, Massachusetts

Samuelson, P. A. (1958), *An exact consumption-loan model of interest with or without the social contrivance of money*, *Journal of Political Economy*, 66: 467–482

Warman, C., Worswick, C. (2016), *Technological change, occupational tasks and declining immigrant outcomes: implications for earnings and income inequality in Canada*, NBER Working Paper No. 21307, Cambridge, Massachusetts

<http://ec.europa.eu/eurostat>

<http://www.insse.ro/>

<http://data.worldbank.org/>

Appendix

Table 1: Average net wage discrepancies at county level

<u>County</u>	<u>Average net wage</u>	<u>County</u>	<u>Average net wage</u>
Bihor	1,299	Galati	1,576
Bistrita-Nasaud	1,273	Tulcea	1,482
Cluj	1,857	Vrancea	1,300
Maramures	1,292	Arges	1,785
Satu Mare	1,344	Calarasi	1,365
Salaj	1,327	Dambovita	1,488
Alba	1,433	Giurgiu	1,413
Brasov	1,604	Ialomita	1,362
Covasna	1,267	Prahova	1,687
Harghita	1,251	Teleorman	1,320
Mures	1,509	Ilfov	2,087
Sibiu	1,616	Municipiul	
Bacau	1,455	Bucuresti	2,441
Botosani	1,347	Dolj	1,541
Iasi	1,649	Gorj	1,761
Neamt	1,274	Mehedinti	1,475
Suceava	1,352	Olt	1,558
Vaslui	1,304	Valcea	1,337
Braila	1,348	Arad	1,492
Buzau	1,326	Caras-Severin	1,326
Constanta	1,571	Hunedoara	1,393
		Timis	1,836
		TOTAL	1,697

Source: National Statistics Institute

Table 2: Life satisfaction scores (1 – the lowest; 10 – the highest) for quintiles 1 and 5

<u>Satisfaction indicator</u>	<u>Quintile 1</u>	<u>Quintile 5</u>
Satisfaction with financial situation	5.2	7.3
Satisfaction with accommodation	6.7	7.7
Job satisfaction	5.5	7.8
Satisfaction with commuting time	6.0	7.6
Satisfaction with time use	6.4	7.3
Overall life satisfaction	6.7	7.7
Satisfaction with recreational and green areas	6.8	7.2
Satisfaction with living environment	7.5	7.2
Satisfaction with personal relationships	7.2	7.8
Meaning of life	6.8	7.8

Source: Eurostat