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Contact: a.wildowicz@uwb.edu.pl

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Anna Wildowicz-Szumarska
University of Bialystok, Poland
orcid.org/0000-0003-1871-5621

Is redistributive policy of EU welfare state effective in tackling income inequality? A panel data analysis

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Abstract

Research background: Income inequality has risen sharply since the 1990s, despite the increase in the average size of redistribution in countries representing different welfare state models. The problem of increasing income inequality is currently a challenge for the EU economies, not only with well-established liberal traditions, but also with conservative and social-democratic ones. Therefore, it is worth conducting research on the redistributive effects of fiscal policy.
Purpose of the article: The article aims to show the redistributive effects of fiscal policy, paying particular attention to the most characteristic trends in redistribution, which are responsible for the growing income inequality. An overview of the fiscal instruments — mainly personal income tax and benefit systems — along with an empirical research on their potential impact on income inequality, allows for conclusions to be drawn about the effectiveness of redistributive policy in the EU countries.
Methods: Both descriptive analysis and panel data analysis is implemented to examine the effectiveness of redistributive policy in tackling income inequality in the EU–28 countries in years 2005–2017.
Findings & value added: Based on the panel analysis, it has been found that social transfers were much more effective than direct taxes in combating income inequality. In addition, the largest increase in income inequality — as previously assumed — was observed in the liberal welfare states, while the smallest in the social democratic welfare states. The empirical analysis extends the existing knowledge on main weaknesses of fiscal welfare state, indicating the required changes that may improve both its equity and efficiency.

Introduction

The need for welfare state in Western Europe appeared along with the societal, economic and political transformation in the last quarter of the XIX century (Alber, 1982, pp. 67–68). In the face of social risks, such as unemployment or illness, the state intervention seemed unquestionably necessary, but raised some concern. One of the German economists, Adolph Wagner (1958[1890]), formulated the law of 'growing public sphere' saying that changes in economy and society may generate increasing levels of state intervention, causing the public expenditure to grow even disproportionately faster than GDP growth. This phenomenon happened in the post-world war II development, however under highly favourable economic and demographic circumstances. As a result, we witnessed social expansion of welfare state almost to the early 1980s. Next, in the response to the economic crisis of the 1970s, the 'golden age' of welfare capitalist — supported by Keynesian economics — gave way to a free market economy, driven by neoliberal ideology. As a result, it turned out that welfare state — perceived as necessary provider of insurance against certain social risks — combating income inequality and poverty, also reduces the size of national income (Lindbeck *et al*., 1994, pp. 3–10). For this reason, the opponents of the existing model — searching for the trade off between equity and efficiency — postulated the urgent need for a minimal welfare state as a necessary prerequisite for promoting efficiency, employment and economic growth (Korpi, 2003, p. 589). This contributed to the fundamental changes, both in the shape and size of the welfare states (Brooks & Manza, 2007, pp. 816–827; Huber & Stephens, 2012, pp. 1–368; Emmenegger *et al.,* 2012, p. 3).

Many EU countries have also begun to question the size, objectives and priorities of their welfare systems, as they have to face new social pressures related to population aging, financial internalization and globalization (Ferrera & Rhodes, 2000, pp. 257–282; Pierson, 2001, pp. 80–104; Taylor-Gooby, 2001, pp. 133–147).

The welfare state is by definition redistributive, but this does not automatically mean that it creates more income equality. According to the author, the redistributive outcomes may depend on welfare state model and implemented fiscal policy. Based on the above assumption, the research hypothesis says that differences in the effectiveness of redistributive policy between the EU countries — belonging to different welfare state model — still exist, in spite of their common features arising from global trends.

The contribution of this article is twofold. First, the results of the panel analysis on the redistributive effects of fiscal policy in EU countries con-

firmed that regardless of the type of welfare state, social transfers along with progressive income taxation are still effective fiscal instruments commonly used in income redistribution. Secondly, the author extended the analysis by trying to estimate to what extent the obtained results can be attributed to different welfare states. The added value of this article is the inclusion of an institutional approach to the international comparison of redistributive effects of fiscal policy. According to the author, differences in institutional redistribution patterns may be key to understanding the redistributive outcomes of European welfare states.

In order to verify the research hypothesis, both a comparative analysis and a panel data analysis were implemented. The dataset used in the empirical research covers 23 EU countries, representing different welfare states, over the period 2005–2017.

The paper is organised as follows. In section 2, the author presents different welfare regimes. Apart from the glance at the issue of income inequality, trends in fiscal redistribution over time are analysed in section 3. Section 4 explains methodology implemented for the purpose of empirical analysis. Results of the panel analysis are shown in section 5. Finally, the last two sections present the main conclusions and discussion regarding the future of social welfare along with some recommendations on fiscal policy which may serve as a guidance for policymakers who can introduce desirable changes in the design of redistributive policy.

Literature review

Five models of European welfares state

The strong degree of income redistribution, resulting from progressive taxation and relatively generous transfers, as well as extensive regulations to protect the poor, seems to be one of the main features of Western European welfare states. However, there are some differences between countries representing various models of welfare state.

Following the original work on regime models of Titmuss (1974) and Esping-Andersen (1990), developed by Leibfried (1993), Ferrera (1993), Hall and Soskice (2001), Amable (2003), Sapir (2006), Farkas (2016), Rapacki and Czerniak (2018), five models of European wefare state are identified: Continental (Bismarckian), Anglo-Saxon (liberal), Nordic (Scandinavian or Social democratic), Southern European (Mediterranean) and Central Eastern European (Post-socialist) Welfare States.

According to the classifications presented above, the selected models are represented by the following countries: Social democratic (Sweden, Denmark, Finland), Continental (Germany, France, Austria, the Netherlands, Belgium, Luxembourg), Liberal (the United Kingdom, Ireland), Mediterranean (Greece, Spain, Portugal, Italy, Cyprus, Malta) and Post-socialist (Poland, the Czech Republic, Hungary, Slovakia, Slovenia, Lithuania, Latvia, Estonia, Croatia, Romania, Bulgaria). Table 1 presents the summary of the redistributive policy of European welfare regimes.

The 'egalitarianism' is the main principle of the Nordic model (Popova & Kozhevnikova, 2013, p. 566). In the context of this principle, the social benefits should be equally distributed between all members of society. However, in spite of strong universalism, the Nordic model is characterized by active labour market policy, strong but limited safety nuts, low poverty and high social inclusion. In fact, social-democratic model is a combination of free market economy with a welfare state, which remains the key player in the protection and promotion of economic and social welfare of its citizens (Holm *et al.,* 1999, p. 321; Jieru, 2013, pp. 3–9).

The Anglo-Saxon model is famous for its 'liberal' attitude towards market, where state is only perceived as social assistance of the last resort. It is related to the targeted redistribution system, based mainly on transfers to the lowest end of the income redistribution (Chauvel & Bar-Haim, 2016, p. 5). Apart from weak universalism narrowing to the means-tested benefits for the poor and fight against poverty & exclusion, at the same time there is occupational/fiscal welfare for the middle classes. As a result, bigger portion of the funds goes to the working-age population, and less towards pensioners.

The Continental model is seen as a corporatist welfare state system. In accordance with the principle of 'security', welfare policy is mainly based on labour relations, particularly collective bargaining. The employment is the basis of social transfers that are income-dependent. In this model government provides relatively generous unemployment benefits or disability pensions (Hajighasemi, 2019, pp. 68–79).

The Mediterranean model is determined by the principle that the family has the main role in supporting its socially unprotected members (Popova & Kozhevnikova, 2013, p. 567). Similarly to the Continental model, the labour market is also not very flexible due to employment protectionism. The Southern European welfare state model is characterized by generous state pensions and early retirements as a means to better work conditions. As a result, the level of social assistance is much lower compared to the other countries.

The Post-socialist model is represented by countries which in the early 1990s started the transition from centrally-planned to market-orientated economy. Each country has chosen its own way, especially when it comes to the design of welfare state. Regardless of the common economic and social changes, it is worth stressing that the Baltic states followed the Anglo-Saxon model, Hungarian and Polish system is similar to the Continental one, whereas Slovenia and the Czech Republic show great similarities with the Nordic model (Hajighasemi, 2019, pp. 107–134).

Trends in fiscal redistribution

A common feature of the personal income taxation of Western and Northern Europe is tax progression. Its application results from the need to take into account the ability to pay and reduce inequality in market income distribution in accordance with the principle of vertical justice. Table 2 proves that extremely high marginal upper income tax rates (60–80%) in the mid-1970s occurred not only in the Scandinavian, Continental and Mediterranean countries, but also Liberal ones.

In the next decades, we were dealing with their systematic decline in most of the old EU-15 countries, regardless of ideological differences in the scope of the welfare state. At the same time, in 8 out of 11 EU countries identified as the Post-socialist welfare state model (Lithuania, Latvia, Estonia, the Czech Republic, Slovakia, Bulgaria, Romania and Hungary), it has been decided to abandon the tax progression, introducing a flat tax that existed in these countries at different periods (for example, in Slovakia only in 2004–2012). A two-stage and flattened tax scale (18% and 32%) was also in force in Poland from 2009 to September 2019, affecting the relatively low upper marginal income tax rates of PIT. Despite the importance of income tax in the process of redistribution, the decline in its progressiveness seems to be common tendency of welfare states across Europe. A significant decline in PIT progressiveness is caused by factors, such as flattening the tax scale through decreasing the differences between the maximum and minimum tax rates, reducing the number of tax brackets, excluding from progressive taxation income from capital gains or increasing the number of reliefs and deductions that contribute to the narrowing of tax base. The above trend can be considered as one of the main reasons for the growth of income inequality and an example of how the tax system — by privileging the wealthiest taxpayers — is becoming less and less effective in reducing income inequality.

Both progressive income taxation and social expenditure are the primary tools for government to fights against income inequality. However, direct

support in the form of social protection system designed to protect people against the risks related to unemployment, parental responsibilities, health care, old age, housing and social exclusion, seems to be even the most decisive in tackling poverty and inequality. As a result, in the analyzed period the increase in the level of public social spending presented in Figure 1 was recorded in countries belonging to the various welfare state models.

According to data from 2018, the highest level of public social expenditure occurred in France (31.2% of GDP), Belgium (28.9% of GDP) and Finland (28.7% of GDP), while the lowest level of social expenditure was registered in: Ireland (14.4% of GDP), Lithuania (16.2% of GDP) and Latvia (16.2% of GDP).

Overview of empirical research on redistributive effects of fiscal policy

The link between redistribution and income inequality has received considerable attention from economists who, especially in the face of the sharp increase in global income inequalities since the 1990s, have focused their research efforts on assessing the redistributive effects of fiscal policy. Taking into account that changes in fiscal policy are perceived in the literature as the main determinant of increasing income inequality, it is worth presenting current empirical research on the impact of various fiscal policy instruments on income inequality.

First, recent panel data analyses confirm that social expenditure, financed by both direct and indirect taxes, has positive redistributive effects in reducing income inequality. A panel analysis by Doumbia and Kinda (2019) for 60 countries (both advanced and developing economies) showed that an increase in social protection spending by 1 percentage point decreased the Gini coefficient of disposable income by 0.8-1 percentage points. Their results are in line with the other empirical findings. The significant distributive effect of social spending was also confirmed by the authors such as: Sánchez & Pérez-Corral (2018); Salotii and Trecroci, 2018; Clifton *et al*., 2020; Gunasinghe *et al*., 2021).

The negative impact of cuts in social spending on income inequality was also found in studies of the redistributive effects of fiscal consolidation undertaken to decrease fiscal deficits and bring down public debt. Based on the analysis conducted by Agnello *et al*. (2016), it was claimed that the increase in income inequality as a result of a reduction in social spending under the austerity policy outweighed the positive redistributive effects of income tax (PIT) in 13 EU in 1980–2013. Moreover, the impact of fiscal austerity measures on income distribution was found to be more pronounced when fiscal consolidation is based more on spending cuts than on

tax increases (Tovar Jalles, 2017; Heimberger, 2018; McManus *et al*., 2021).

Secondly, there is a consensus among most scholars that progressive personal income tax — along with social spending — is a key tax instrument for redistributing income. An increase in the upper marginal PIT, like social spending, reduces income inequality, although to a lesser extent than social transfers (Chen *et al.,* 2018; Doumbia & Kinda, 2019; Clifton *et al*., 2020).

Overall, the empirical results of most studies suggest that progressive income taxes, as well as an increase in social spending reduce income inequalities, while consumption taxes act regressively, contributing to greater income inequality (Schmutz & Schaltegger, 2018). In the light of empirical findings of Salotii and Trecroci (2018) or Clifton *et al*. (2020) not only personal income tax, but also public spending on education and health, play an important role in reducing income inequality. What is more, the results of recent empirical research also suggest that redistributive policy does not always undermine economic growth. According to Gründler and Scheuermeyer (2018), redistribution may have a direct negative impact on economic growth only in extreme cases. This means that the issue of equity-efficiency trade-off in redistribu-tive policy can be minimized in the long-run (Gunasinghe *et al*., 2021; Muinelo-Gallo & Lescano, 2022). The redistributive potential of fiscal policy is important both for reducing inequalities and raising long-term economic growth (Kyriacou *et al*., 2016).

At the end of this section, it is worth emphasizing that many research on the redistributive effects of fiscal policy was conducted on the established welfare states — members of the European Union (EU) or advanced OECD countries. Regardless of the sample chosen, there are only a few empirical analyses focusing on the redistributive effects of fiscal policy in the context of the institutional setups of different welfare states. Dabla-Noris *et al.* (2015) used panel data for a large number of countries (covering the period 1980–2012) and found that the redistributive effects of fiscal policy may vary across countries due to different institutional arrangements for tackling income inequality. Jianu *et al.* (2021) confirmed the higher capacity of government spending on social protection to reduce income inequality in the case of developed EU Member States, where social benefits systems are usually better designed compared to developing EU Member States. Welfare state dummies as a control variable were also included in a panel analysis of 28 OECD economies during the period 1995–2010 by Kyriacou *et al.* (2016). Their findings proved the importance of the welfare state regime for redistributive efficiency.

Research method

The author uses the panel data model to empirically verify the impact of fiscal policy on income inequality across EU countries The data covers the period from 2005 to 2017. Finally, estimation is done for the EU–23 countries — OECD members — which belong to different welfare state regimes:

- Social-democratic (Scandinavian) welfare regime (SDWR): Sweden, Denmark and Finland,
- Continental welfare regime (CWR): Germany, France, Austria, the Netherlands, Belgium, Luxembourg,
- Mediterranean welfare regime (MWR): Greece, Spain, Portugal, Italy
- Liberal welfare regime (LWR): the United Kingdom and Ireland,
- Post-socialist welfare regime (PSWR): Poland, Czech Republic, Hungary, Slovakia, Slovenia, Lithuania, Latvia, Estonia

A statistic panel model allows to estimate the impact of fiscal policy on income inequality in Europe over the past decade. In general, the model can be written as follows (equation 1):

$$\mathrm{GINI_{it}} = \alpha + \sum_{j=1}^{k} \beta_j \, F_{jit} + \sum_{j=1}^{n} \gamma_j X_{jit} + e_{it} \qquad (1)$$

where:

F_{jit}	k-element vector of fiscal variables;
X_{jit}	n-element vector of control variables;
e_{it}	random error;
α, $ß_j$, γ_j	parameter and vector of parameters, respectively.

In the analysed model, the dependent variable is GINI as a measure of income inequality after taxes and transfers used for country i at time t. For this purpose, the author used OECD Income Distribution database (2020), although there are also alternative inequality panel data provided by Luxembourg Income Study (LIS) and the Standardized World Income Inequality Database (SWIID) which can be explored in further empirical research. Following the literature (Martinez-Vazquez *et al.*, 2012; Doerrenberg & Peichl, 2012; Woo *et al.*, 2017; Chen *et al*., 2018; Causa *et al.,* 2018), fiscal variables are classified into two groups. Looking at the government's revenue side, the first group consists of fiscal variables such as: the share of PIT and VAT in tax revenue. In addition, the third variable of interest are statutory top tax rates which show the degree of progressivity of a given tax system.

The second group of fiscal instruments represents government's expenditure side which should be included in the analysis. Among them, the most important fiscal instruments are: government expenditure on social protection, education and health (Sănchez & Pérez-Corral, 2018; Salotii and Trecroci, 2018; Clifton *et al*., 2020; Gunasinghe *et al*., 2021).

Moreover, a set of standard control variables, including: GDP per capita income, education level, trade openness, globalization, unemployment, union density and inflation, is also used as a part of the robustness check (Chen *et al*., 2018). One of the most important control variables — from the point of view of research hypothesis — is a type of welfare state regime. It is a dummy variable taking value 1 if the country belongs to the one of five welfare state regimes (j=1,2,3,4,5) such as: Social-democratic (SDWR), Continental (CWR), Liberal (LWR), Mediterranean (MWR) and Post-socialist (PSWR). The list of variables with data sources is presented in Table 3.

The pooled ordinary least squares (OLS) model was implemented in this research which assumed that there is no individual effect u_i (cross-sectional or time specific effect). The obtained results of regression diagnostic tests served in the selection of the appropriate model. For this purpose, the author uses F test to check if there are time-fixed effects, Breuscha-Pagan test (LM test) that examines random effects, and the Hausmann specification test, comparing a random effect model to its fixed counterpart. It is assumed that if the null hypothesis regarding individual effects which are uncorrelated with the other regressors is not rejected, a random effect model is favoured over fixed effect model (Park, 2011). In addition, the regression specification RESET test is used to check if models are correctly specified. What is more, on the basis of White's test, the heteroscedasticity is examined in all models along with the collinearity by checking Variance Inflation Factors (VIF). The results of White's test show the problem with heteroscedasticity and as a result all estimations were done under the assumption of heteroscedasticity (HCMM).

Results

The author presents the results of country-level panel data regressions covering EU-23 countries from 2005 to 2017. At the first stage of the analysis, the specification formulated in equation 1 was used to asses an impact of redistributive policy on income inequality. However, this specification was modified, and as a result Model 1 includes only a type of welfare state regime as a control variable. The result of diagnostic test F with value p=

0.777 confirms that the pooled OLS model is more appropriate than fixed-effects model. Similarly, Breusch-Pagan test statistic with value p = 0.342 proves that OLS model is more adequate that random-effects model. The achieved result of RESET test on specification with value p = 0.164 means that we have no grounds to reject the null hypothesis of correct specification. The final model estimations is presented in Table 4.

In line with other empirical studies (Martinez-Vazquez *et al.* 2012; Doerrenberg & Peichl, 2012; Woo *et al*., 2013; Chen *et al.*, 2018; Causa *et al*., 2018; Salotii & Trecroci, 2018; Doumbia & Kinda, 2019; Clifton *et al*., 2020; Gunasinghe *et al*., 2021), the estimated model 1 shows that top tax rates and social transfers are effective in combating income inequality. Raising top tax rates is associated with a reduction of net GINI (-0.12 percentage points). Strong and negative relationship is also found between social protection expenditure and income inequality. The estimation proves that higher social protection spending is linked to a lower Gini index (-0.14 percentage points). In the case of health spending, it managed to achieve a negative and significant result. Spending on health may increase the productivity of low income workers affecting income inequality positively. It means that higher public spending on health helps in decreasing income inequality, but it does not simultaneously concern all kind of public expenditure. In the face of fast technology progress which determines productivity and simultaneously mechanizes jobs, raising skill levels seems to be critical for reducing the dispersion of earnings. Taking it into account, expenditure on education should be extremely important particularly for low income households (Becker, 1964). Unexpectedly, the sign of coefficient for explanatory variable representing education is positive. It may be explained as a result of poor targeting education spending if its main benefits are captured by the urban middle class for political economy reasons (Alesina, 1998). In addition, it turns out that the rise in income inequality was observed across EU countries regardless of a type of welfare state. However, still the lowest increase in income inequality is identified with Scandinavian welfare state, while the highest with Mediterranean and Liberal.

At the second stage of the analysis, model 1 was extended through the use of control variables which choice was motivated by the literature. The achieved result of RESET test on specification with value p = 0.157 means that there is no ground to reject the null hypothesis of correct specification. On the basis of diagnostic test F with value p = 0.0006, it was found that the fixed-effect model is more appropriate than the pooled OLS model. Similarly, Breusch-Pagan test with value p = 0.003 proves that the random effect model is more adequate that the pooled OLS model. Finally, the ob-

tained result of Hausman test H = 79,828 with value $p < 0.0002$ decided on the choice of fixed effect model. The estimation of model 2 is presented in Table 5.

Looking at the control variables in fixed effects model 2, it has to be stressed that their impact on income inequality, excluding inflation and globalisation, is statistically significant, and what is more, that their direction is usually in line with the results of the previous studies. In addition, all parameters on the variable related to a type of welfare state are positive and statistically significant. The lowest increase in GINI index is associated with the Scandinavian and Continental welfare state, while the highest with Liberal and Mediterranean. Model 2, however, does not include the dummy variable for Post-socialist welfare state due to the problem of collinearity. Regardless of this, it should be remembered that on the basis of the change in the GINI coefficient after taxes and transfers, we cannot compare the effectiveness of redistributive policy of individual welfare states, because only a comparison of the absolute change in the Gini coefficient before and after taxes and transfers allows us to draw certain conclusions in this regard.

Discussion

Having in mind the golden rule of public finance, the issue of redistributive policy effectiveness in tackling income inequality unquestionably becomes one of the most important subject currently discussed by both academic and policymakers. Thanks to empirical analysis, it managed to confirm that social protection expenditure has greater redistributive effect on income inequality than the increase in top tax rates. It is in line with previous studies (Bastagli *et al.,* 2012; Denk *et al.,* 2013; Krueger, 2012; Woo *et al.,* 2013; Chen *et al.,* 2018; Doumbia & Kinda, 2019). The major redistributive tool are non-means-tested transfers typical for Scandinavian welfare states, but also met in Continental countries such as Austria or Belgium, and Post-socialist, mainly Poland and Hungary.

As universalist programs often seem too expensive under public budget constraints, there is also a tendency to increase the targeting of social spending and reduce universal benefits (Gugushvili & Hirst, 2014; van Oorschot & Roosma, 2015; Jacques & Noël, 2018). Targeting within universalism can be seen as a new approach to two opposite ideas identified with redistributive policy of Scandinavian and Liberal welfare states. In the light of such an approach, Korpi and Palme's paradox of redistribution (1998) is contested. It happens under today's welfare states that have to

continue austerity policy in the long term, although they currently suffer from demographics, migration, environmental and health crises.

For this reason, better access to education and health care, supported by well-targeted social policies, addressed not only to the low income households, but particularly to the working-age population is of high importance (Chen *et al.,* 2018). Improving the access of lower-income groups to higher education and maintaining access to health services should be accompanied by the increase in the statutory progressivity weakened by declining top tax rates and tax expenditures that benefitted high-income groups (OECD 2012).

While the author attempts to use the appropriate econometric techniques to assess the impact of redistributive policy on income inequality, it should be stressed that the estimation method may not adequately address the endogeneity of fiscal variables. The degree and persistence of income inequality may contribute to shaping redistributive policy, its size and structure by influencing public opinion on income redistribution (Chen *et al.,* 2018). To avoid the problem of causal identification, frequently applied researchers are tended to use a lagged value of an explanatory variable X in order to 'exogenize' (Bellemare *et al.,* 2015). However, at this stage of research the author mainly following the study of Chen *et al.* (2018) decided not to introduce a one-period lag in his explanatory variables.

Conclusions

Rising inequality is a widespread concern. Irrespective of ideology associated with a type of welfare state and its institutional setup, widening inequality brings significant implications for both macroeconomic and social stability. For this reason, the welfare state redistribution — based on the equity and inclusive growth promoting fiscal policy — seems to be extremely important in tackling income inequality.

The analysis of the trends in both taxes and spending policies of EU–28 countries allows to indicate their main features. On the one hand, since 1990s rising market income concentration at the top of the distribution in many advanced economies, including Western EU countries, has been commonly observed. On the other hand, declining top marginal tax rates have coincided with the growing number of various tax allowances in PIT related to children, education, housing, health, social contribution, etc.

Unfortunately, tax allowances often go disproportionately to the rich, and as a result have negative impact on PIT progressivity, which in combination with reducing top tax rates hinder to achieve redistributive objec-

tives. Moreover, it turns out that dividend/capital gains are currently excluded from progression or completely exempt from taxation in many EU countries. Taking it into consideration, it seems that both taxes on capital income and wealth could play a larger role in redistributive policy of European welfare state.

Looking at the expenditure-side, a direct support in the form of social protection system designed to protect people against different social risks is a distinguishing feature of welfare state. Since 1960s the rapid growth in public social expenditure of most advanced countries has been registered. The expansion of the public sector was an answer to the growing demand for public goods and services from individuals exposed to various social risks. Despite the focus on market efficiency and the justified need to cut public expenditure since 1980s, an expansion of government spending has not been limited under less favorable economic conditions. What is more, it has coincided with the further income inequality growth.

In general, it has to be emphasized that effectiveness of fiscal policy in combating income inequality depends on a relative progressiveness of the whole tax system. Importantly, both the size and the design of social transfers can contribute to the declining income inequality.

The main added value of this paper is to show that, despite significant achievements in the field of redistribution, research on the institutional shape of redistributive policy, including their impact on both income inequalities and the efficiency of the economic system, is certainly worth further examination, especially since many advanced countries not only experienced an increase in net income inequality, but also faced long-term development challenges. From this point of view, the implemented research methodology and the obtained findings are important as they contribute to a better understanding of institutional weaknesses in the existing tax-and-transfer systems. The author is simultaneously conscious of some limits of the estimation method used to study the redistributive impact of fiscal policy in the empirical part of the paper. One of the problems arises from the fact that this method may not adequately address the endogeneity of explanatory variables. Its results may also be sensitive to model specification and data sources.

In conclusion, we witness increasing income inequality irrespective of the level of economic development, axiological premises for redistribution and adopted institutional design in the scope of redistributive policy in most EU-28 countries. However, according to research hypothesis, the greater effectiveness of redistributive policy of Scandinavian and Continental European welfare states over Liberal and Mediterranean, was finally confirmed. The conducted analysis also proved that social protection spending

reduces inequality more effectively supported by progressive personal income taxes.

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Annex

Table 1. Models of redistributive policy of EU–28 countries

Characteristics	Model of redistribution				
	Nordic	**Liberal**	**Continental**	**Mediterranean**	**Post-socialist**
Role of: family	marginal	marginal	central	central	central
market	marginal	central	marginal	marginal	marginal
state	central	marginal	subsidiary	marginal	marginal/or subsidiary
access to social services	wide	narrow	wide	moderate	moderate
scope of social protection	universal	the poor	universal	universal, mainly pensioners	moderate, pensioners and the poor
main source of financing	through tax system (high income taxes)	low taxation of unemployed, social insurance for employees	insurance-based, non-employment benefits, and old-age pension contributions	local authorities through taxes family support; self-support	government through tax system (low income taxes); family support; self-support

Source: own elaboration based on Baranowski (2017, p. 163).

Table 2. Top marginal income tax rates in the selected welfare regimes in %

Countries	**1975**	**1983**	**1989**	**1996**	**2000**	**2005**	**2010**	**2018**
France	60	65	57	54	40.5	36.5	38.4	55.2
Germany	56	60	53	56	53.8	43.4	47.5	47.5
Greece	63	63	50	45	37.8	33.6	37.8	55
Spain	62	60	65	47,6	48	45	43	43.5
Sweden	87	85	72	54,4	55.4	56.6	56.6	60.12
Denmark	40	70	68	65	53.7	54.3	55.4	55.9
Poland	-	-	-	45	26.4	31.5	23.7	22.1
Hungary	-	-	-	48	56	56	40.6	15
Ireland	77	80	58	48	46	44	52	48
United Kingdom	83	60	40	40	40	40	50	45

Source: own elaboration: Tanzi (2011) and *Top marginal…* (2019).

Table 3. Variable description

Name	Description	Source
GINI	Gini coefficient of equalised disposable income after taxes and transfers	OECD Income Distribution Database
PIT	Sum of personal income tax in percent of GDP	European Commission Data on Taxation
VAT	Sum of value added tax in percent of GDP	European Commission Data on Taxation
TopTaxR	Top statutory personal income tax rates	European Commission Data on Taxation
SocialExpen	Expenditure on social protection as a % of GDP	Eurostat
GDP	GDP per capita (in euro)	Eurostat
Inflation	Annual average rate of change	Eurostat
TradeOpen	Trade openness: (export+import)/GDP	AMECO
Unemploy	Unemployed as percent of active population	Eurostat
Union density	Trade union density rate (%)	ILOSTAT data
Globalization	KOF Globalisation Index	Swiss Economic Institute
Dependency	Old-age dependency ratio: the ratio of the number of persons aged 65 and over to the number of persons aged between 15 and 64	Eurostat
Ter_edu	Gross enrollment ratio in tertiary education (%)	UNESCO Institute for Statistics (UIS)
Health	Expenditure on health as a % of GDP	Eurostat
Education	Expenditure on education as a % of GDP	Eurostat

Table 4. Pooled OLS. Fiscal policy and income inequality

Variables	coefficient	p-value
Const	-0.529	<0.0001 ***
TopTaxR	-0.129	<0.0001 ***
PIT	0.001	0.924
VAT	0.016	0.702
SocialExpen	-0.141	0.0011 ***
Health	-0.221	<0.0001 ***
Education	0.257	<0.0001 ***
MWR	0.322	<0.0001 ***
CWR	0.161	<0.0001 ***
SDWR	0.059	0.052*
LWR	0.286	<0.0001 ***
R-square	0,67	
Number of observation	272	

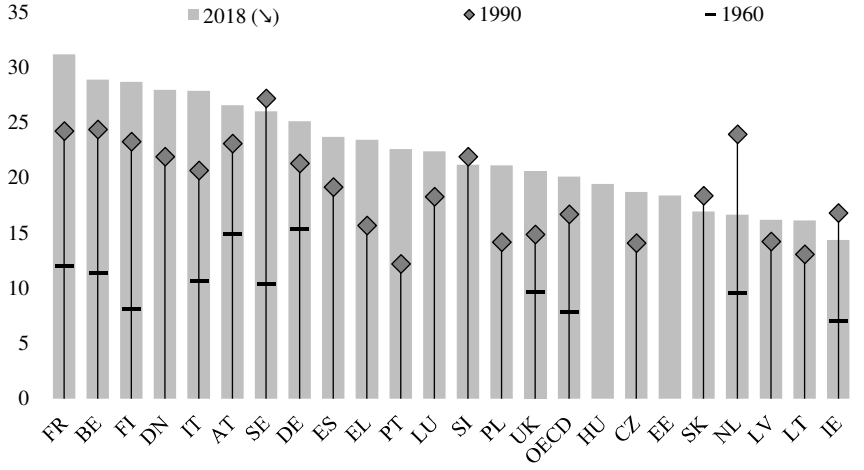
Dependent variable (Y): lnGINI - logarithm of Gini index of equivalized disposable income; standard errors (robust HAC); variables: TopTaxR, PIT, VAT, SocialExpen are logarithmized; MWR, CWR, SDWR and LWR are binary variables; PSWR is excluded due to the problem of collinearity. There is no country and year fixed-effect; ***, **, * - statistical significance at the level of 1%, 5% and 10% threshold respectively.

Table 5. Fixed Effect model. Fiscal policy of different welfare states and income inequality

Variables	coefficient	p-value
Const	-0.727	0.017**
TopTaxR	-0.021	0.309
SocialExpen	-0.160	0.0003***
PIT	0.0006	0.974
VAT	0.109	0.006***
Health	-0.016	0.006***
Education	0.019	0.0004***
GDPpc	0.001	0.071*
Inflation	0.002	0.110
TradeOpeness	-0.0004	0.0237**
Unemploy	0.007	<0.0001***
Uniondensity	-0.003	0.0002***
Globalization	-0.004	0.279
Dependencyratio	0.005	0.0010***
Tertiaryenrolment	-0.0009	0.051*
MWR	0.204	<0.0001***
CWR	0.149	0.002***
SDWR	0.113	0.068*
LWR	0.241	<0.0001***
LSDV R-square	0,93	
Wald test	Welch F(27, 73,1) = 1.90152 with value p = 0.0160343	
Number of observation	239	

Dependent variable (Y): lnGINI - logarithm of Gini index of equivalized disposable income; standard errors (robust HAC); explanatory variables: TopTaxR, SocialExpen, PIT and VAT are logarithmized; PSWR is excluded due to the problem of collinearity. There are country and year fixed-effect included; * **, **, * - statistical significance at the level of 1%, 5% and 10% threshold respectively.

Figure 1. Public **s**ocial expenditure as a % of GDP in the selected OECD countries



Source*:* OECD Income Distribution Database (2020).