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TRANSFERS AND TAXES
AS INSTRUMENTS OF REDISTRIBUTION

1. Introduction

The purposes of the paper are as follows: (1) to discuss the usefulness of transfers and taxes in lowering income inequality; (2) to appraise the efficiency of transfers and taxes in Poland, and (3) to evaluate trade-offs between redistributive instruments in terms of their impact on income inequality and budget expenditure in Poland. The empirical research is based on the method of analysing the effect of small changes in income sources on the inequality of income distribution [Lerman, Yitzhaki 1994]. The data come from the 2006 Family Budget Surveys (FBS) of Poland.

Section 2 presents transfers and taxes as instruments of a redistributive policy; Section 3 describes the method used; Section 4 discuses findings on the marginal impact of transfers and taxes on overall inequality in Poland in 2006; Section 5 concludes.

2. Mechanisms of redistribution

A redistributive function of a state can be carried out through social benefits or taxes. Social protection generally encompasses two classes of interventions: social insurance and social assistance. They differ in their aims and a way of financing. Social insurance includes transfers in which the primary focus is on managing risks through smoothing an individual's income over time and in the face of difficulties (for example, old-age and disability pensions; health and unemployment insurance).Social assistance means general tax funded transfers in which the focus is to protect the poor people's minimum income (a variety of cash and in-kind programmes targeted at the poor). There is no consensus on a form of social

protection, even in countries that have resources to implement each combination of social protection programmes. There is the debate on the pros and cons of different strategies in social policy. Advocates of social assistance emphasise that means-tested benefits guarantee that social expenditures are received by those defined as needy. Opponents highlight that social transfers can reduce work incentives and private savings as well as weaken informal insurance mechanisms. Social assistance benefits tend to stigmatise the recipient and impose psychic cost on the claimant. Moreover, they are costly to administer.

A main argument against social insurance is that the primary beneficiaries of important social policies are the non-poor. This critique is based on an assumption that there is a zero-sum conflict between the level of minimum income protection and the level of income security, and the benefits to the non-poor are assumed to lower the amount available for redistribution to the poor [Besley 1990]. On the other hand, Korpi [1983] states that non-targeted transfers are likely to be more redistributive in the long run. This opinion is derived from the middle class inclusion thesis [Pedersen 1999] that granting of a high level of income security to people in middle- and higher income groups may increase the possibilities of also providing a high level of income protection to those located in the lower parts of the income distribution [Nelson 2004].The mix of social protection forms selected will depend on the risks faced, the age structure, the administrative capacity, and the complementary social policies and socio-cultural or political factors. Almost all countries spend more on social insurance than on social assistance [World Bank 2006, Figure 7.5]. In transition countries social protection should be shifted from social assistance, that was necessary at the earlier stage of transition, toward social insurance based on the individual contribution.Many countries seek a progressive income tax structure that would have the effect of reducing income inequality among income classes of households as classified for tax purposes. Horizontal and vertical equities justify progressive income taxation. The difference between the distributions of household's income based on gross income and disposable income provides an index of income tax progressivity that enables to evaluate if these two types of equity are observed. Horizontal and vertical equities can be addressed by means of inequality decomposition (see [Zandvakili 1994]).

Taxes can generate some different effects for social cohesion and economic growth. Income taxes are both the source of revenue and redistributive tool used by policy makers. These two aspects should be considered in evaluating income tax progressivity. Income taxes imposed with high marginal rates (specially on labour) are more damaging than value added taxes (basically proportional taxes on consumed income). In general, to improve the efficiency of an economy, tax reforms should replace income taxes with proportional sales taxes.

The modern view of public finance sees most redistribution occurring not through the revenue side of the budget but through the expenditure side via transfers, benefits and such public expenditures as health and education.

3. Methodology

3.1. Variables

The components of income, included in the research, are as follows:
1) money social benefits[1]
− transfers from social insurance – 6 types, including old-age pensions and incapacity pensions,
− transfers from social assistance – 17 types, including a child allowance, social pensions, unemployment benefits, support for housing, pre-pension benefits;
2) income taxes – 32 types, including wage taxes, social insurance contributions and taxes imposed on particular transfers from social assistance

3.2. Inequality measure and its decomposition by income sources

An appraisal of fiscal policy alternatives is based on the method of analysing the effect of small changes in income sources on the inequality of income distribution. This approach was developed in [Lerman, Yitzhaki 1994]. The method is based on the Gini coefficient as a measure of income inequality. To take into account family size, each component of family income and total after-tax income is divided by the number of equivalent adults in the household. The equivalence scale proposed by the OECD (1982) is used as the scale adjustment factor. The use of the concept of income per standard adult allows to focus on the economic well being of individuals.

Let x denote total after-tax family income and t_j ($j = 1, ..., n$) represents income component j (transfer j or income tax on source j).[2] The first step of the method is the source decomposition of the Gini coefficient, G_x. The effect of a particular income source (income source j can be a transfer j or a tax on income source j) on the Gini coefficient for total after-tax income, G_x, can be presented as a following function (see [Lerman, Yitzhaki 1994, p. 405]):

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[1] Transfers to households, in cash, intended to relieve them from financial burden of a number of risks or needs (by convention: sickness, invalidity, disability, occupational accident or disease, old age, survivors, maternity, family, promotion of employment, unemployment, housing, education and general neediness) made through collectively schemes, or outside such schemes by government units.

[2] If an appraisal of fiscal reforms includes changes in indirect taxes, the method can be very easy adjusted. Instead a transfer and an income tax, t_j represents expenditures on a commodity j or a subsidy for a commodity j.

$$G_x = \frac{2\operatorname{cov}\left[x, F_x(x)\right]}{\mu_x} = \frac{2\operatorname{cov}\left[\sum t_j, F_x(x)\right]}{\mu_x} = \sum_j \frac{2\operatorname{cov}\left[t_j, F_x(x)\right]}{\mu_x} =$$

$$= \sum_j \frac{\mu_{tj}}{\mu_x} \cdot \frac{\operatorname{cov}\left[t_j, F_x[x]\right]}{\operatorname{cov}\left[t_j, F_{tj}(t_j)\right]} \cdot \frac{2\operatorname{cov}\left[t_j, F_{tj}(t_j)\right]}{\mu_{tj}} = \sum S_j \cdot R_j \cdot G_j.$$

Finally,

$$G_x = \sum_j G_j R_j S_j,$$

where: G_j – the Gini coefficient of income source j (t_j – transfer j or income tax on source j);

R_j – the Gini correlation between income source j (t_j – transfer j or income tax on source j) and the cumulative distribution of after-tax income;

$$R_j = \frac{\operatorname{cov}\left[t_j, F_x(x)\right]}{\operatorname{cov}\left[t_j, F_{tj}(t_j)\right]};$$

S_j – the share of income source j in after-tax income: if income source j is a tax, then $S_j < 0$, because after-tax income is of interest;

$$S_j = \frac{\mu_{tj}}{\mu_x} = \frac{\sum_i t_{ji}}{\sum_i x_i}$$

i – a household ($I = 1, ..., m$),

m – number of households in a sample.

In order to compare which components account for greater or lesser overall inequality, one should examine the extent to which a marginal increase (for example, by 1%) in one component would be likely to increase or decrease overall inequality. If a component t_j (t_j – transfer j or income tax on source j) increases by 1%, the Gini coefficient for total after-tax income G_x will change as follows [Lerman, Yitzhaki 1994]:

an absolute change in G_x due to a 1% increase in t_j [3]	a percentage change in G_x due to a 1% increase in t_j
$\dfrac{\partial G_x}{\partial d_t} = S_t\left(R_t G_t - G_x\right)$	$\dfrac{1}{G_x} \cdot \dfrac{\partial G_x}{\partial d_t} = S_t\left(\dfrac{R_t G_t}{G_x} - 1\right)$

A tax is defined as progressive if a 1% increase in the tax reduces the Gini coefficient of after-tax income by more than 1%. It means that the change in the tax

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[3] Formally, $t' = t(1 + d_t)$.

affects the rich more than it affects the poor. A tax is defined as regressive if a 1% increase in the tax reduces the Gini coefficient of after-tax income by less than 1%. It means that the change in the tax affects the poor more than it affects the rich. The progressivity (regressivity) of a change in the tax depends on whether a percentage change in the Gini coefficient is smaller or greater than -1.

Transfers should alleviate poverty. A 1% increase in a transfer is expected to reduce the overall inequality by more than 1%. It means that the transfer is a well-targeted policy instrument.

An appraisal of fiscal reforms in terms of revenue and expenditure requires to measure an impact of a 1 złoty change in a transfer or a tax on income inequality, G_x. If T_t means a change in a component t (a transfer or a tax) per an equivalent adult in a household (a change in a component t is expressed in money), T_t can be presented as follows:

$$T_t = \overline{t \cdot d_t \cdot D_t} = \mu_t d_t D_t = S_t \mu_x D_t \cdot d_t,$$

where D_t represents the substitution effect of a tax change.

A tax change results in the substitution effect and the distributional effect. The substitution effect requires time series to be estimated. Unfortunately such data are not available. Lerman and Yitzhaki [1994] assumed $D_t = 1$ for all income components. Finally for $D_t = 1$, if a transfer or a tax increases by 1 złoty, overall inequality, measured by G_x changes as follows [Lerman, Yitzhaki 1994]:

an absolute change in G_x due to a 1 złoty increase in t_j	a percentage change in G_x due to a 1 złoty increase in t_j
$\dfrac{\partial G_x}{\partial T_t} = \dfrac{R_t G_t - G_x}{\mu_x}$	$\dfrac{1}{G_x} \cdot \dfrac{\partial G_x}{\partial T_t} = \dfrac{\dfrac{R_t G_t}{G_x} - 1}{\mu_x}$

μ_x – mean income.

3.3. Policy alternatives

The fiscal policy alternatives can be considered in terms of their effects on: (1) tax revenue or (2) income inequality. Examples of such alternatives can be as follows.

- A government would like to conduct a change in the proportion between the income tax revenue and the indirect taxes revenue under the condition that total revenue will be intact. It is necessary to evaluate how such a change will affect inequality.
- If a tax on any income source is chosen as a numeraire by how much the taxes on other sources of income should be changed to have the same effect on inequality.
- If a government wants to rise an income tax or a tax on any commodity so as to add an additional złoty of revenue by how much the transfers should be changed in order to keep inequality intact.

- How to change a structure of transfers to reduce inequality under the condition that total spending will be intact or decline.

The method enables to evaluate the impact of a marginal change in a tax (or a transfer) on income inequality. It is only required income inequality to be measured by the Gini coefficient, and the evaluation to be restricted to marginal changes. Yitzhaki [1997] suggests that if a reform fails to change the structure of an economy, or if it does not change incomes (or expenditures) by more than 10%, an analysis based on margins is sufficient as a policy guide.

3.4. Data

The data come from the 2006 Family Budget Surveys (FBS) of Poland. The sample consists of 37 508 households. It is representative for the populations in Poland.

4. Findings

A percentage changes in overall inequality (measured by the Gini coefficient for after-tax income) due to a 1% increase in a particular transfer reveal that only four transfers were well-targeted instruments of the redistributive policy in Poland (they are in bold in Table 1). Two transfers increased inequality: maternity benefits and child-birth benefits. Incapacity pensions occurred to be the most efficient instrument. A 1% increase in these transfers could reduce income inequality by more than 4%.

In general, three of four efficient transfers come from social insurance and only one, the child allowance, belongs to a social assistance. The findings support the thesis that social insurance is relevant for the vertical redistribution and the alleviation of poverty (see [Nelson 2004]). In Poland more may be gained from the extension of social insurance than from increasing poor-targeted social assistance.

The Polish income tax system is not progressive. The Gini coefficients for before-tax income and after-tax income were almost the same in 2006, respectively 0.30687 and 0.30379. The values presented for income taxes in Table 1 indicate that these components of income did not contribute considerable towards reducing overall inequality. Considering a wage tax, that revealed the strongest impact, a 1% increase in a wage tax could lower the Gini coefficient only by 0.47%. Almost half of income taxes increased overall inequality. The findings show that in Poland income taxes are not instruments of redistribution. They are only a source of revenue.

In Poland income inequality can be reduced mainly through the transfer system. A 1 złoty increase in total transfers is likely to lower the Gini coefficient by 0.03%, while a 1 złoty increase in income tax revenue could reduce overall inequality only by 0.015% (see Table 1).

Table 1. Changes in overall inequality (measured by Gini coefficient G_x) due to a 1% (or 1 złoty) increase in a transfer or an income tax, Poland, 2006

Transfers and income taxes (t_j) chosen to be presented	Share of transfer/tax in total transfers /total income taxes (%)	A percentage change in overall inequality (G_x) due to a 1% increase in a transfer/ a tax (%)	An absolute change in Gini coefficient (G_x) due to a 1złoty increase in a transfer/ a tax	A percentage change in Gini coefficient (G_x) due to a 1złoty increase in a transfer/ a tax
Transfers from social insurance				
Old-age pensions	65.45	**–1.04736**	–0.000011	–0.00372
Structural pensions for farmers	0.39	–0.01647	–0.000029	–0.0097
Incapacity pensions	11.83	**–4.44313**	–0.000265	–0.08721
Family pensions	9.77	**–1.26111**	–0.000091	–0.02998
Maternity benefits	0.18	0.001489	0.000006	0.00195
Transfers from social assistance				
Child allowance	1.42	**–1.11667**	–0.000553	–0.18216
Supplement for taking care of a child during a parental leave	0.32	–0.17785	–0.000392	–0.12912
Child-birth benefits	0.10	0.007399	0.000054	0.017635
Support for alimony	0.24	–0.18891	–0.000555	–0.18256
Support for housing	0.72	–0.54353	–0.000533	–0.17542
Social pensions	0.61	–0.3774	–0.000439	–0.14464
Unemployment benefits	0.96	–0.56894	–0.000416	–0.13705
Pre-old-age pension benefits	2.97	–0.89411	–0.000212	–0.06981
Total transfers	100.00	–12.6696	–0.000089	–0.02943
Current income taxes				
Wage tax	51.22%	–0.47841	–0.000083	–0.027265
Tax on old-age pensions	31.36%	–0.12147	–0.000034	–0.011306
Tax on incapacity pensions	3.48%	0.096478	0.000246	0.08088
Tax on family pensions	4.46%	0.01391	0.000028	0.0091
Non-current income taxes				
Real estate tax	4.66%	0.003328	0.000006	0.00208
Contribution to social insurance paid by an individual	0.32%	–0.010015	–0.000276	–0.09072
Total income taxes	**100.00%**	**–0.50306**	**–0.000045**	**–0.014685**

An absolute change of the Gini coefficient due to a 1 złoty increase in any income source enables to compare the effects of transfers at the margin. Among transfers from social assistance, the child allowance can be chosen as a numeraire. For example, a 1 złoty child allowance will have the same effect on inequality as a 1.41 złoty supplement for

taking care of a child during a parental leave (source: Table 2). If the child allowance increases and the supplement for taking care of a child during a parental leave declines at the margins, inequality does not change but expenditure will be reduced.

Table 2. The magnitude of transfers from social assistance with equal effect on inequality as the family allowance, Poland, 2006

Transfers from social assistance	Magnitude of transfer with equal effect on the Gini coefficient (in Polish złoty)
Child allowance as a numeraire	1
Supplement for taking care of a child during a parental leave	1.41
Support for alimony	0.99
Support for housing	1.04
Social pensions	1.26
Unemployment benefits	1.33
Pre-old-age pension benefits	2.61

Source: see Table 1.

Table 3. The magnitude of transfers from social assistance with equal effect on inequality as the pre-old-age pension benefits, Poland, 2006

Transfers from social assistance	Magnitude of transfer with equal effect on the Gini coefficient (in Polish złoty)
Pre-old-age pension benefits as a numeraire	1
Child allowance	0.38
Supplement for taking care of a child during a parental leave	0.54
Support for alimony	0.38
Support for housing	0.40
Social pensions	0.48
Unemployment benefits	0.51

Source: see Table 1.

Recently the aim of Polish government has been to remove the pre-old-age pension benefits. The opposition in the parliament has partly blocked this reform suggesting its negative influence on inequality. However, comparison of the amount of other transfers from social assistance that will have the same effect on inequality like the pre-old-age pension benefits reveals that most of these transfers can offer the same reducing overall inequality for less public money (source: Table 3).

5. Conclusions

Overall income inequality is at a high level in Poland. The Gini coefficient for after-tax income amounted to 0.304 in 2006. The redistributive policy is carried out mainly through social insurance. Only one transfer from social assistance, it means

the family allowance, occurred to be a well-targeted instrument. The income tax system is rather regressive. A 1% increase in each income tax could reduce overall inequality by less than 1%. In Poland income taxes are a source of revenue, not instruments of redistribution.

Literature

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