Income inequality and economic growth: the reexamination of the existence of Kuznets curve: evidence from CEE countries

SŁAWOMIR KUŹMAR

Poznań University of Economics and Business, Institute of Economics, Department
of Macroeconomics and Development Research, Al. Niepodległości 10, 61-875 Poznań, Poland
✉ slawomir.kuzmar@ue.poznan.pl
ⓘ orcid.org/0000-0002-2458-0463

Abstract

Motivation: In the last years, a lot of attention has been paid to economic inequality — a phenomenon that may lead to what some commentators predict as the end of capitalism. At the same time some economists believe that the economic inequalities are natural and excessive inequalities can be reduced through the process of economic growth. The natural starting point in the discussion concerning the relation between inequality and economic growth is the theory proposed by Simon Kuznets, according to which inequality rises in the early phases of economic development but falls eventually as the growth advances, taking the shape of the inverse-U shaped pattern. The empirical validity of the so-called "Kuznets curve" has been intensively investigated, but the evidence is ambiguous. In this context re-examining Kuznets theory in CEE countries is interesting especially because of the observed rapid economic growth as a result of structural transformation in these countries.

Aim: The aim of the study is an attempt to investigate the nature of relation between economic growth and income inequality levels in Central and Eastern Europe (CEE) countries in years 2004–2020 and verify if the analysed relation is taking an inverse-U shape as indicated by the Kuznets curve.

Results: The results of conducted analysis indicate that the evidence for an inverted-U shaped relation between inequality levels and economic growth in CEE countries is much less robust than what is implied by Kuznets curve theory.

1. Introduction

Even though the reflection on income distribution goes back to the beginnings of economics as independent science, its popularity is not diminishing. In recent years books such as Deaton (2013) or Piketty (2014) have reignited a worldwide interest for income and wealth inequalities, making this topic one of the most popular subjects both in empirical and theoretical analyses over the last twenty years.

Part of this interest concerns the determinants of economic inequalities, among which the role of economic growth is especially debated. The natural starting point in the discussion concerning the relation between inequality and economic growth is the theory proposed by Kuznets (1955), according to which inequality rises in the early phases of economic development but falls eventually as the growth advances, taking the shape of the inverse-U shaped pattern of inequality. The empirical validity of so called "Kuznets curve" has been intensively investigated, but the evidence is ambiguous. Critics of studies devoted to this theory among other problems point out the low availability and reliability of the income distribution data. This problem has been partly solved by the creation of the World Inequality Database (WID.world, 2022). Taking the advantage of the accessibility to the new high quality income inequality data and concentrating on Central and Eastern Europe CEE countries this paper hopes to contribute to existing extensive research on determinants of income inequality focusing on the relation between economic growth and income inequalities in this group of countries.

Taking the above into account the main goal of the presented study is an attempt to investigate the nature of relation between economic growth and income inequality levels as measured by set of inequality indicators in CEE countries in the years 2004–2020 and verify if analysed relation is taking the inverse-U shape as indicated by the Kuznets curve theory. Additionally, as some kind of robustness check, a similar analysis was conducted for 14 so-called old EU (EU14) countries.

The results of conducted analyses indicate that the evidence for an inverted-U shaped relation between inequality levels and economic growth in CEE countries is much less robust than what is implied by Kuznets curve theory. The predictive power of the level of economic development as indicated by GDPpc is not a strong predictor of the inequality levels among CEE countries. Much more surprising results have been obtained for 14 old EU countries. First, in most of the tested specification the relation between economic development and inequalities has not been statistically significant. Second, and more interestingly, in case of statistically significant estimations the relationship between

income inequality and the level of economic development has a U shape rather than an inverted U shape as Kuznets theory implies.

Section two points to some key insights from the (large) literature on Kuznets curve theory. Section 3 describes data and some descriptive statistics concerning the dynamic of economic growth and income inequality levels in studied countries. Consequently, section 4 presents methods of conducted analysis and obtained results. The last section concludes.

2. Economic growth and income inequality: literature review

Since the seminal work by (Kuznets, 1955) the nature of the relation between economic growth and income inequities has been one of the most debated issues in development economics. Even though the so-called Kuznets curve hypothesis has become the central point of this discussion, the original paper contains within it not only indication of the famous "inverse-U" relation between growth and inequalities, but a whole range of arguments and intuitions about the evolution of income distribution during economic development as well as suggestions of potential problems in such analyses. For example, Kuznets introduced the "modern" questions of inequality of pre-tax versus post-tax income, inequality versus poverty when there is significant growth in mean income and the implications of volatility for measured inequality (Kanbur, 2012). Nevertheless, as previously mentioned, the so-called Kuznets curve hypothesis or as Anand and Kanbur (1993b) call the "Kuznets process" have caught the biggest interest of researchers. For example, Milanovic (2016) stated that "the Kuznets curve was the main tool used by inequality economists when thinking about the relationship between development or growth and inequality over the past half century".

In a nutshell, the hypothesis assumes the process of distributional shift of income as the population moves from agricultural (rural, traditional) to non-agricultural (urban, modern) sectors during the course of development. Kuznets, with the help of a numerical illustration, pointed out that "[e]ven if the differential in per capita income between the two sectors remains constant and the intrasector distributions are identical for the two sectors, the mere shift in the proportions of numbers produces slight but significant changes in the distribution for the country. In general, as the proportion of A (the first sector) drifts from 0.8 downwards, the range tends first to widen and then to diminish" (Kuznets, 1955, p. 15).

After two decades since the publication of Kuznets (1955) paper the first empirical studies on Kuznets hypothesis appeared (Adelman & Morris, 1973; Ahluwalia, 1976; Paukert, 1973; Robinson, 1976). It seems that among those studies, research conducted by Ahluwalia, (1976) launched the most furious debate about the applicability of the "inverse-U hypothesis" in cross-country analyses. In the summary of his work Ahluwalia (1976) pointed out the main findings of his research in which he regressed income shares from survey data

across countries on a quadratic function of log GDP per capita. He indicated that there is strong support for the proposition that relative inequality increases substantially in the early stages of development, with a reversal of this tendency in the later stages. He distinguished a number of processes occurring simultaneously with development which are correlated with income inequality, and which can plausibly be interpreted as causal. He listed processes such as intersectoral shifts in the structure of production, expansion in educational attainment and skill level of the labour force, and reduction in the rate of growth of population. He also suggested that the cross-section results do not support the stronger hypothesis that the deterioration in relative inequality reflects a prolonged absolute impoverishment of large sections of the population during development. Finally, he pointed out that the cross-section results do not support the view that a faster rate of growth is systematically associated with higher inequality than can be expected given the stage of development achieved (Ahluwalia, 1976, p. 338).

In subsequent years most studies based on better quality cross-sectional data found no proof of the existence of the Kuznets curve. For example, Anand and Kanbur (1993a) conducted a thorough analysis based on the Ahluwalia (1976) data set. The authors tested for the robustness of Ahluwalia's estimates with respect to variations in functional form and data set, and found them to be lacking. They used rigorous statistical methodology for testing non-nested functional forms against one another and found that alternative forms which are equally well supported by the data imply very different shapes for the inequality-economic development relationship. A similar conclusion and a consensus of the lack of empirical support for the inverse-U relationship between inequality and economic development has been reached among others by (Bruno et al., 1998; Fields, 2001; Fields & Jackubson, 1994; Ram 1997; Ravallion, 1997). For a sharp critique of cross-country regressions on inequality and growth, see Banerjee and Duflo (2003). A critical overview of research on the interplay between economic development and economic inequality has been presented also by Piketty (2006).

The natural answer to the critique of cross-country analyses of the relation between economic growth and inequality was concentration on time series data. It is worth to recall here that the central empirical information deployed by Kuznets (1955) was time series information, on the United States, United Kingdom, and Germany. One of the most popular examples of such a type of analysis is the study conducted by Barro (2000). In his broader study on the overall relation between income inequality and rates of growth and investment based of panel data analysis of 100 countries he tested among others the hypothesis on as an inverted-U relationship between the Gini value and log(GDP). He concludes that the hypothesis — whereby inequality first increases and later decreases during economic development — emerges as a clear empirical regularity. However, the relation does not explain the bulk of variations in inequality across countries (Barro, 2000, p. 29).

In the new millennium, parallelly to the studies based on panel data, new hypotheses related to forces behind the inverted-U shape on inequalities have been broadly tested. Among those theories a political Kuznets curve seems to be especially interesting. This theory popularised by Acemoglu and Robinson (2000; 2002) suggests that income inequality increases at the early stages of democratization but declines when suffrage becomes more widespread. In the Acemoglu and Robinson theory (2000), the initial ruling elites accumulate wealth, but the poor are unable to do so without redistribution. In consequence inequality rises. When inequality reaches a threshold, social unrest and a threat of revolution intensify. These trends result in the extension of the franchise. With the extension of the franchise, the poor become the median voters, redistribution occurs, the poor accumulate capital and inequality falls.

Summing up this review it is also worth pointing out that in the last few years a huge interest in so-called Environmental Kuznets Curve theory has arisen (for critical review of literature see Bhattacharya, 2019). The environmental Kuznets curve theory suggests that environmental pollutions increases at the beginning of economic growth, similar to the original Kuznets curve. However, when it passes a certain level of income, the economic development allows environmental remediation.

3. Data used in empirical analyses

In the original paper Kuznets (1955) made a clear statement concerning the income distribution data requirements. Showing himself to be the careful empirical economist, he listed five specifications of the data necessary in the evaluation of income distribution. He for example pointed out that the units for which incomes are recorded and grouped should be family-expenditure units, properly adjusted for the number of persons in each-rather than income recipients for whom the relations between receipt and use of income can be widely diverse. Later assumptions concerned the completeness of distribution data, full-time earnings, the meaning of taxes and the need of using so-called "secular" levels of income, free of cyclical and other transient disturbances.

Most of the Kuznets' concerns related to the availability and reliability of the income distribution data was overcome by a collaborative effort involving hundreds of researchers throughout the world resulting in the creation of the World Inequality Database (WID.world, 2022) — an extensive database on the distribution of income and wealth, both between and within countries. Relying on this source of data in the analysis of the nature of relation between economic growth and income inequality levels in ten CEE countries[1] measures such as Top 1% , Top 10% to Bottom 50% ratio and values of Gini index of pre-tax as well as after tax or in the form of disposable income for years 2004–2020 were utilized. Following most of the empirical studies aimed at the verification

---

[1] This group is comprised of countries such as: Bulgaria, the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, Slovakia.

of existence of the original Kuznets Curve as the measure of economic development the GDP per capita indicator (GDPpc) in logarithmic form obtained from Eurostat (2022) have been used. Additionally, for comparative reasons, in the analysis data on other 14 so-called old EU (EE14) countries[2] have been used. The basic descriptive statistics of the variables under analysis are shown in Table 1.

In the analysis of the potential relation between economic growth and income inequalities it is interesting to simply look at the data in graphical form. For example Barro (2000, p. 21) presenting a scatter plot of the Gini index and log(GDPpc) stated that an inverted-U relationship between the Gini value and economic growth is not obvious from the scatter plot, although one can discern such a curve staring at the diagram for a long time. Similar scatter plots for CEE and EU14 countries (see Chart 1 and Chart 2) seems to be more puzzling. As in CEE countries the inverted U shape seems to appear as some kind of regularity, such shape of relation cannot be observed in EU14 countries. In those countries, much more diversified in terms of GDPpc levels, the relation between inequalities and economic growth seems to be a contradiction of Kuznets curve.

4. Methods

To make a deeper verification of the relation between economic growth and inequalities, the following basic model has been used, although it may have some variants depending on the type of inequality measures as well as panel data econometric model estimated:

$$Inequal_{it} = \alpha + \beta_1 lnGDP_{it} + \beta_2 \left(lnGDP_{it} \right)^2 + \mu_i + \varepsilon_{it}, \tag{1}$$

for $i=1,...,N$ and $t=1,...,T$.

The presented equation indicates that inequality measures ($Inequal_{it}$) are determined by logarithmic values of per capita income and its square ($lnGDP_{it}$). Additionally, μ_i is a country effect and ε_{it} is used as the error term in the equation. The form of the equation (1) is resulting from the Kuznets curve hypothesis and has been widely studied (see for instance, Brida et al., 2021; Cheng, 2003; Ille et al., 2017; Oczki et al., 2017; Risso & Sanchez Carrera, 2019). In order to prove the inverted U-shape relation concurrently with the confirmation of the significance of the parameters β_1 and β_2, their values should comply with the following conditions $\beta_1>0$ and $\beta_2<0$ ($|\beta_1|>|\beta_2|$). Thus, findings of a positive and significant coefficient β_1 and a negative and significant β_2 should be taken as evidence in support of the Kuznets inverted-U hypothesis.

To determine whether the variables are stationary as well as to rule out the possibility of applying non-stationary methodology such as cointegrated

---

[2] This is countries such as: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden.

panel models, the unit root analysis method developed by Levin et al. (2002) was used. Table 2 shows the unit root tests for all variables used in estimation. As can be seen, in all cases the existence of a unit root can be rejected in the context of panel data, and therefore the aforementioned techniques can be applied.

5. Results

As already mentioned, the analysis of the relation between income inequalities and economic growth has been conducted separately for group of 10 CEE countries as well as for the so-called other 14 old EU countries for pre-tax and after-tax level of inequalities. As a result, 16 different models have been estimated. To distinguish between fixed effects and random effects models, the Hausman test was performed (Baltagi, 2005). The final form of the presented model (FE or RE) depends on the test results. The results of the conducted estimations are presented in Table 3.

As previously indicated, in order to confirm the inverted U-shape relation hypothesis, the parameters β_1 and β_2 should be statistically significant, and their values should comply with the following conditions $\beta_1 > 0$ and $\beta_2 < 0$ ($|\beta_1| > |\beta_2|$). The obtained results indicate that in CEE countries such conditions have been fulfilled for all tested specifications. However, the explained variation in each of the panel regression analyses was relatively low (see R^2), indicating that levels of economic development indicated by GDPpc is not a strong predictor of the inequality levels among CEE countries. Much more surprising results have been obtained for 14 old EU countries. First, in most of the tested specification β_1 and β_2 parameters have not been statistically significant. Second, and more interestingly, in the case of statistically significant (two out of eight) estimations in which the Gini index and 10 t0 50 index after tax income were independent variables, parameters β_1 and β_2 parameters are statistically significant, and their values are as follows: $\beta_1 > 0$ and $\beta_2 < 0$ ($|\beta_1| > |\beta_2|$). Such values indicate that income inequality declines and then increases with the rise of GDP per capita following a quadratic trend. Such results indicate that the relationship between income inequality and the level of economic development has a U shape rather than an inverted U shape as Kuznets theory implies.

5. Conclusion

In this paper, the nature of the relation between economic growth and income inequality levels in Central and Eastern Europe (CEE) as well as old European Union countries (EU14) have been analyzed.

The conducted literature review indicates that the Kuznets curve was one of the main tools used by inequality economists when studying the relationship between economic development and inequality over the past half century. Analyzing the history of studies based on this tool, it is fair to say that the consensus

states there is no hard or empirical proof that an inverse-U relationship between inequality and development exists.

The results obtained in this paper seems to support this consensus as far as the studied group of countries is concerned. The inconclusiveness of the nature of the relation between economic development and inequality was reflected by the fact that the obtained results differ significantly between the CEE and EU14 countries groups. It is also important to underline that the predictive power of the level of economic development as indicated by GDPpc is not a strong predictor of the inequality levels in the studied groups of countries. What's more the result obtained for EU14 countries indicate that studied relation takes a U shape rather than an inverted U. A contradiction on Kuznets curve theory.

This findings once again open the door to further analyses aimed at the identification and exploration of the deeper determinants that may shape the relation between economic growth and income inequalities. In such analyses the incorporation of the institutional determinants in Acemoglu and Robinson (2000; 2002) style seems to be most promising.

References

Acemoglu, D., & Robinson, J.A. (2000). Why did the west extend the franchise: democracy, inequality, and growth in historical perspective. *The Quarterly Journal of Economics*, 115(4), 1167–1199. https://doi.org/10.1162/003355300555042.

Acemoglu, D.,& Robinson, J.A (2002). The political economy of the Kuznets curve. *Review of Development Economics*, 6(2), 183–202. https://doi.org/10.1111/1467-9361.00149.

Adelman, I. & Morris, C.T. (1973). *Economic growth and social equity in developing countries.* Stanford University Press.

Ahluwalia, M.S. (1976). Income distribution and development: some stylized facts. *The American Economic Review*, 66(2), 128–135.

Anand, S., & Kanbur, S.M.R. (1993a). Inequality and development: a critique. *Journal of Development economics*, 41(1), 19–43. https://doi.org/10.1016/0304-3878(93)90035-L.

Anand, S., & Kanbur, S.M.R. (1993b). The Kuznets process and the inequality: development relationship. *Journal of Development Economics*, 40(1), 25–52. https://doi.org/10.1016/0304-3878(93)90103-t.

Baltagi, B.H. (2005). *Econometric analysis of panel data* (3rd ed.). John Wiley & Sons.

Banerjee, A.V., & Duflo, E. (2003). Inequality and growth: what can the data say. *Journal of Economic Growth*, 8, 267–299. https://doi.org/10.1023/A:1026205114860.

Barro, R.J. (2000). Inequality and Growth in a Panel of Countries. *Journal of Economic Growth*, 5(1), 5–32. https://doi.org/10.1023/A:1009850119329.

Bhattacharya, M. (2019). The environmental Kuznets curve: a critical review of earlier literature. In B. Özcan, & I. Öztürk (Eds.), *Environmental Kuznets Curve (EKC)*, (pp. 9–14). Academic Press. https://doi.org/10.1016/B978-0-12-816797-7.00002-3.

Brida, J.G., Risso, W.A., Sánchez Carrera, E.J., & Segarra, V. (2021). Growth and inequality in the Mexican states: regimes, thresholds, and traps. *Papers in Regional Science*, 100(5), 1295–1322. https://doi.org/10.1111/pirs.12616.

Bruno, M., Ravallion, M., & Squire, L. (1998). Equity and growth in developing countries: old and new perspectives on the policy issues. In V. Tanzi, & K. Chu (Eds.), *Income distribution and high-quality growth* (pp. 117–146). MIT Press.

Cheng, W., & Yongzheng W. (2017). Understanding the Kuznets process: an empirical investigation of income inequality in China: 1978–2011. *Social Indicators Research*, 134(1), 631–650. https://doi.org/10.1007/s11205-016-1435-x.

Deaton, A. (2013). *The great escape: health, wealth, and the origins of inequality.* Princeton University Press. https://doi.org/10.2307/j.ctt3fgxbm.

Eurostat. (2022). *Eurostat database.* Retrieved 01.09.2022 from https://ec.europa.eu/eurostat/data/database.

Fields, G. (2001). *Distribution and development: a new look at the developing world.* MIT Press.

Fields, G.S. & Jakubson, G.H. (1994). *New evidence on the Kuznets curve.* Cornell University.

Ille, S., Risso, A., & Sanchez Carrera, E.J. (2017). Democratization and inequality: empirical evidence for the Organisation for Economic Co-operation and Development member countries. *Environment and Planning C: Politics and Space*, 35(6), 1098–1116. https://doi.org/10.1177/0263774X16684521.

Kanbur, R. (2012). Does Kuznets still matter. In S. Kochhar (Ed.), *Policy making for Indian planning: essays on contemporary issues in honor of Montek S. Ahluwalia* (pp. 5–128). Academic Foundation Press.

Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review*, 45(1), 1–28.

Levin, A., Lin, C.F. & Chu, C.S.J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24. https://doi.org/10.1016/S0304-4076(01)00098-7.

Milanovic, B. (2016). *Introducing Kuznets waves: how income inequality waxes and wanes over the very long run.* Retrieved 01.09.2022 from https://cepr.org/voxeu/columns/introducing-kuznets-waves-how-income-inequality-waxes-and-wanes-over-very-long-run.

Oczki, J., Muszyńska, J., & Wędrowska, E. (2017). Kuznets hypothesis of income inequality: empirical evidence from EU. *Hradec Economic Days*, 7(1), 643–651.

Paukert, F. (1973). Income distribution at different levels of development. *International Labour Review*, 108(1), 97–125.

Piketty, T. (2006). The Kuznets curve: yesterday and tomorrow. In A.V. Baner-jee, R. Benabou, & D. Mookherjee (Eds.), *Understanding poverty* (pp. 63–72). Oxford Academic. https://doi.org/10.1093/0195305191.003.0004.

Piketty, T. (2014). *Capital in the twenty first century.* The Belknap Press.

Ram, R. (1997). Level of economic development and income inequality: evidence from the postwar developed world. *Southern Economic Journal*, 64(2), 576–583. https://doi.org/10.2307/1060869.

Ravallion, M., & Chen, S. (1997). What can new survey data tell us about recent changes in distribution and poverty. *The World Bank Economic Review*, 11(2), 357–382.

Risso, W., & Sanchez Carrera, E.J. (2019). On the impact of innovation and inequality in economic growth. *Economics of Innovation and New Technology*, 28(1), 64–81. https://doi.org/10.1080/10438599.2018.1429534.

Robinson, S. (1976). A note on the U hypothesis relating income inequality and economic development. *The American Economic Review*, 66(3), 437–440.

WID.world. (2022). *World inequality database.* Retrieved 01.09.2022 from https://wid.world.

Acknowledgements

Appendix

Table 1.
Income inequalities and economic development indicators: main statistics

Variable	2004 CEE				2004 EU14			
	Mean	Sd	Min	Max	Mean	Sd	Min	Max
pre-tax top 1% share	11.19	2.37	7.61	15.41	10.89	2.15	7.01	15.75
pre-tax top 10% share	34.70	4.08	29.77	40.99	33.85	3.29	29.08	39.62
pre-tax top 10% to bottom 50%	8.93	2.56	5.92	13.62	8.14	1.63	5.90	11.26
post-tax top 1% share	8.06	2.72	4.10	14.09	7.85	1.43	5.04	9.65
post-tax top 10% share	28.45	4.63	23.05	36.28	27.27	3.00	23.00	33.24
post-tax top 10% to bottom 50%	5.98	1.75	3.42	8.69	5.01	1.26	3.62	7.72
pre-tax Gini index	0.46	0.05	0.39	0.54	0.45	0.04	0.39	0.51
post-tax Gini index	0.37	0.07	0.25	0.46	0.34	0.05	0.27	0.44
GPD per capita (USD 2017)	16 004	3 496	10 907	22 868	38 798	14 544	24 463	86 388
pre-tax top 1% share	11.68	3.43	7.04	18.27	10.45	1.69	6.92	12.91
pre-tax top 10% share	34.70	5.45	26.50	43.52	33.38	1.92	29.43	37.07
pre-tax top 10% to bottom 50%	9.10	2.88	5.39	13.67	7.92	0.86	6.47	9.76
post-tax top 1% share	9.04	3.28	5.29	16.85	7.63	1.66	5.28	10.60
post-tax top 10% share	29.48	5.23	22.79	39.99	27.05	2.15	23.26	30.36
post-tax top 10% to bottom 50%	6.16	2.13	3.53	9.59	4.93	0.81	3.67	6.10
pre-tax Gini index	0.46	0.06	0.38	0.54	0.45	0.02	0.41	0.48
post-tax Gini index	0.38	0.07	0.26	0.48	0.34	0.04	0.28	0.40
GPD per capita (USD 2017)	34 061	4 873	23 688	40 802	56 149	24 162	28 491	119 208

Source: Own preparation based on Eurostat (2022) and WID.world (2022) data.

Table 2.
Levin Lin Chu unit root test results of variables at levels

Variables	Statistic (unadjusted t)	Statistic (adjusted t*)	p-value
pre-tax top 1% share	−11.3729	−6.2109	0.0000***
pre-tax top 10% share	−10.2174	−5.9182	0.0000***
pre-tax top 10% to bottom 50%	−10.7048	−6.7249	0.0000***
post-tax top 1% share	−11.5146	−7.4024	0.0000***
post-tax top 10% share	−9.8554	−5.8226	0.0000***
post-tax top 10% to bottom 50%	−8.6777	−4.6171	0.0000***
pre-tax Gini index	−10.7378	−6.7211	0.0000***
post-tax Gini index	−8.1200	−3.9695	0.0000***
GPD per capita (USD 2017)	−5.3643	−3.6708	0.0001***

Notes:

*** denotes statistical significance at the 1% level and therefore rejection of the unit root hypothesis at 1%. Lag selection (Automatic) is based on Akaike Information Criteria (AIC).

Source: Own preparation based on Eurostat (2022) and WID.world (2022) data.

Table 3.
Economic growth and income inequality: results of panel data analysis

| Variable	Pretax Gini		Pretax Top 10% to 50%		Pretax 10% share		Pretax 1% share	
	CEE (RE)	UE 14 (FE)	CEE (FE)	UE 14 (FE)	CEE (FE)	UE 14 (FE)	CEE (FE)	UE 14 (FE)
const	-5.839***	0.474	-358.678***	-40.296	-7.994***	-1.740	-6.283***	-1.526
	1.418	1.326	84.26	63.234	1.582	1.516	1.308	1.148
LnGDP (β_1)	1.253***	0.009	72.948***	8.792	1.661***	-0.018	1.266***	0.306
	0.282	0.245	16.765	11.692	0.315	0.28	0.26	0.212
LnGDP2 (β_2)	-0.062***	0.000	-3.615***	-0.399	-0.083***	-0.017	-0.063***	-0.014
	0.014	0.011	0.834	0.54	0.016	0.013	0.013	0.01
R2	0.1123	0.0036	0.1101	0.0298	0.1497	0.2759	0.275	0.27
observations	170	238	170	238	170	238	170	238
Hausman test	44743	13.59	42156	24412	34425	20668	35521	15067
	0.426	0.001	0.046	0.003	0.084	0.014	0.084	0.111
const	-7.041***	4.909***	-283.095***	102.087***	-9.197***	0.868	-6.432***	-0.966
	-1.726	26299	63.25	43.734	1.709	1.459	1.323	1.005
LnGDP (β_1)	1.477***	-0.856***	57.391***	-18.074***	1.874***	-0.11	1.282***	0.198
	0.343	0.318	12.585	8.087	0.34	0.27	0.263	0.186
LnGDP2 (β_2)	-0.734***	0.040***	-2.844***	0.840***	-0.092***	0.005	-0.063***	-0.009
	0.107	0.015	0.626	0.374	0.017	0.868	0.013	0.009
observations	170	238	170	238	170	238	170	238
R2	0.11	0.09	0.12	0.15	0.18	0.36	0.17	0.01
Hausman test	44593	769.16	44593	99.25	26024	20.72	31079	0.39
	0.601	0.000	0.329	0.000	0.095	0.000	0.240	0.824

Notes:

*** denotes statistical significance at the 1% level.

Source: Own preparation based on Eurostat (2022) and WID.world (2022) data.

Chart 1.
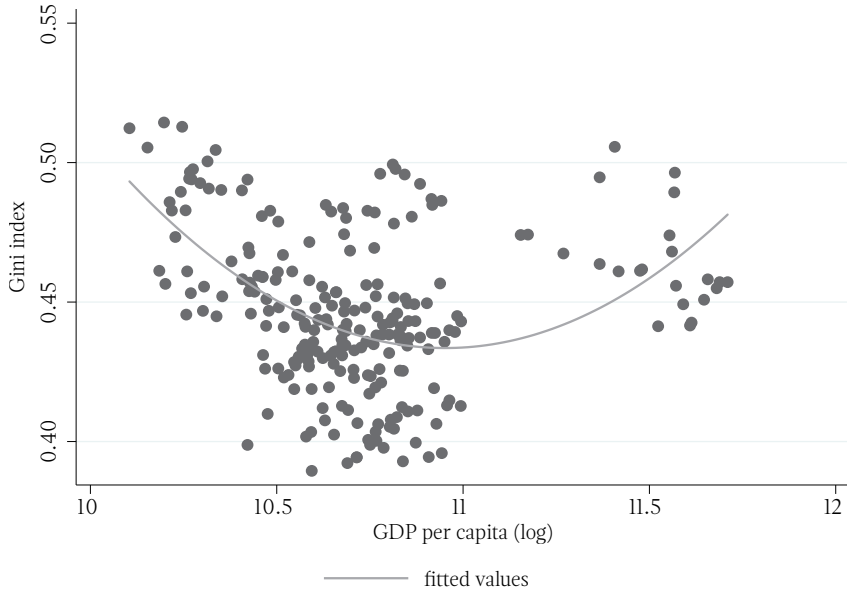**Inequality and economic growth in CEE countries in years 2004–2020**
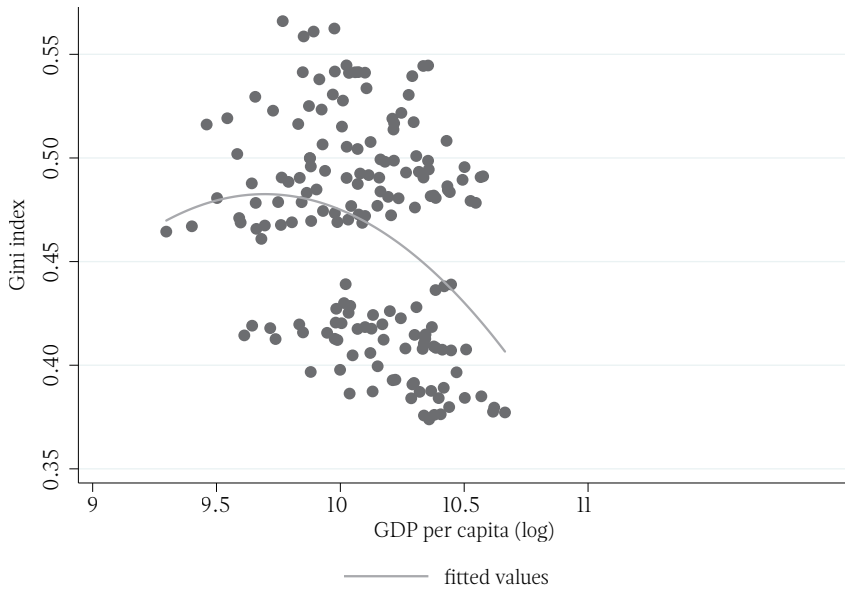
Notes:

The fitted values line was estimated as the prediction for independent variable from a linear regression of yvar on xvar and xvar^2.

Source: Own preparation based on Eurostat (2022) and WID.world (2022) data.

Chart 2.
Inequality and economic growth in EU14 countries in years 2004–2020

fitted values

Notes:

The fitted values line was estimated as the prediction for independent variable from a linear regression of yvar on xvar and xvar^2.

Source: Own preparation based on Eurostat (2022) and WID.world (2022) data.