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Inequality of Pre-fiscal and Post-fiscal Income Distribution in European Countries[1, 2]

1. Introduction

Although economic literature on income inequality is vast, empirical papers examine mostly inequality of distribution of gross income, which is understood as the sum of pre-government income and government social benefits (at individual or household level). The most popular measure of income inequality used in various international comparisons is the Gini coefficient for the gross income distribution, and this statistic is relatively easily accessible. At the same time, the number of papers that analyze anatomy of the original income distribution is much more limited. For this reason, studies that deal with income redistribution, including transformation of pre-government income into final income due to redistributive effect of social benefits and income taxes are rather rare.

That is why the paper has two aims. The first intention is to depict original income distribution in European countries in more detail. The second purpose is to capture the link between the pre-fiscal and post-fiscal income inequality, namely to assess the overall redistributive impact of social transfers and taxes.

To meet the aims, this study identifies the Gini coefficient for pre-government income in European countries in 2004–2014, that is in all EU countries, as well as Iceland, Norway and Switzerland. The Gini measure is evaluated for the entire income distribution and by income quintiles. Model of the tax-benefit redistributive effect, which allows to verify if there is statistically significant re-

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lationship between the pre-fiscal income inequality and the dependent variable, is also proposed. Additionally, model of social expenditure-to-GDP ratio, within which within-group and between-group components of the original income Gini coefficient play the role of essential predictors, is suggested. Both models rely on panel data derived from the EU-Survey on Income and Living Conditions (EU-SILC), are classified as fixed effect models, and are estimated using the least squares dummy variable (LSDV) estimator.

As regards recent studies on income redistribution in Europe, which use the Gini coefficient as income inequality measure, the work of Čok and Urban (2007) indicated that pre-tax income and post-tax income inequality was higher in Croatia than in Slovenia, but the absolute redistributive effect of PIT was slightly lower in the former country. According to Urban (2008), in Croatia, income equalizing effect of social transfers (including old-age pensions), PIT and social security contributions (SSC) was estimated at about 40%. Due to Zaidi (2009), in 17 EU member states, social benefits (together with public pensions), PIT, SSC and taxes on wealth resulted in income inequality reduction by around 43%. Bargain et al. (2013) focused on redistributive effect of tax-benefit system in 11 Eurozone countries, pointing out that replacing one third of the national tax-benefit systems by a European system would result in compelling redistributive impact both within and across member states. Implementing microsimulation model EUROMOD for the EU-15, Figari and Verbist (2013) revealed that there is a trade-off between the average tax rate and tax progressivity: countries with a high pre-tax inequality level tend to redistribute less. Mezzanzanica et al. (2013) evaluated redistributive impact of the Italian tax system with reference to the individual level and the family level: in relative terms, the effect is lower at the family level than at the taxpayer level (12.5% versus 14.7%). Policy indication resulting from this result was that the use of the French method of income taxation (families as being tax units) would not lead to satisfactory outcome in terms of inequality reduction. Analyzing the effect of changes in tax-benefit policies on the income distribution, Agostini et al. (2016) showed that, in 2014–2015, tax and benefit policy changes were mostly poverty-reducing in Estonia, Belgium and Finland, whilst they were poverty-increasing in Greece and Latvia (in other countries the effect was mostly not statistically significant).

The main finding of this paper is that the original income Gini coefficient is not statistically significant predictor of the tax-benefit redistributive influence, namely, countries with the most unequal market income distribution, on average, do not have more redistributive fiscal systems. Besides, the key variable of interest is not correlated with social expenditure-to-GDP ratio, as it is very broad measure of income inequality, which is not able to discriminate between different inequality components that may have different effect on social spending (its specific levels may summarize many different distributions). But pre-fiscal income inequality within the first quintile, the second quintile and between those two quintiles turn out to be significant predictors of social expenditure.

The paper is organized as follows. Section 1 presents the FE panel data models. Section 2 describes the panel data used. In section 3, the empirical results are analyzed. Conclusions complete the whole.

1. The models

Redistributive effect of tax-benefit system can be expressed as the relative difference between the post-fiscal income Gini coefficient and the pre-fiscal income Gini coefficient:

$$RE(NT) = \frac{G(Z) - G(X)}{G(X)}, \tag{1}$$

where $G(Z)$ is the post-fiscal income inequality and $G(X)$ is the pre-fiscal income inequality.

Substituting decomposition of the Gini coefficient introduced by Lambert and Aronson (1993):

$$G(X) = G(X)^B + \sum \rho_n G(X)^W + R(X)$$

into transformed equation (1) yields:

$$G(Z) = [1 + RE(NT)]G(X)$$
$$= [1 + RE(NT)]G(X)^B + [1 + RE(NT)]\sum \rho_n G(X)^W + [1 + RE(NT)]R(X), \tag{2}$$

where $G(X)^B$ is between-group original income inequality, $G(X)^W$ represents within-group original income inequality and $R(X)$ denotes residual that reflects the fact that income ranges can overlap (inter-group inequality is computed by substituting every income in every subgroup with the relevant subgroup mean; if sub-group income ranges do not overlap, $R(X)$ is equal to zero). Thus, the net income Gini coefficient is the weighted avarage of the between-group, within-group and overlaping original income components, the weights being equal to $(1 + RE(NT))$.

Formula (2) allows to evaluate the contribution of between-group original income inequality into the overall net income inequality.

It is worth to note that, dividing the sample into more subgroups results in the decline of intra-group inequalities, and consequently, increase in inter-group inequality. The higher the number of sub-groups, the higher the percentage contribution to total inequality that is attributable to inter-group inequality.

Generally, there are many socio-economic and demographic factors that can influence redistributive effect of tax-benefit system in a particular country, and some of the explanatory variables are complex and difficult to measure, for example the political system, culture, religion, race etc. These factors are specific

to individual country, and they are rather time-constant. Hence, while building econometric model of tax-benefit system redistributive effect, to avoid the above problem, the fixed effect (FE) approach was adopted. Contrary to the random effect (RE) model, in the FE effect model, time-invariant differences across countries that may have an impact on the left-hand side variable are controlled (the effects are captured by the constant, and that is why they are allowed to be correlated with other regressors).

The functional form of the FE model of tax-benefit system redistributive effect is:

$$RE(NT)_{it} = \alpha_0 + \alpha_1 G(X)_{it} + \alpha_2 SE_{it} + \alpha_3 C(B)_{it} + \\ + \alpha_4 ITR_{it} + \alpha_5 C(T)_{it} + \alpha_6 GDP_{it} + \delta_t + \nu_{it}, \tag{3}$$

where SE represents social expenditure-to-GDP ratio, $C(B)$ denotes social benefit concentration coefficient, ITR stands for income tax revenue as a percentage of GDP, $C(T)$ measures income tax concentration coefficient, ITR is GDP per capita in PPS, δ denotes time-specific effects, and v_{it} represents the composite error term (country-specific effects plus usual error term).

After disaggregating household sample into the pre-fiscal income quintiles, it is possible to analyze the importance of the within-group original income inequality for the social expenditure level.

The FE model explaining social expenditure takes the form:

$$SE_{it} = \beta_0 + \beta_1 G(X)_{(n)it} + \beta_1 TR_{it} + \beta_3 GDP_{it} + \vartheta_t + \nu_{it}, \tag{4}$$

where $G(X)_{(n)}$ is the original income Gini coefficient in the n-th quintile and is total revenue as a share of GDP.

2. Panel description

Equation estimation is based on the panel data for the European countries over a period 2004–2014, which is described below.

Pre-government income equals income received by all household members except for state-granted-social transfers other than pensions, as old-age pensions are assumed to be the earlier worked out, put off income from work. To be precise, pre-fiscal income consists of the following components: gross employee cash or near cash income, gross cash benefits from self-employment, public and private plans pensions, regular inter-household cash transfers, and income received by people aged under 16 (as defined by Eurostat). It is current income.

Final income is defined as original income plus social transfers that are not pensions, minus tax on income and social insurance contributions. Social benefits taken into account include: sickness benefits, disability benefits, family-related allowances, housing allowances, education allowances and unemployment ben-

efits. For the sake of brevity, tax on income and social insurance contributions hereinafter will be referred to as "tax".

The household income is adjusted for differences in household size and demographic structure with the use of modified OECD equivalent scale.

Social expenditure are general government transfers which are related to the following general government functions: social protection, health, education, housing and community amenities, as well as recreation, culture and religion (obviously, these outlays may affect household income).

Income tax revenue is general government revenue that comes from current taxes on income and wealth and net social insurance contributions.

The Gini coefficients and other concentration coefficients were calculated using data from the EU-Survey on Income and Living Conditions 2004–2014, which is the largest harmonized database of households in EU member states, together with a few others European countries (it is coordinated by Eurostat). To be precise, the micro-data from the EU-SILC section 'Income Distribution and Monetary Poverty' were used. In this research, the sample includes all EU countries, along with Iceland, Norway and Switzerland. On the subject of limitations in collection of data on pre-government income, in 2004, only 10 countries collected the data; in 2006, 21 countries reported the data; in 2008, 30 countries reported the data, and since 2012, the data for all countries have been available.

Unlike administrative data that refer to beneficiaries and taxpayers as being natural persons, numerical results presented in this study refer to distribution of households with respect to income per equivalent unit.

Table 1

The size of EU-SILC household sample used in the study

Year	Number of households
2004	116 714
2005	197 657
2006	202 978
2007	219 275
2008	230 068
2009	231 957
2010	233 497
2011	235 535
2012	244 463
2013	237 666
2014	226 701

Source: Own calculations.

One can note that cross-country panel data of high quality is important challenge to be faced by researchers conducting empirical studies on income distribution and redistribution. It is because the data used must guarantee comparability of income across units of observation, that is with respect to reference group (family or individual), income components or equivalence scale (Leigh 2007).

A regards the panel-level average of basic variables, the original income Gini coefficient was 0.3641, and, as this category of income consisted mainly of income from various types of employment contracts (both hired work and self-employment earnings), this factor income contributed most substantially to the total pre-fiscal income inequality. To discuss income inequality in Europe that arises both between skilled and unskilled labor force and between labor and capital, see for example Atkinson (2013).

Table 2 presents the original income Gini coefficient by quintiles: as expected, the highest income dispersion was observed within households in each tail of the income distribution. However, dispersion in the lowest quintile was higher than in the top quintile, and this may suggest that the EU-SILC underreports income of the richest households (this is a general problem faced by income and expenditure surveys) (Atkinson, Micklewright 1983; *The Distribution of Household…* 2010).

Table 2

The original income Gini coefficient by quintiles

$G(X)$	$G(X)_1$	$G(X)_2$	$G(X)_3$	$G(X)_4$	$G(X)_5$	$G(X)_{1-5}$
0.3641	0.2546	0.0644	0.0544	0.0601	0.2031	0.3418

Source: Own calculations.

Calculating the ratio of observed inter-group inequality ($G(X)_{1-5}$) to total inequality, it can be seen that between-group inequality was the key factor in explaining total pre-fiscal income inequality. For alternative approach to measure the relative importance of between-group inequality see Elbers et al. (2008). As expected, there was correlation between inter-group inequality and intra-group inequalities.

Considering the within-country panel-level average, the highest pre-fiscal Gini coefficient was registered in Ireland (42.89), Portugal (42.66), and the United Kingdom (41.57), whereas the lowest one was observed in Slovakia (29.35), Czech Republic (31.35) and Island (31.94). Hence, the pre-government inequality differs across the European countries.

Table 3

The original income Gini coefficient by country

	2006	2008	2010	2012	2014
the lowest $G(X)$	IS (0.3142) DK (0.3143)	IS (0.3177) CZ (0.3189)	CZ (0.3101) NL (0.3140)	DK (0.2845) CZ (0.3000)	CZ (0.3026) IS (0.3087)
the highest $G(X)$	IE (0.4334) UK (0.4093)	LV (0.4426) PT (0.4324)	IE (0.4276) UK (0.4164)	IE (0.4378) UK (0.4349)	PT (0.4332) IE (0.4250)

Source: Own calculations.

In 2004, in the sample as a whole, the average original income Gini coefficient was at 0.3681, as compared to 0.3604 in 2012; therefore, the indicator slightly decreased. There were probably two main reasons for this phenomenon (Borsi and Metiu 2013, *Global Wage Report* 2015). Firstly, there was a reduction in income inequality driven by some degree of economic convergence between the EU-15 and countries which joined the EU in 2004 (mainly decrease in wage inequality). Secondly, during the economic crisis of 2008–12, households in the upper part of the income distribution registered income losses. But in 2014, the Gini measure reached the level of 0.3640.

The post-fiscal income Gini coefficients assumed the value of 0.2940. Thus, final income inequality was lower than original income inequality, surely as a result of redistributive impact of tax-benefit system. Redistributive effect of these fiscal instruments was computed at 0.1993, and, obviously, the higher the level of income equalizing effect in absolute value, the stronger the income inequality reduction.

The benefit concentration coefficient indicates the extent to which the benefit allocation is unequal over the distribution of original income, while the tax concentration coefficient points out the degree to which the tax burden distribution differs from the gross income distribution. In the research sample, social benefit concentration coefficient was negative, while income tax concentration coefficient was positive, which means that households in the lowest tail (decile) of the original income distribution receive larger share of total social benefits, and families in the upper part of gross income distribution bear greater share of total tax burden.

In the research sample, there was no correlation between the market income Gini coefficient for the entire income distribution and social expenditure-to-GDP ratio, and that is why both variables were decided to be used as predictors of the tax-benefit redistributive effect.

3. Empirical results

As a matter of fact, in the panel data, both fixed and random effects were statistically significant, so the Mundlak test was conducted: the test allows to decide whether to use FE or RE estimator if in both FE and RE model robust standard errors are computed (Mundlak 1978) (the Hausman approach does not allow for the 'robust' option).

FE models were estimated by the LSDV1 estimator, that is the approach within LSDV method that drops a country dummy variable to avoid perfect multicollinearity (entity dummy eliminated serves as a reference group, but parameter estimates and goodness-of-fit measures of the model do not change). The 'robust' option to control for heteroscedasticity was used. To assure clear presentation of the calculations, only the main results are presented (entity and time binary dummies are not reported).

Table 4

Tax-benefit redistributive effect model and net income Gini coefficient model

	Dep. var.: *RE*(*NT*)	Dep. var.: *G*(*Z*)
G(*X*)	0.1146 (0.1520)	0.7779*** (0.0515)
SE	0.0045** (0.0019)	0.0016** (0.0006)
C(*B*)	0.1467*** (0.0334)	0.0568*** (0.0126)
ITR	0.0016 (0.0016)	0.0005 (0.0006)
C(*T*)	0.1666*** (0.0442)	0.0608*** (0.0165)
GDP	0.0002 (0.0004)	0.0001 (0.0002)
Constant	0.0428 (0.1136)	0.0782** (0.0339)
Number of countries	31	31
Number of observations	292	292
F test (Prob > *F*)	0.0000	0.0000
R^2 adjusted	0.8750	0.9589
Mundlak test (Prob > Chi^2)	0.0398	0.0426

Notes: Year dummies are not reported. Standard errors (in parentheses) are robust to heteroscedasticity. The Mundlak test allows to decide whether to use RE or FE estimator if a robust estimator of the variance-covariance matrix is used. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Own calculations.

Concerning tax-benefit redistributive effect model, the coefficient on the key variable of interest, that is the pre-fiscal income Gini measure, was not statistically significant (Table 4). Therefore, on average, inequality of this category of income does not influence the degree of income redistribution which is expressed in relative terms: countries with the most unequal original income distribution do not have more redistributive tax-benefit systems. This outcome corresponds, for instance, to the results of Wagstaff et al. (1999) who identified the redistributive impact of PIT in 12 OECD countries, and Paulus et al. (2009) who analyzed the impact of tax-benefit fiscal instruments on income distribution in the enlarged EU. Admittedly, Milanovic (2000) evaluated income redistribution through taxes and benefits in 24 democracies, and concluded that more unequal factor-income countries redistribute more toward the poor and very poor (the lower half of income distribution). Nevertheless, contrary to current study, in his work, old-age pensions were treated not as factor income, but as social transfers.

Social expenditure exerted negative and significant influence on tax-benefit redistributive impact (the 0.05 significance level), that is countries with higher welfare spending report income inequality reduction (recall that the higher the level of redistributive effect in absolute value, the stronger the income inequality reduction). Higher social benefit concentration, which is equivalent to transfers being less targeted towards poorer households, resulted in higher net income inequality (strong statistical significance). Income tax concentration caused the response variable to decrease, as increase in the income tax concentration means that the burden of the tax incurred by richest taxpayers is higher (high statistical significance as well). Both income tax revenue and GDP per capita were found not to be statistically significant predictors of the dependent variable.

Moreover, the net income Gini coefficient was regressed on the same predictors. The coefficient on original income inequality was positive, with 0.01 significance level, informing that, on average, the higher the original income dispersion, the higher the net income dispersion. The magnitude of coefficient says that a 1 percentage point increase in the predictor (across time) would yield on average a 0.78 percentage point increase in the dependent variable.

Estimated coefficients on other predictors gave the expected indications.

As it was said, no correlation between the original income Gini coefficient and social expenditure as a share of GDP was observed; hence, both variables entered the equation for the net income Gini coefficient. The reason for this is that the Gini coefficient is a very broad measure of income inequality, which takes into account the entire income distribution (it also has the characteristic that its specific level may summarize many different distributions). Moreover, its sensitivity to income transfers in the bottom part of income distribution is weak (Pyatt 1976, Svedberg 2004, Wisniewski 1992). Although the fact that the Gini measure takes into account the entire income distribution is, in general, one of its main advantages, the above limitation may be crucial in the context of research on poverty and social exclusion.

Nevertheless, income inequality observed within households located in the lower parts of the pre-fiscal income distribution may, of course, affect general government social expenditure. Hence, the expenditure was regressed on the original income Gini coefficient by income quintiles, which is presented in Table 5.

Social expenditure as a percentage of GDP positively depended on the original income dispersion in the first quintile and the second quintile, as well as dispersion between these two quintiles ($G(X)_{1-2}$) (columns 1–3 in Table 5). In each case, the significance level is 0.01. Therefore, countries characterized by higher income discrepancies both within and between lowest quintiles tend to spend relatively more on social transfers at the general government level.

Regressing the left-hand side variable on the original income distribution by all quintiles revealed that it was statistically significantly, positively related to income inequality in the first quintile, the second quintile and the fifth quintile (in Table 5, column 4). Not surprisingly, the highest significance level referred to the coefficient on the first predictor. Income discrepancies within households in the middle income quintiles do not play important role.

Table 5

Social expenditure model

	(1)	(2)	(3)	(4)	(5)
$G(X)_1$	6.9427*** (2.2805)			5.9257*** (2.2438)	
$G(X)_2$		21.6752*** (8.1772)		18.1622** (8.5054)	
$G(X)_{1-2}$			11.0601*** (2.5080)		
$G(X)_3$				25.4394 (21.0573)	
$G(X)_4$				2.4784 (4.2031)	
$G(X)_5$				7.9080** (3.6028)	
$G(X)_{1-5}$					4.7351 (4.5503)
TR	0.1802*** (0.0574)	0.1862*** (0.0574)	0.1844*** (0.0582)	0.1742*** (0.0570)	0.1834*** (0.0587)
GDP	0.0823*** (0.0129)	0.0898*** (0.0138)	0.0745*** (0.0134)	0.0889*** (0.0135)	0.0874*** (0.0144)
Constant	19.6861*** (3.4594)	20.6143*** (3.6513)	18.5776*** (3.7312)	22.3431*** (3.5956)	20.5146*** (4.2993)
Number of countries	31	31	31	31	32
Number of observations	292	292	292	292	292
F test (Prob > *F*)	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.9542	0.9536	0.9555	0.9554	0.9528
Mundlak test (Prob > Chi^2)	0.0452	0.0415	0.0483	0.0398	0.0421

Notes: Year dummies are not reported. Standard errors (in parentheses) are robust to heteroscedasticity. The Mundlak test allows to decide whether to use RE or FE estimator if a robust estimator of the variance-covariance matrix is used. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Own calculations.

Since there was correlation between inter-group inequality and intra-group inequalities, it was possible to run the regression with the use of only either of these two components of the Gini coefficient for the entire income distribution. Regressing the dependent variable on inter-group inequality alone ($G(X)_{1-5}$) showed that this regressor was not statistically significant, which was fully in line

with expectations as the Gini coefficient for the entire income distribution is predominantly made up of this component (in Table 5, column 5).

In each model specification, total government revenue had a positive effect on social spending, whereas GDP per capita had a negative influence (both explanatory variables were strongly significant).

Of course, in each country, social expenditure depends on a broad spectrum of variables, such as the unemployment rate, the age-sex structure of the population (the ratio of people younger than 15 or older than 64, number of women per 100 men), life expectancy etc. However, these covariates are correlated with the Gini coefficient for original income per equivalent unit, so they do not appear in the model.

Table 6

Standardized coefficients

	Dep. var.: *RE*(*NT*)		Dep. var.: *SE*
G(*X*)		$G(X)_1$	0.0714
SE	–0.340	$G(X)_2$	0.0447
C(*B*)	0.276	$G(X)_3$	
ITR		$G(X)_4$	
C(*T*)	–0.201	$G(X)_5$	–0.0449
(*GDP*)		*TR*	0.242
		GDP	–0.800
Number of countries	31	Number of countries	31
Number of observations	292	Number of observations	292

Source: Own calculations.

As regards tax-benefit redistributive effect model and social spending model, the standardized coefficients were calculated in order to assess the relative strength of the right-hand side variables as predictors (Table 6). Only the results concerning statistically significant predictors are presented. Under the first model, social expenditure has the highest relative strength (the absolute values are taken into account): a one standard deviation increase in the expenditure level would yield a 0.34 standard deviation decrease in the predicted left-hand side variable level. Social benefit concentration has the second largest standardized coefficient and income tax concentration has the third largest standardized coefficient. Under the second model, the strongest explanatory power is assigned to GDP per capita, and, subsequently, total general government revenue and the pre-fiscal income Gini coefficient within the first quintile.

Conclusions

The panel-level average of the original income Gini coefficient was 0.3641, and, referring to change of the indicator over time, in the regarded period, it stayed almost constant (it was mainly due to essentially unfluctuating earning disparities). By the pre-fiscal income quintiles, evidence of significant between-group differences was found.

Both social benefits and income tax led to income inequality reduction, which was reflected in the post-fiscal income distribution being less skewed: the corresponding Gini measure amounted to 0.2940. However, the FE model of the tax-benefit redistributive effect showed that countries with higher original income disparity, on average, do not redistribute more to the poor households.

The Gini coefficient for the entire pre-fiscal income distribution does not explain social expenditure effectively. This is because it is a comprehensive measure of income inequality, which is not able to discriminate between different inequality components that may have different effect on social spending. But regressing social expenditures on the Gini measure by income quantiles allowed to conclude that income inequality within the lowest quintile, the second quintile and between those two quintiles were significant predictors.

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Bibliography

Agostini P., Paulus A., Tassev I., *The Effect of Changes in Tax-benefit Policies on the Income Distribution in 2008–2015*, EUROMOD Working Paper Series, EM 6/16, July 2016.

Atkinson A.B., Micklewright J., *On the Reliabity of Income Data in the Family Expenditure Survey 1970–1977*, "Journal of the Royal Statistical Society" 1983, vol. 146, Part 1, Series A.

Atkinson A.B., *Reducing Income Inequality in Europe*, "IZA Journal of European Labor Studies" 2013, no. 2.

Bargain O., Dolls M., Fuest C., Neumann D., Peichl A., Pestel N., Siegloch S., *Fiscal Union in Europe? Redistributive and Stabilising Effects of an EU Tax-Benefit System and Fiscal Equalisation Mechanism*, "Economic Policy" 2013, no. 28(75).

Borsi M.T., Metin R., *The Evolution of Economic Convergence in the European Union*, Discussion Paper no. 28/2013, Deutsche Bundesbank Eurosystem, Frankfurt 2013.

Čok M., Urban I., *Distribution of Income and Taxes in Slovenia and Croatia*, "Post-Communist Economies" 2007, no. 19(3).

Elbers C., Lanjouw P., Mistiaen J.A., Özler B., *Reinterpreting Between Group Inequality*, "Journal of Economic Inequality" 2008, no. 6.

Figari F., Verbist G., *The Redistributive Effect and Progressivity of Taxes Revisited: An International Comparison Across Europe*, XXV Conferenza di Societa Italiana di Economia Pubblica, La Finanza Pubblica Nei Sistemi Multilivello, Pavia, 26–27 Settembre 2013.

Global Wage Report 2014/15: Wages and Income Inequality, International Labour Office, Geneva 2015.

Kanbur R., *Income Distribution and Development*, in: *Handbook of Income Distribution*, A.B. Atkinson, F. Bourguignon (eds.), North-Holland Elsevier, Amsterdam 2000.

Lambert P.J., Aronson J.R., *Inequality Decomposition Analysis and the Gini Coefficient Revisited*, "The Economic Journal" 1993, vol. 103.

Leigh A., *How Closely Do Top Income Shares Track Other Measures of Inequality?*, "The Economic Journal" 2007, no. 117.

Milanowic B., *The Median-voter Hypothesis, Income Inequality and Income Redistribution: an Empirical Test with the Required Data*, "European Journal of Political Economy" 2000, vol. 16.

Mezzanzanica M., Santoro A., Verzillo S., *The Redistributive Impact of Taxation when Families are Accounted For: Evidence from Italy*, Fifth ECINEQ Meeting, Bari 2013.

Mundlak Y., *On the Pooling of Time Series and Cross Section Data*, "Econometrica" 1978, no. 46.

Paulus A., Čok M., Figar F., Hegedüs P., Kump N., Lelkes O., Levy H., Lietz C., Lüpsik S., Mantovani D., Morawski L., Sutherland H., Szivos P., Võrk A., *The Effects of Taxes and Benefits on Income Distribution in the Enlarged EU*, EUROMOD Working Paper 2009, no. EM8/09.

Pyatt G., *On the Interpretation and Disaggregation of Gini Coefficients*, "The Economic Journal" 1976, no. 86(342).

Svedberg P., *World Income Distribution: Which Way?*, "The Journal of Development Studies" 2004, no. 5.

The Distribution of Household Income and Federal Taxes, 2010, CBO, Congress of the United States, Congressional Budget Office, Washington, D.C. 2013.

Urban I., *Income Redistribution in Croatia: The Role of Individual Taxes and Social Transfers*, "Financial Theory and Practice" 2008, no. 32(3).

Wage and Income Inequality in the European Union, Study for the EMPL Committee, European Parliament, Policy Department, Economic and Scientific Policy, January 2015, http://www.europarl.europa.eu/RegData/etudes/STUD/2015/536294/IPOL_STU(2015)536294_EN.pdf

Wagstaff A. et al., *Redistributive Effect, Progressivity and Differential Tax Treatment: Personal Income Taxes in Twelve OECD Countries*, "Journal of Public Economics" 1999, no. 72.

Wiśniewski M., *Wrażliwość mierników nierówności dochodów na zmiany w rozkładzie dochodów*, "Przegląd Statystyczny" 1992, nr 1.

Zaidi S., *Main Drivers of Income Inequality in Central European and Baltic Countries, Some Insights from Recent Household Survey Data*, Policy Research Working Paper No. 4815, The World Bank, Europe and Central Asia Region, Poverty Reduction and Economic Management Department, 2009.

NIERÓWNOŚCI PODZIAŁU DOCHODÓW BRUTTO I NETTO W KRAJACH EUROPEJSKICH

Streszczenie

Celem artykułu jest analiza nierówności dochodów pierwotnych w Europie, a także identyfikacja statystycznej zależności między nierównościami dochodów pierwotnych i dochodów netto, tj. redystrybucyjnego efektu świadczeń społecznych i podatku dochodowego. Badanie empiryczne dotyczy wszystkich krajów Unii Europejskiej, a ponadto Islandii, Norwegii i Szwajcarii w latach 2004–2014. Próbę badawczą stanowią gospodarstwa domowe objęte Europejskim Badaniem Dochodów i Warunków Życia (EU-SILC) (wielkość próby waha się od 116 714 gospodarstw w 2004 r. do 226 701 podmiotów w 2014 r.). Model ekonometryczny z efektami stałymi ujawnia, że współczynnik Giniego dla dochodów pierwotnych nie jest statystycznie istotną zmienną objaśniającą redystrybucyjny efekt świadczeń i podatku (kraje o najwyższych rozpiętościach dochodów pierwotnych nie mają bardziej redystrybucyjnych systemów fiskalnych). Co więcej, brana pod uwagę zmienna, jako całościowa miara nierówności dochodowych, która nie rozróżnia pomiędzy różnymi aspektami nierówności, nie wyjaśnia wydatków na świadczenia społeczne w relacji do PKB. Niemniej współczynnik Giniego dla dochodów pierwotnych w pierwszym i drugim kwintylu oraz między tymi kwintylami (wewnątrzgrupowe i międzygrupowe dysproporcje dochodowe) skutkują wyższymi wydatkami socjalnymi.

Słowa kluczowe: nierówności dochodów pierwotnych, współczynnik Giniego, redystrybucyjny efekt świadczeń społecznych i podatku dochodowego, regresja dla danych panelowych (model z efektami stałymi)

JEL: C23, D31, E62, H23, H53

INEQUALITY OF PRE-FISCAL AND POST-FISCAL INCOME DISTRIBUTION IN EUROPEAN COUNTRIES

Summary

The paper aims at assessing inequality of distribution of pre-fiscal income in European countries and capturing the statistical link between the pre-fiscal and post-fiscal income inequality, namely identifying redistributive effect of social transfers and income tax. All EU member states, along with Iceland, Norway and Switzerland in 2004–2014, are covered by the study. Unit data required to calculate the Gini coefficient were obtained from the EU-Survey on Income and Living Conditions (empirical sample ranged from 116 714 households in 2004 to 226 701 households in 2014). Fixed effect panel data model reveals that the original income Gini coefficient is not statistically significant predictor of the tax-benefit redistributive impact, which is expressed in relative terms (on average, countries with the most unequal original income distribution do not have more redistributive fiscal systems). Besides, the key variable of interest, as a comprehensive measure of income inequality, which is not able to discriminate between different aspects of inequality, has no explanatory power while explaining social expenditure-to-GDP ratio. But the original income Gini coefficient within the first quintile, the second quintile and between those

two quintiles (within-group and between-group income inequality) turned out to cause social expenditure to grow.

Key words: original income inequality, The Gini coefficient, tax-benefit system redistributive effect, panel data model

JEL: C23, D31, E62, H23, H53

НЕРАВЕНСТВО В РАСПРЕДЕЛЕНИИ ДОХОДОВ БРУТТО И НЕТТО В ЕВРОПЕЙСКИХ СТРАНАХ

Резюме

Целью статьи является анализ неравенства первичных доходов (доходов брутто) в Европе и определение статистической зависимости между неравенствами доходов брутто и доходов нетто, т.е.перераспределительного эффекта социальных выплат и подоходного налога. Эмпирическое исследование касается всех стран Евросоюза и дополнительно Исландии, Норвегии и Швейцарии в период 2004–2014 гг. Исследование проводилось на группе домашних хозяйств, охваченных Европейским исследованием доходов и условий жизни (EU-SILC) (величина выборки колеблется от 116 714 хозяйств в 2004 г. до 226 701 субъектов в 2014 г.). Эконометрическая модель с постоянными эффектами показывает, что коэффициент Джини для первичных доходов не является статистически существенной переменной, объясняющей перераспределительный эффект социальных выплат и налога (страны с самым высоким неравенством первичных доходов не имеют более жестких перераспределительных фискальных систем, чем остальные). Более того, переменная, которая в полной мере отражает неравенство доходов, но не учитывает различий между разными аспектами неравенства, не объясняет величины доли расходов на социальные нужды в ВВП. Тем не менее, коэффициент Джини для первичных доходов в первом и втором квинтиле и между этими квинтилями (внутригрупповые и межгрупповые диспропорции в области доходов) дают в результате более высокие социальные расходы.

Ключевые слова: неравенство первичных доходов, коэффициент Джини, перераспределительный эффект социальных выплат и подоходного налога, регрессия для панельных данных (модель с постоянными эффектами)

JEL: C23, D31, E62, H23, H53