THE REDISTRIBUTIVE EFFECT OF THE ROMANIAN TAX-BENEFIT SYSTEM: A MICROSIMULATION APPROACH[1]

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Abstract:

This paper attempts to investigate the income distribution of Romanian households, focusing on the role of the tax-benefit system in income redistribution. We evaluate the redistributive effect by estimating income inequality changes due to tax-benefit components. We use EU-SILC microdata and the EUROMOD microsimulation model to simulate income components. The results point out that income inequality is considerably reduced through the tax-benefit system, as a great deal of income is redistributed among households. The analysis of the income components that contribute to inequality reduction emphasizes that pensions, personal income taxes and social benefits are in favour of inequality reduction, while social contributions act the opposite way. Our results are sensitive to social and fiscal policy changes.

Key words: Income distribution, Redistributive effect, Tax-Benefit System, Income inequality, Microsimulation

1. Introduction

The aim of this paper is the investigation of household income distribution in Romania, with focus on the role of the tax-benefit system in income redistribution. The evolution of income distribution in Romania has encountered many changes during recent years. We remark average household income growth before the economic crisis (up to 2008), income decline during crisis and slight recovery during the most recent years (2012-2013). It seems that the poorer households have benefited more from pre-crisis positive economic developments and have lost lower proportions of their incomes during the economic crisis, as compared to higher income households. The unequal changes along the income distribution have shaped a more equal income distribution in 2013 compared to 2007. Besides the economic developments which had a direct influence on household income levels, the changes that took place in the tax-benefit system (as social and fiscal policy response to crisis) have a serious impact on household income developments.

The paper attempts to evaluate the redistributive effect of the Romanian tax-benefit system, by estimating income inequality changes due to tax-benefit components. It covers the period between 2007 and 2013. The results indicate that half of the income inequality before taxes and transfers is reduced through the tax-benefit system. We find out that the economic crisis has led to the decline of income inequalities, as richer households have lost

more of their market incomes; but income inequality has dropped also due to tax-benefit system changes that were adopted in order to cope with the emerging situation. We use the EUROMOD microsimulation model in order to split the household income into income components (i.e. social benefits: pensions, means-tested benefits, non means-tested benefits, etc.; taxes: personal income tax, social insurance contributions) and assess the role of each of these components in the redistribution of income. The redistribution of income through the tax-benefit system is evaluated by calculating an indicator derived from the Gini coefficient of pre and post social transfers and taxes. We concentrate on the income components which are responsible for the differences between the two measures, by decomposing the Gini coefficient by income source.

The rest of the paper is organized as follows. We continue with a brief overview of the general framework with respect to recent empirical findings concerning the evolution of income distribution in Romania. Then, we focus on the description of methodology, data and indicators used. The following section summarizes the most important findings concerning the estimation of the redistributive effect of the tax-benefit system in Romania. The paper ends with some concluding remarks.

2. General framework

During the last decades there has been a great interest in the measurement of the redistributive effect of social benefits and fiscal systems and of the contribution of each income component to redistribution. Starting with Kakwani (1977a, 1977b) who has laid the foundations for the measurement of income redistribution through the difference between the pre and post taxes and transfers Gini coefficients, a large strand of the literature in this field has focused on theoretical issues regarding measurement, but also on effective assessment of income redistribution through the tax-benefit system.

We mention as follows several recent relevant studies dealing with household income distribution in Romania. Most of these studies were focusing on the estimation and explanation of income inequalities, and very few are concerned with the effects of the tax-benefit system on income distribution.

One of the most relevant studies concerning the estimation and analysis of income inequalities can be attributed to Molnar (2010) who has decomposed income inequality by groups of main household characteristics. Her results show that the most important elements driving income inequalities between groups of households are education and labour market status. A decomposition exercise has been employed also by Zamfir et al. (2008) who have investigated the impact of remittances sent by Romanians working abroad on income inequalities between and within urban and rural areas. Their results show that remittances have driven the decline of income inequalities both between and within rural and urban areas. Dachin and Mosora (2012) have studied the inequalities driven by the regional distribution of household income and shown that the most relevant factors driving the unequal distribution of income by regions are the employment structure by economic activities and the prevalence of subsistence agriculture.

Concerning the effects of the country's economic development on income distribution, we mention Militaru and Stroe (2010) who have investigated the income dynamics in Romania between 2000 and 2007 using a growth incidence curve approach. Their findings clearly show that the economic growth has been pro-poor, meaning that the

average income growth of poor households has been more substantial than the income growth of the rest of the households. Both households from rural and urban areas have been affected by crisis, but not equally. This is an issue addressed by Dachin and Sercin (2012) who concluded that household income in rural areas is less affected by crisis, compared to household income in the urban area. This can be explained by the different structure of household income by income sources between the two areas, the consumption from own-resources and the prevalence of informal income in the rural area as well.

The effectiveness of social policies in reducing income inequalities has been investigated by Precupetu (2013) who has focused on income inequalities in Romania after 1990. The concern on the tax-benefit system's effect on income distribution in Romania is very recent though. For example, Voinea and Mihaescu (2009) have measured the changes in the income distribution due to the income tax reform that took place in 2005, shifting from a progressive to a flat rate personal income tax and showed that only the richest 20% are clear winners of this reform. Avram et al. (2012) in their study on the distributional impact of fiscal consolidation measures taken in Romania (and other eight EU countries) during the recent economic crisis have shown that richer households have lost higher proportions of their incomes than poorer households, as a result of the above-mentioned measures. A similar analysis has been carried out by De Agostini et al. (2014), but they have measured the effects of all changes in the tax-benefit system (not limited to fiscal consolidation). They have concluded that in Romania the changes in the tax-benefit system were progressive, in the sense that their distributional effects were mainly beneficial for the bottom of the income distribution. Avram, Levy et al. (2014) have studied the redistributive effect of the tax-benefit system and found out that in Romania, unlike in most of the EU countries, social contributions increase income inequalities mostly due to higher limits set on contribution base.

3. Methodological issues

3.1. Methodology and data

We base our analysis on microdata from the European Union Survey on Income and Living Conditions (EU-SILC). The data is collected annually and it is nationally representative for the Romanian population. We use data collected during the 2008 and 2010 surveys, the income reference years being 2007, respectively 2009. Using updating factors by detailed income components (i.e. change in the average value of an income component between the year of the data and the current/ policy year), we adjust the value of the income variables from 2007 to 2008 and from 2009 to 2010-2013. Other variables (demographic, household size and composition, labour market variables) are kept constant to the survey years. We estimate the direct, static effect of the tax-benefit system on household income distribution.

We make use of a tax-benefit microsimulation instrument, namely the tax-benefit microsimulation model EUROMOD. The model comprises the Romanian tax-benefit policy rules for 2007-2013 and is built on EU-SILC data. The model can simulate the entitlement to cash social benefits (i.e. in-kind benefits are not taken into account) and tax and social contribution liabilities. The implemented tax-benefit policy rules are those in place at the middle of the year (i.e. the 30th of June), being assumed that no changes have occurred during the rest of the year. In the interpretation of results from microsimulations using

EUROMOD, one should bear in mind this very important issue. In our case, several relevant changes in the Romanian tax-benefit system took place during the second half of the year, they being effectively implemented in EUROMOD in the following year's rules. The model assumes 100% benefit take-up (exception in the case of the minimum guaranteed income) and no tax evasion. Asset tests that condition the entitlement for means-tested benefits are not simulated due to the lack of adequate information (EUROMOD Country Report: Romania, 2007-2009, 2009-2010, and 2009-2013).

The household disposable income is calculated as the sum between the original income (i.e. market or gross income) and the social transfers, minus direct taxes. The social transfers (benefits) are split into three categories: pensions, means-tested benefits (i.e. beneficiaries have to comply with some eligibility criteria regarding income levels below a threshold, often differentiated by household size, number of children, etc.; the beneficiaries may also be subject to asset tests for some of the benefits), non means-tested benefits (such as the state allowance for children, etc.). The category of direct taxes includes the flat-rate personal income tax (together with the tax allowance) and the social insurance contributions paid by the employees, self-employed (and pensioners) in order to cover the risks of retirement, sickness, unemployment, work-accidents, etc. The household size and age structure is taken into account by using the modified OECD equivalence scale. Thus, household income is adjusted and each household member is assigned the same amount of income.

3.2. Indicators

In order to measure the redistributive effect of the tax-benefit system in Romania, we use the common approach proposed by Kakwani (1977a, 1977b), who has suggested the assessment of the size of the income redistribution (RE) through the social benefit and tax system by the difference between the Gini coefficients of pre-fiscal income (no social benefits and taxes) (G_X) and post-fiscal income (G_N):

$$RE = G_X - G_N \tag{1}$$

The Gini coefficient measures the income inequality by the area between the Lorenz curve and the equality line. A progressive tax-benefit system moves the Lorenz curve towards the equality line; therefore the income inequality will be lower in this case. The redistributive effect is larger for greater average tax rates and greater progressivity. Atkinson (1980) and Plotnick (1981) pointed out that the tax-benefit system induces, besides the movement of the Lorenz curve, the re-ranking of individuals/ units, which can be measured by the difference between the Gini and the concentration coefficient of post taxes and transfers income. A few years later, Kakwani (1984) has decomposed the redistributive effect into vertical (progressivity) and re-ranking terms. In other words, the redistributive effect is reduced by the changes in the new ranking of individuals/ households which occurred in the post- tax and transfers system (see formula (2) below):

$$RE = V^K - R^{AP} \tag{2}$$

where, V^k is the Kakwani vertical effect and R^{AP} the Atkinson-Plotnick index of re-ranking.

The vertical effect can be computed as below:

$$V^K = G_x - D_N^x = \frac{t^x P_T^k}{1 - t^x} \tag{3}$$

where t_x is the average tax rate and P_T^k is the progressivity of the tax-benefit system (named the Kakwani index of progressivity).

The re-ranking effect is the difference between the Gini coefficient of post-taxes and transfers (G_N) and the concentration coefficient of post-tax and transfers income (D_N^x):

$$R^{AP} = G_N - D_N^x \quad (4)$$

We estimate the redistributive effect of the Romanian tax-benefit system between 2007 and 2013 and then, we decompose the effect into vertical and re-ranking effect. The Gini coefficient is decomposed by income source in order to estimate the contribution of each income component to income inequality, following the approach described in Lerman and Yitzhaki (1985) and in Stark, Taylor and Yitzhaki (1986), which allows the calculation of the impact that a marginal change in a particular income source will have on inequality. The influence of an income component on total income inequality depends on the importance of the income source with respect to the total income (S_k), the extent of equality/ inequality in the distribution of that income source (G_k) and on the correlation of the income source with the total income distribution (R_k) (see formula (5)).

$$G = \sum_k S_k G_k R_k \quad (5)$$

Using the above decomposition we estimate the effect that 1% change in income from source *k* will have on total income inequality, as:

$$\frac{S_k G_k R_k}{G} - S_k \quad (6)$$

This approach concerning the measurement and decomposition of the redistributive effect of the tax-benefit system has been most recently used by Verbist and Figari (2014), and the decomposition of inequality by income source has been employed by Avram et al. (2014). These papers follow a comparative framework and analyse groups of EU countries. The contribution of our paper is that the methodology is applied on Romania, for the period between 2007 and 2013 and is focused on the dynamics of the redistributive effect, explaining the impact of certain changes that took place in the tax-benefit system on the size of the redistributive effect.

4. Main findings

4.1. Income distribution and the structure of the tax-benefit system, 2007-2013

Between 2007 and 2013, the household income dynamics has been strongly influenced by the economic downturn which became visible in Romania by the end of 2009. The average household income (real income, adjusted with the consumer prices index, reference 2007) has dropped in 2009 by approximately 5%. The negative developments of household incomes continued during the next two years, but the pace of decline was smoother than in 2009 (see Fig. 1).

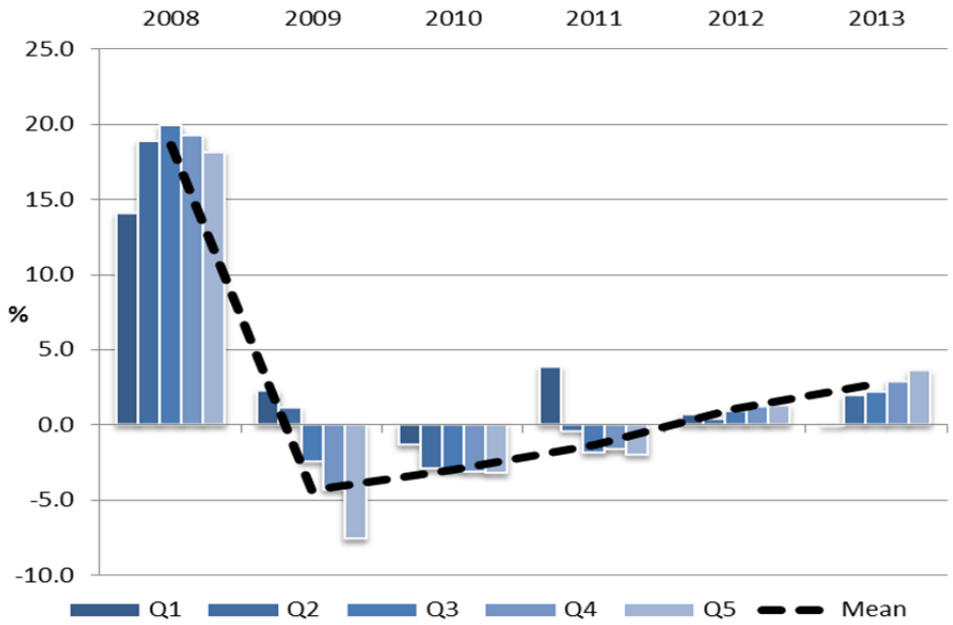

Figure 1. Annual percentage change in the average household disposable income, by quintile groups, %

Source: own calculations using EU-SILC, EUROMOD ver. G.1.0
Note: incomes are adjusted with the consumer prices index, reference year 2007; quintiles are constructed based on the equivalised household disposable income.

However, the developments were uneven along the income distribution (by quintile groups, each quintile comprises 20% of the population), the middle and the upper quintiles have benefited more from the economic growth in 2008, but also lost more during the crisis than the bottom quintiles, who have managed to preserve their levels of income from one year to another (except for the year 2010). This is mostly due to important changes in the tax-benefit system, the so-called "austerity measures" aiming fiscal consolidation, but also helping the worse off population. The fiscal policy changes that took place in 2010 and 2011 seem to have had a positive impact on household disposable incomes, while some of the changes in the social benefit system had a positive impact on household disposable income (i.e. changes in the means-tested benefits) and others a negative effect (i.e. the decrease of the unemployment benefit and the changes in the rules for the child raising allowance). Overall, the changes in the tax-benefit system seem to be progressive, as the bottom of the income distribution is advantaged in terms of income losses.

The Romanian tax-benefit system's largest component is public pensions. The pensions' share in the average household disposable income accounts for around 23-28%, slightly changing with the years. The other social benefits, either means-tested or not, do not exceed 8% of the household disposable income. The direct taxes, which consist of personal income tax and social insurance contributions account for almost 30% of the household disposable income. The social insurance contributions are designed to cover contingencies such as old-age, sickness, unemployment, work accidents, etc. and are paid by employees and self-employed. Additionally, pensioners with pension levels exceeding a statutory threshold pay the health insurance contribution.

As it can be seen in the figure bellow (Fig.2), the structure of the tax-benefit system has not changed considerably between 2007 and 2013. We notice though an increased

share of social benefits in 2010. This can be explained by the increase of the income eligibility thresholds for some means-tested benefits (i.e. minimum social pension, social assistance benefit). There was also a decline in the share of social contributions after 2011, most likely as a result of the introduction of an upper ceiling to the social insurance contribution of employees and self-employed, and the introduction of lower limits to health insurance contribution for all population (active population and pensioners). In 2011, the share of social benefits has contracted, consequence of the following changes: decrease of the unemployment benefit, maximum threshold set for the child raising benefit and the policy rules were changed, increase of the child raising incentive, the allowance for the new-born children was abolished, the income thresholds and the amounts of the means-tested family benefit and the means-tested heating benefit have been changed. We should note that some of the above mentioned changes took place during the second half of the year 2010, being part of the austerity measures, but according to EUROMOD rules, they are implemented in 2011 (see the previous section on methodology of the paper).

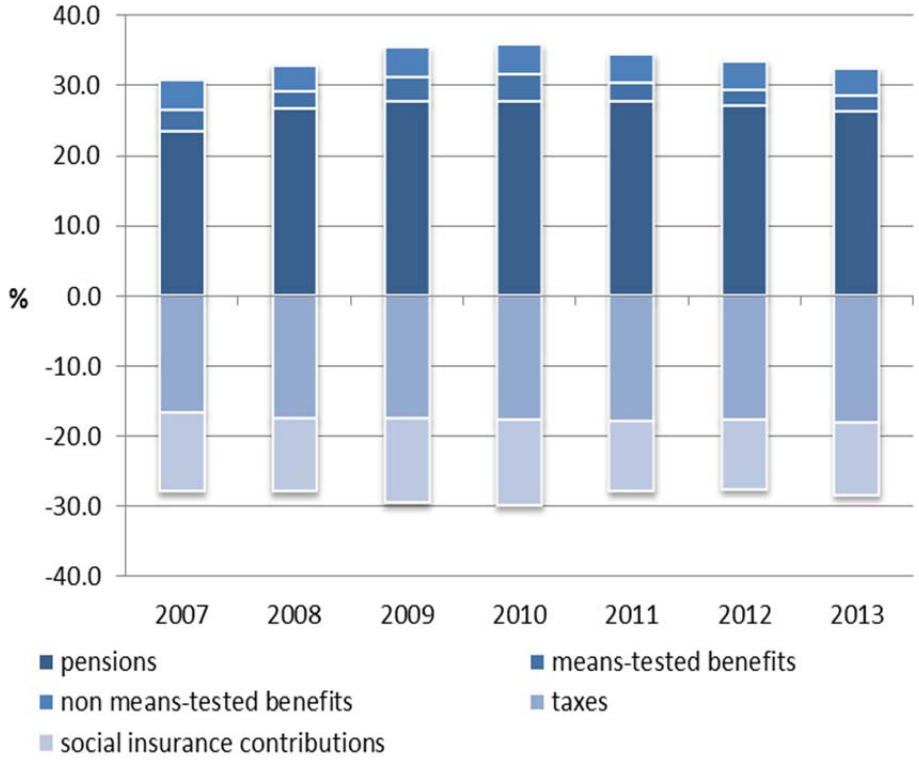

Figure 2. Structure of the tax-benefit system, % of household disposable income, 2007-2013

Source: own calculations using EU-SILC, EUROMOD ver. G.1.0

It is important to mention that the structure of the tax benefit-system varies a lot by quintile groups constructed based on the equivalised household disposable income. Naturally, the bottom quintile (1st quintile) relies on means-tested benefits to a much greater extent than the other parts of the income distribution. On the other hand, the upper quintiles (4th and 5th quintiles) are paying a higher proportion of their disposable income as personal income taxes and social insurance contributions (see Fig. 3). This picture points towards a progressive tax-benefit system, where poorer households benefit more from social transfers

and the richer pay more taxes, but the size of the redistribution is to be treated in the next sub-section.

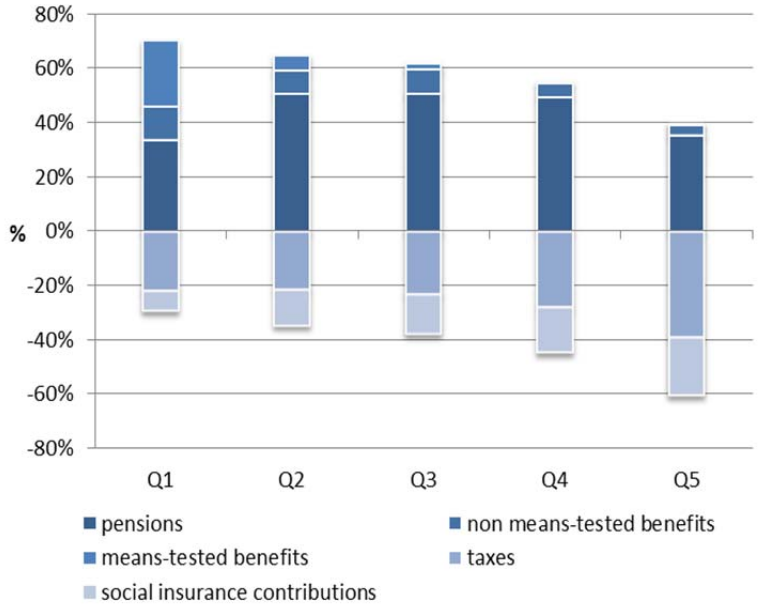

Figure 3. Structure of the tax-benefit system, by quintile groups, % of household disposable income, 2013

Source: own calculations using EU-SILC, EUROMOD ver. G.1.0

4.2. Redistribution of income through the tax-benefit system

We have measured the redistributive effect of the tax-benefit system as a whole, by the difference between the Gini coefficient of pre and post taxes and transfers, as described in detail in the section on methodological issues. The results are presented in the figure below (see Fig. 4). More than half of the income inequality before taxes and transfers (i.e. original or market income) is reduced through the tax-benefit system. It seems that the economic crisis has led to the decline of income inequalities, as richer households have lost more of their market income, but also due to the tax-benefit system changes that were adopted in order to cope with the crisis. Thus, the redistributive effect of the tax-benefit system was highest in 2011 and lowest in 2009.

We have decomposed the redistributive effect into vertical effect and re-ranking effect, the idea behind being that the vertical effect is actually reduced by the re-ranking of individuals that has occurred in the post-tax and transfers system. As it can be seen in the figure below (Fig. 4), the re-ranking effect resulted from the redistribution of income lowers the total redistributive effect by approximately 40%. Only in 2009 and 2010, the re-ranking effect has exceeded 50% of the total redistributive effect. Nevertheless, the dynamics of the redistributive effect is strongly driven by the vertical equity term.

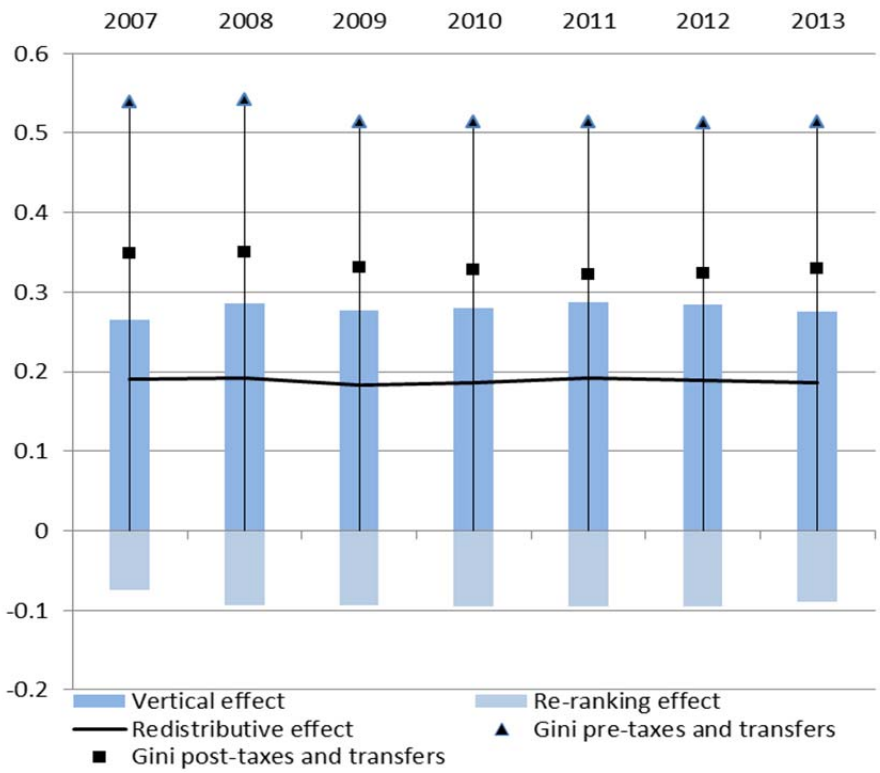

Figure 4. Redistributive effect of the tax-benefit system, 2007-2013
Source: own calculations using EU-SILC, EUROMOD ver. G.1.0

The decomposition of the Gini coefficient by income source shows that pension income is the most important driver for inequality reduction from all income components. This is because pensions are the largest component of the tax-benefit system and are more equally distributed among the whole population than other income components (except for the personal income tax and the social insurance contributions). The means-tested benefits contribute to the reduction of income inequality due to their negative correlation with the distribution of total income, as the lower part of the income distribution benefits more from these transfers.

The personal income tax is decreasing income inequality due to its distribution and strong negative correlation with total income distribution. However, the size of the effect is lowered by the nature of the tax rate, this being a flat-rate tax. The non means-tested benefits have lower impact on income inequality. As expected, their share in total household disposable income is the lowest. The social insurance contributions have acted in the sense of inequality reduction after 2011, as a result of several important changes that took place in 2011 in the social insurance system. On one hand, an upper ceiling was introduced for the social insurance contribution paid by employees and self-employed which could have increased income inequality, but this was counterbalanced by the introduction of lower limits to health insurance contribution in the case of pensioners, thus the overall effect being in favour of inequality reduction. The dynamics of the marginal effect of personal income tax shows a decline in the contribution of the income tax to income inequality reduction.

During the first years of economic crisis (2009-2010), the means-tested benefits have strongly acted as to decrease income inequalities.

5. Conclusions

The paper has attempted to study the income distribution of Romanian households, concentrating on the structure of the tax-benefit system and on the effects on the income redistribution of income components and of the system as a whole.

Our analysis covers the period between 2007 and 2013 and is based on annual nationally representative microdata from the European Union Survey on Income and Living Conditions (EU-SILC). We use the tax-benefit microsimulation model EUROMOD in order to simulate the components of the tax-benefit system. In order to measure the redistributive effect of the tax-benefit system in Romania, we use the approach proposed by Kakwani (1977a, 1977b) and we assess the size of the income redistribution through the social benefit and tax system by the difference between the Gini coefficients of pre-fiscal and post-fiscal income. We decompose the redistributive effect into vertical and re-ranking effect. In order to establish the contribution of each income component to income inequality, we decompose the Gini coefficient by income source, following the approach described in Lerman and Yitzhaki (1985) and in Stark, Taylor and Yitzhaki (1986), which allows the calculation of the impact on income inequality of a marginal change in a particular income source.

Our results show that between 2007 and 2013, the household income dynamics has been strongly influenced by the economic downturn which became visible in Romania by the end of 2009. The average household income has dropped in 2009 and the negative developments have continued for the next two years, but the pace of decline was smoother than in 2009. Starting from 2012, we notice a slight increase in the average level of household income. Though, the developments were unequal along the income distribution, the middle and the upper quintiles have benefited more from the economic growth in 2008, but also lost more during the crisis than the bottom quintiles, who generally have managed to preserve their levels of income. This latter result is mostly due to important changes that took place in the tax-benefit system.

With respect to income redistribution, the results indicate that income inequality before taxes and transfers is reduced to half through the tax-benefit system. During the economic crisis, richer households have lost more of their market income. This is reflected in the reduction of the original income inequality (before taxes and transfers). Additionally, the role of the tax-benefit system was considerable in income inequality reduction, due to changes that were adopted in order to cope with the economic crisis. The decomposition of the redistributive effect into vertical effect and re-ranking effect shows that the redistributive effect is reduced by the re-ranking of households that has occurred in the post-tax and transfers system. The re-ranking of households lowers the total redistributive effect by approximately 40%. In 2009 and 2010, the re-ranking effect has exceeded 50% of the total redistributive effect. However, the dynamics of the redistributive effect is mainly driven by the vertical equity term.

The decomposition of the Gini coefficient by income source has shown that pensions, which account for the larger part of the tax-benefit system, play the most important part in income redistribution, while social insurance contributions increase income inequalities (especially before 2011). The personal income tax is redistributive, though its effect is not substantial due to its flat-rate. Means-tested and non means-tested social

benefits are conducive to income inequality reduction. During the economic crisis, the means-tested benefits have been the most influential on decreasing income inequality.

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