Income Dynamics in Poland during the Great Recession and Recovery: The Role of Tax and Benefit System[1]

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1. Introduction

According to the newly established strategy, the World Bank aims at ending extreme poverty at the global level within a generation and promoting shared prosperity understood as sustainable fostering of the incomes of the bottom forty (B40) of the population in each country. According to the second objective, the economic growth should be inclusive benefiting the less well-off. The present paper is the Polish country study for the World Bank project *Shared prosperity in the EU11*, which studies income dynamics (or mobility) of the B40 in the group of 11 Central and Eastern European (CEE) countries that joined the European Union (EU) after 2004. The paper focuses on measuring the inflow and outflow of persons into the B40 group as well as on determining what personal characteristics are associated with staying in the B40 group for a period of time, and what characteristics account for moving out of it and moving into it. In other words, the paper attempts to discover why some Poles are chronically stuck at the bottom of the income distribution and why others move down to the bottom group or move out of it. The paper is therefore concerned with the classic problem of "income mobility", which is about longitudinal changes in incomes between one year and the next or some later year. In particular, the paper studies the intra-generational, short-run (2-4 years) income mobility of the B40 group in Poland using the European Union Statistics on Income and Living Conditions (EU-SILC) data. Various income variables available in the EU-SILC (disposable income, gross income, net market income) are used to assess the the impact of fiscal and social public policies on the inflow to and outflow from the B40 group. The period

[1] I would like to thank the participants of the World Bank 's workshop on *Fiscal Policy and Income Dynamics* in the EU (Brussels, March 12, 2015) for helpful comments and suggestions. All remaining errors are my responsibility.

under study is 2008-2010. This is the period covered in the latest available release of the longitudinal component of the EU-SILC. It allows us to analyse the impact of the recent global economic crises on the income dynamics of the B40 group in Poland, but only during the first phase of the crisis. The distributional consequences of the significant growth slowdown since 2012 will have to be analysed with the help of the future releases of the EU-SILC data.

The reminder of the paper is organized as follows. Section 2 shortly presents the recent macroeconomic and distributional developments in Poland. The EU-SILC data are presented in Section 3. The following section analyses positional income mobility in Poland using transition matrices, while Section 5 discusses inclusive growth and income mobility as individual income growth using the concepts of anonymous and non-anonymous (individual) growth incidence curves. Section 6 analyses the inequality of opportunity in Poland in 2010. The next section studies the socio-economic, demographic and individual correlates of permanent membership in the B40 group as well as of moving out of it and moving into it. Finally, the last section concludes.

2. Recent macroeconomic and distributional developments in Poland

After joining the EU in 2004, the rate of economic growth in Poland accelerated and reached on average 6.6% per year between 2006 and 2007 (see Figure 1 below). The unemployment rate dropped by about 10 percentage points between 2004 and 2008. This contributed to a pro-poor and inequality-reducing growth, with rates of growth for the poor and the B40 group markedly higher than for the rest of the population (see Brzezinski 2012, World Bank 2013). In effect of the Great Recession, Poland experienced a slowdown in growth over 2008-2009 but there was no recession.[2] After growth picked up somewhat over 2010-2011, it slowed down significantly again since 2012. The unemployment rate has increased from 7% to 9.7% between 2007 and 2010 and remains stable since then.

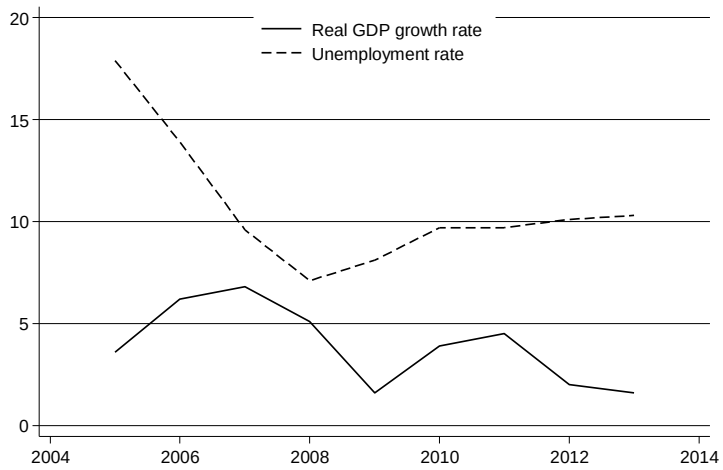
Figure 2 presents trends in income inequality and poverty during 2005-2012. There is a significant disagreement between the two main data sources (EU-SILC and Polish Central Statistical Office, CSO) on the recent trend in the Gini index.[3] This problem is not solved yet, although some accounts of it suggest that it might have been caused by some problems in the

[2] See Bukowski and Magda (2013) for more details of the impact of the Great Recession in Poland on the economy in general and the labour market in particular.

[3] This disagreement is similar for other inequality measures. It cannot be also explained by the fact that estimates on Figure 2 use different approaches to equivalize household incomes in order to account for differences in household size and composition.

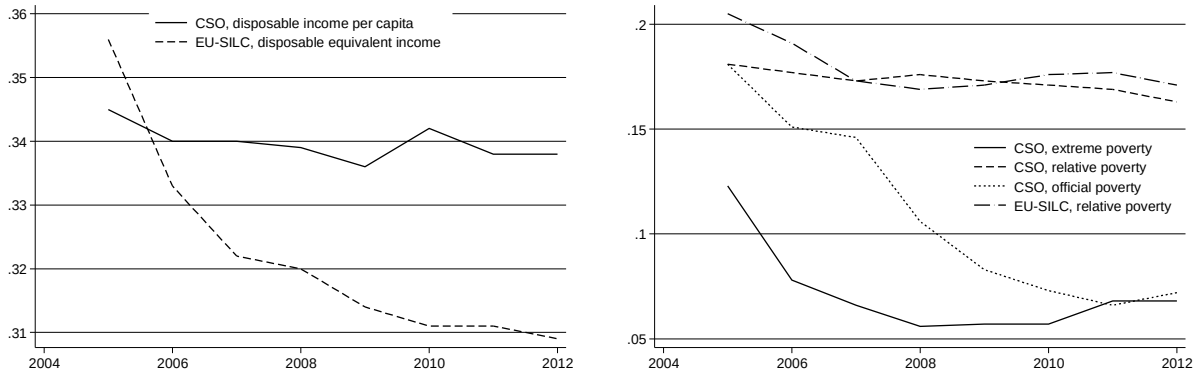
first years of the EU-SILC implementation in Poland (OECD 2012). However, it seems that income inequality in recent years, including the period of the crisis, followed a non-increasing trend.

Figure 1. Real GDP growth and unemployment rates, Poland, 2005-2013



Source: Eurostat.

Figure 2. The Gini index (left panel) and poverty rate (right panel), Poland, 2005-2012



Source: Polish Central Statistical Office (CSO), Eurostat.

Regarding trends in poverty, it can be observed that relative poverty (with the poverty line set to the 60% of the median income) has been moderately decreasing in recent years. Absolute poverty, both measured with the official poverty line and with the "extreme" poverty line based on subsistence minimum, has been falling between 2005 and 2010, but slightly increased since then. This may be the most visible negative distributional consequence of the Great Recession in Poland.

Several policy measures were introduced in Poland over 2008-2010 in order to mitigate the effects of the crisis. They include expansionary monetary policy, aid for the repayment of housing loans, increasing public investment (funded mainly from the EU sources), increased expenditures on both passive and active labour market policies, and introducing more flexible rules for accounting of working time and allowing employers in difficult situation to reduce labour costs (see Bukowski and Magda 2013). Moreover, several changes to the tax and transfer system have been introduced prior to the crisis that could have seriously affect the income dynamics of the B40 group. These reforms include a significant reduction in disability insurance contribution by 7 percentage points (from 13% to 6%) between 2007 and 2008, a reduction in income tax rates (a system of three tax rates, 19%, 30%, 40% was a replaced by a system with two rates 18% and 32%) since 2009, and an introduction of a universal, generous child tax credit in 2007.[4]

In this paper, there will be no attempt to disentangle the individual effect of every single policy change described above on income dynamics in Poland. However, the paper will try to account for the overall impact of: 1) income taxes, and 2) social transfers, on the income dynamics.

3. The longitudinal EU-SILC data

The main source of data for this paper is the EU Statistics on Income and Living Conditions (EU-SILC). EU-SILC is the EU reference source for comparative statistics on income distribution, living standards, and social exclusion (see Atkinson and Marlier 2010). EU-SILC started in 2003 and has been fully implemented in all EU countries since 2005. The main variables covered by EU-SILC are socio-demographic variables, as well as variables related to education, housing, labour status, social exclusion, health and income. EU-SILC is organized in the form of the 4-year rotational panel, which allows for collecting representative cross-sectional and longitudinal data. Every year since 2003, an EU-SILC sample consists of four representative of the whole population sub-samples, which have been in the survey for from 1 to 4 years. Every subsample remains in the survey for four years; each year one of the 4 sub-samples from the previous year is dropped and a new one is added. The rotational panel method allows therefore for both analysing cross-sectional (all sub-samples collected in a given year) as well as longitudinal samples (households followed by 2, 3 and 4 years).

[4] The impact of these changes in the tax and transfer system on poverty in Poland is investigated in detail by means of microsimulation in Myck et al. (2012).

In this paper, we use the latest release of the EU-SILC data from 2011, which covers the period 2008-2011. Since in a given survey year EU-SILC asks respondents about incomes received in the preceding year, our samples cover incomes received between 2007 and 2010.[5] The data were collected by the CSO using two-stage sampling scheme with stratification by voivodships and clustering by enumeration census areas.[6] Most of the analyses are performed for two samples: 1) the longest 4-year panel available – i.e. persons, whose incomes are observed from 2007 to 2010; 2) the 3-year panel consisting of persons with incomes observed from 2008 to 2010. The first sample is the longest available recent panel covering a pre-crisis year of 2007, when the growth was still high and pro-poor. The second sample covers the period of the crisis, which started to affect Poland in 2008. We will be using the second sample (3-year panel with observations from 2008 to 2010) in all analyses devoted to discovering the impact of the crisis on income dynamics of the B40 group. Unless otherwise stated, all estimates in this paper are weighted with EU-SILC personal longitudinal weights specific for either 3-year or 4-year panel duration (see Verma et al. 2007). The sample size for the balanced panel with observations from 2007-2010 is 7805 persons, while for the panel with observations for 2008-2010 it is 15823 persons.

The EU-SILC contains both net and gross income variables, which allow to construct various income concepts suitable for the analysis of the redistributive impact of tax and benefit system. Our main income variable is *equivalized disposable income* (EDI), which is defined as the sum of gross personal incomes for all household members (employee cash or near cash income, self-employment income, unemployment benefits, old-age benefits, disability benefits and education-related allowances) plus gross income components at household level minus regular taxes on wealth, regular inter-household cash transfer paid and tax on income and social insurance contributions. Following Fuest et al. (2010), we use three other income concepts at different stages of redistribution.[7] *Equivalized factor income* (EFI) is defined as the sum of all employee and self-employment cash or near cash income for all household members plus gross income components at household level. *Equivalized market income* (EMI) is EFI plus old-age benefits (pensions). Adding other social transfers (unemployment

[5] In the reminder of the paper, the years refer to the income reference years (years during which incomes were actually received), not to the EU-SILC survey years.

[6] The information about stratification and clustering in the EU-SILC s not available in the data files. For this reason, we do not account for the complexity of survey design in our computations of standard errors and confidence intervals for various estimated quantities. See Goedemé (2013) for an approach to recover approximately appropriate standard errors for SILC-based estimates using existing information about the EU-SILC sample design.

[7] See also Lustig and Higgins (2013) for a description of this type of approach to assessing the distributional impact of taxes, subsidies and transfers.

benefits, survivor' benefits, sickness benefits, disability benefits, education-related allowances, family/children related allowances, social exclusion not elsewhere classified, housing allowances) gives *equivalized post-benefit income* (EPBI). Finally, EPBI minus regular taxes on wealth, regular inter-household cash transfer paid and tax on income and social insurance contributions gives EDI. All income concepts are equivalized using the modified OECD equivalence scale. This scale gives a weight of 1 to the first adult, 0.5 to any other household member aged 14 and over and 0.3 to each child below 14. The resulting number is attributed to each household member. All incomes are expressed in Polish zlotys (year 2010 prices).

4. Income mobility as positional change

In this section, we analyse income mobility of persons belonging to the B40 group in relative or positional terms. We are therefore concerned only with a pattern of exchange of individuals between positions (e.g. membership in a quantile group) over time. In this sense, mobility of a person over time (between some origin and destination points) depends solely how the person's position relative to others is changed. However, it does not depend on whether the person's income has increased or decreased.[8] The standard tool to measure positional income mobility is a transition matrix, which for a given division of a society into income groups (e.g. income deciles) gives the probability a_{jk} that an individual in an income group j in an initial year (origin group) is found in income group k in a final year (destination group).

The decile transition matrix for a 4-year panel with observations from 2007 to 2010 is given in Table 1. Results are presented for all four income definitions under study. We first analyse results for EDI. It can be seen that there is substantial income mobility over the studied 4-year period. However, as in most of the analyses of short-term mobility, the observed mobility is rather short-distance mobility. Only 5.5% of persons belonging to the B40 in 2007 moved to the richest decile in 2010. On the other hand, as much as 14.3% of persons from the richest decile in 2007 moved down to B40. In order to put our results in a perspective, we can compare results from Table 1 with results from other studies devoted to measuring income mobility. Alves and Martins (2012) used EU-SILC data and transition matrices to study income mobility for pooled 4-year panels in the EU in the period from 2004 to 2008.

[8] This positional approach to income mobility is to be contrasted with mobility understood as individual income growth, which is analysed in terms of individual (non-anonymous) Growth Incidence Curves in the next section. See Jenkins (2001), for a discussion of these and other approaches to income mobility.

Table 1. Decile transition matrices: Poland, various income concepts, 2007-2010 (percentages)

	Destination group, 2010									
Origin group, 2007	1	2	3	4	5	6	7	8	9	10
	EFI									
1	58.0	20.2	8.2	4.9	3.9	1.9	1.5	1.4	0.0	0.0
2	15.1	52.3	14.6	5.6	1.5	6.1	3.1	0.8	0.7	0.2
3	8.1	12.5	34.0	19.8	11.5	6.5	2.1	3.8	0.7	1.1
4	4.9	4.3	8.8	25.5	19.7	14.5	10.1	7.8	3.2	1.3
5	6.5	3.2	14.7	14.3	16.7	17.3	8.2	8.9	4.8	5.3
6	1.5	1.4	4.6	9.2	20.6	21.3	21.7	11.0	6.5	2.4
7	4.3	2.2	7.0	6.7	11.5	8.8	24.7	21.4	9.7	3.6
8	0.4	1.5	5.6	6.6	7.4	13.8	15.9	18.0	18.9	12.0
9	0.9	1.4	1.3	2.8	3.3	5.6	7.2	18.9	35.8	22.8
10	0.5	0.7	1.6	4.5	3.9	4.4	5.2	8.5	19.1	51.5
	EMI									
1	43.6	22.7	8.1	8.8	6.1	4.0	5.0	1.0	0.8	0.1
2	17.5	36.6	19.1	10.6	4.1	4.3	2.2	4.1	0.2	1.4
3	5.5	10.0	29.3	16.9	13.6	8.6	7.1	5.2	2.6	1.2
4	10.1	11.3	12.7	21.5	16.6	8.9	5.4	4.3	4.4	4.7
5	5.2	7.6	8.0	13.3	24.7	16.4	13.5	6.5	3.2	1.6
6	5.1	3.2	6.4	14.5	11.5	20.3	21.3	10.7	4.0	3.0
7	6.7	4.9	7.4	4.9	9.1	15.2	18.7	15.3	13.1	4.5
8	3.3	2.3	3.0	4.9	6.5	13.0	17.4	23.3	14.8	11.5
9	1.5	0.4	2.3	2.3	4.4	5.7	5.2	20.7	38.8	18.7
10	1.3	0.8	3.9	3.7	2.5	3.2	4.2	8.7	18.3	53.3
	EPBI									
1	46.3	19.2	8.8	8.5	7.8	5.4	0.8	1.8	0.6	0.8
2	17.1	35.2	16.9	9.4	7.5	2.2	3.8	5.1	2.1	0.7
3	10.9	12.3	22.2	20.4	11.9	7.0	3.2	6.2	4.6	1.4
4	6.6	10.4	15.2	19.6	13.2	19.5	6.3	5.7	2.1	1.5
5	7.0	10.1	11.7	19.8	19.6	12.5	9.7	4.6	1.4	3.6
6	2.4	2.4	9.7	9.2	17.9	17.9	21.0	11.4	3.9	4.2
7	4.1	4.9	4.1	5.4	9.3	14.4	21.9	17.6	10.6	7.8
8	1.4	3.9	2.5	2.4	6.1	11.9	20.5	25.2	16.9	9.0
9	1.4	0.5	2.9	3.3	4.5	8.2	8.0	14.4	36.1	20.6
10	2.9	0.9	5.6	2.3	2.2	0.9	4.5	8.0	22.0	50.6
	EDI									
1	40.9	19.8	11.4	12.3	5.0	5.3	1.2	1.3	1.9	1.1
2	19.0	27.6	15.7	9.5	7.6	3.7	6.4	3.9	5.1	1.4
3	11.8	15.3	20.1	20.9	11.7	11.3	2.2	3.8	0.9	2.0
4	8.7	16.6	18.6	13.7	10.0	12.7	7.9	9.4	1.3	1.0
5	5.1	7.9	10.5	16.0	21.2	15.0	9.4	4.6	4.4	5.9
6	5.8	3.7	9.2	9.6	19.8	16.5	16.1	12.7	4.8	1.6
7	1.4	2.0	3.4	5.5	12.9	18.0	24.1	13.2	10.8	8.7
8	1.3	3.5	2.2	2.7	6.2	9.0	15.1	27.8	21.2	11.0
9	2.0	2.0	4.1	5.6	5.1	6.3	14.4	15.3	28.8	16.5
10	3.9	1.8	4.5	4.1	0.6	2.2	3.0	8.2	20.8	51.0

Note: The decile groups are ordered from the poorest to the richest one.
Source: Own computation using EU-SILC data.

The comparison of Table 1 with their results (Alves and Martins 2012, p. 63) suggests that in general income mobility in Poland during 2007-2010 was close to the average mobility in the EU over 2004-2008. One major difference is that the rates of persons belonging initially to the highest two deciles and eventually moving down to the lowest deciles are visibly higher for Poland over 2007-2010 than for the EU over 2004-2008.

Turning to the comparison of transition matrices for various income concepts, we can see that there is little difference between estimates for EDI and EPBI. This suggests that income taxes have little impact on positional income mobility in Poland. Comparing estimates for EFI and EMI reveals that old-age benefits play an important role in shaping income dynamics in Poland. It is most evident in the case of the poorest decile. Pensions reduce the proportion of persons staying in the poorest decile from 58% to 43.6% The effect is much smaller for the whole B40 group. Table 2 presents estimates of some indices of B40 positional mobility over 2007-2010.

Table 2. Indices of positional mobility for B40, Poland, 2007-2010

	EFI	EMI	EPBI	EDI
Percentage staying in B40	74.2	71.1	69.8	70.5
B40 exit rate	25.8	28.9	30.2	29.5
B40 entry rate	17.2	19.5	20.2	19.7

Note: B40 exit rate is defined as the fraction of individuals in B40 in 2007 that are not in B40 in 2010. B40 entry rate is defined as the fraction of individuals not in B40 in 2007 that are in B40 in 2010.
Source: Own computation using EU-SILC data.

The indices take rather similar values for all income definitions. It can be observed, however, that social transfers taken together reduce slightly the percentage of persons staying in B40 (that is persons in B40 both in 2007 and in 2010) from 74.2% to 69.8% and, equivalently, increase the B40 exit rate (from 25.8% to 30.2%). The role of pensions is bigger than that of other social benefits, especially in the case of the first decile.

The results of measuring positional income mobility with 3-year panel covering the period of crisis (2008-2010) are given in the Appendix. The estimated transition matrix is very similar to that estimated from the HBS data for a 2-year panel covering 2009-2010 (see Bukowski and Magda 2012, p. 133). The mobility for the 3-year panel is of course a little lower than for the 4-year panel. In this case, pensions seem to be the only element of the tax and benefit system that increase the exit rate from the B40 income group.

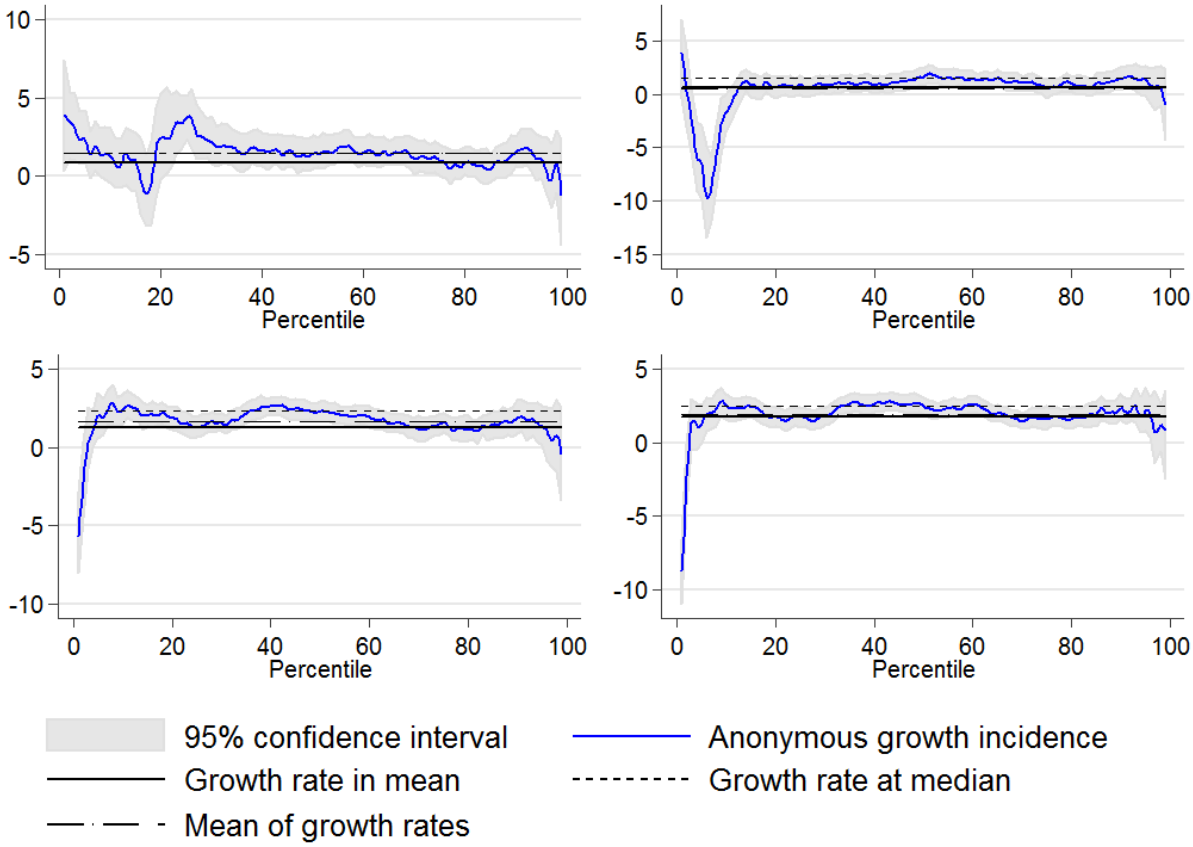
5. Anonymous and non-anonymous (individual) income growth for the B40

In this section, we analyse the growth experience and income mobility of the B40 in terms of a Growth Incidence Curve (GIC), which computes the rates of income growth between two points in time for all quantiles of an income distribution (Ravallion and Chen 2003). The original GIC of Ravallion and Chen is based on the anonymity axiom, which requires that the given growth episode between t_1 and t_2 points in time should be evaluated for the poor in both points treated *independently*. In other words, the *anonymous approach* compares incomes of the initially poor (at t_1) with incomes of those finally poor (at t_2), without checking whether the finally poor are the same individuals as those initially poor. Therefore, this approach does not allow to measure income mobility or chronic poverty or B40 membership. Grimm (2007) has introduced a non-anonymous (individual) GIC, which assumes that the identity of individuals at times t and t-1 is known.[9] In this approach, using longitudinal data we order individuals, observed at t-1 and t, according to the information about the income quantile $p(y_{t-1})$ they belonged to at t-1. Then, individuals are ordered in ascending order according to their initial income quantile $p(y_{t-1})$. Next, one can compute quantile-specific mean incomes for t-1 and t and growth rates in mean incomes for all quantiles.

Following World Bank (2013), we present our analysis of growth incidence curves for the period of crisis between 2008 and 2010. Figure 3 presents anonymous growth incidence curves for all our income definitions. We begin the discussion with the results for EFI. The figure shows that while most of the population experienced positive rates of growth in EFI, there were two income groups that did not – a part of the B40 between 16th and 20th percentile and a few of the highest percentiles. However, on average percentiles of EFI distribution grew by about 1.5% annually (see Table 3). Moving to the results for EMI, we observe that adding pensions results in relatively big losses (up to 10% annually) for a range of percentiles between 3rd and 15th. This seems to be caused by changes introduced in 2009 to the system of early retirement benefits in 2009. In that year, the system of early retirement benefits was replaced by the "bridging" pension system, which reduced the availability of these benefits and their generosity. Moreover, in the same year the first benefits from a new old-age pension scheme, introduced in a reform of 1999, were paid. Since they are significantly less generous than pensions from the old pension system, this could also contribute to the observed losses for lower percentiles of the EMI distribution.

[9] An equivalent approach has been also proposed by Van Kerm (2006, 2009).

Figure 3. Anonymous growth incidence curves for EFI (top left), EMI (top right), EPBI (bottom left), EDI (bottom right), Poland, 2008-2010.



Source: own computations using EU-SILC data.

Comparing results for EMI and EPBI we can see that other social benefits grew during 2008-2010 fast enough to bring the growth rates for majority of the B40 group to the positive levels. Only for about two of the poorest percentiles we can observe losses up to 5% annually. There is little difference in anonymous growth incidence for EPBI and EDI, which suggests that income taxes played a very small role in shaping the pattern of growth across percentiles. Overall, it seems that increased other social benefits contributed most to the improving situation of the most of percentiles in the B40 group.

Table 3. Measures of growth and inclusive growth, annual rates, Poland, 2008-2010

	Grow rate in mean	Growth rate at median	Mean percentile growth rate	Mean percentile growth rate in B40
Anonymous approach				
EFI	0.87	1.51	1.49	1.91
EMI	0.66	1.56	1.55	-0.35
EPBI	1.31	2.32	1.67	1.66
EDI	1.73	2.46	1.92	1.72
Non-anonymous approach				
EFI	1.39	1.19	10.95	13.23
EMI	1.52	1.60	9.51	11.76
EPBI	2.12	2.74	5.89	6.75
EDI	2.65	3.18	6.40	7.11

Source: Own computation using EU-SILC data.

Figure 4. Non-anonymous (individual) growth incidence curves for EFI (top left), EMI (top right), EPBI (bottom left), EDI (bottom right), Poland, 2008-2010.

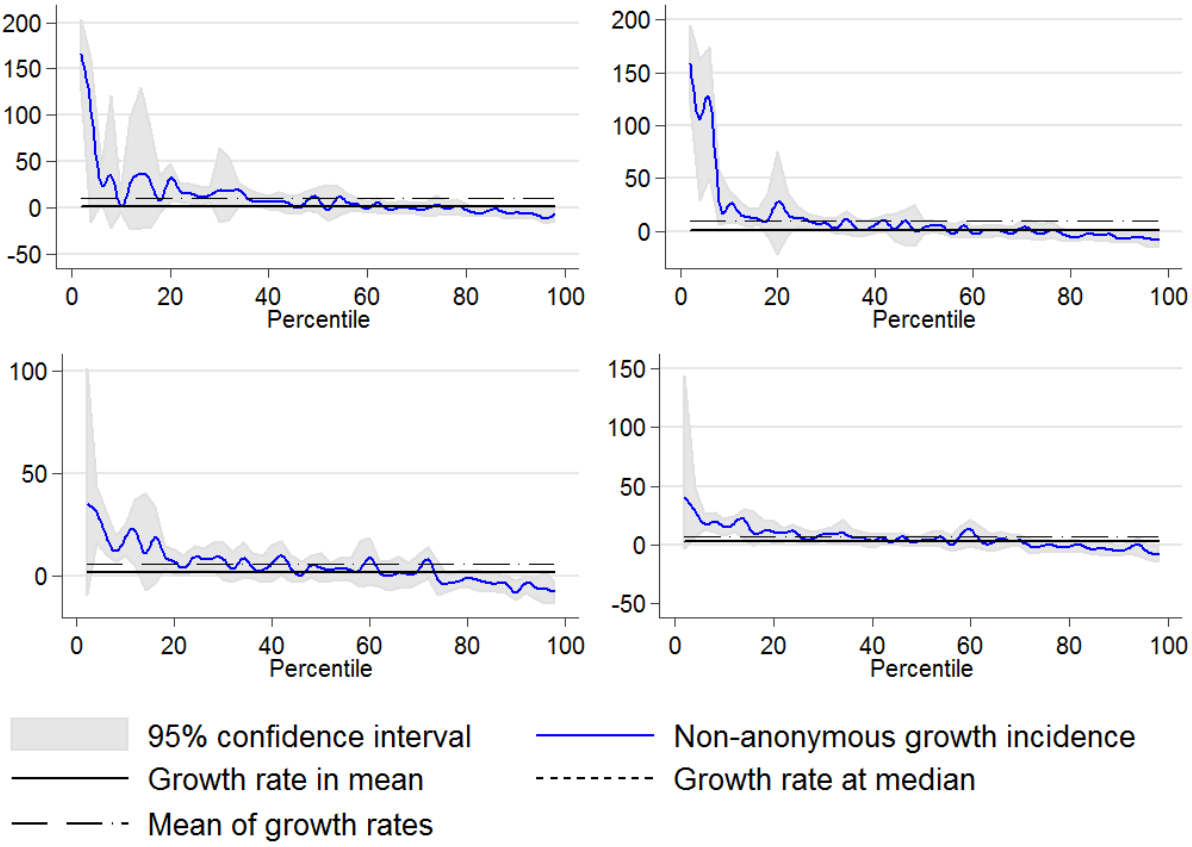


Figure 4 shows estimates of non-anonymous GICs.[10] In general, the results suggest that the incomes of the persons in the lower part of the distribution in 2008 grew faster than the incomes of the rest of the population. In particular, mean percentile growth rate over 2008-2010

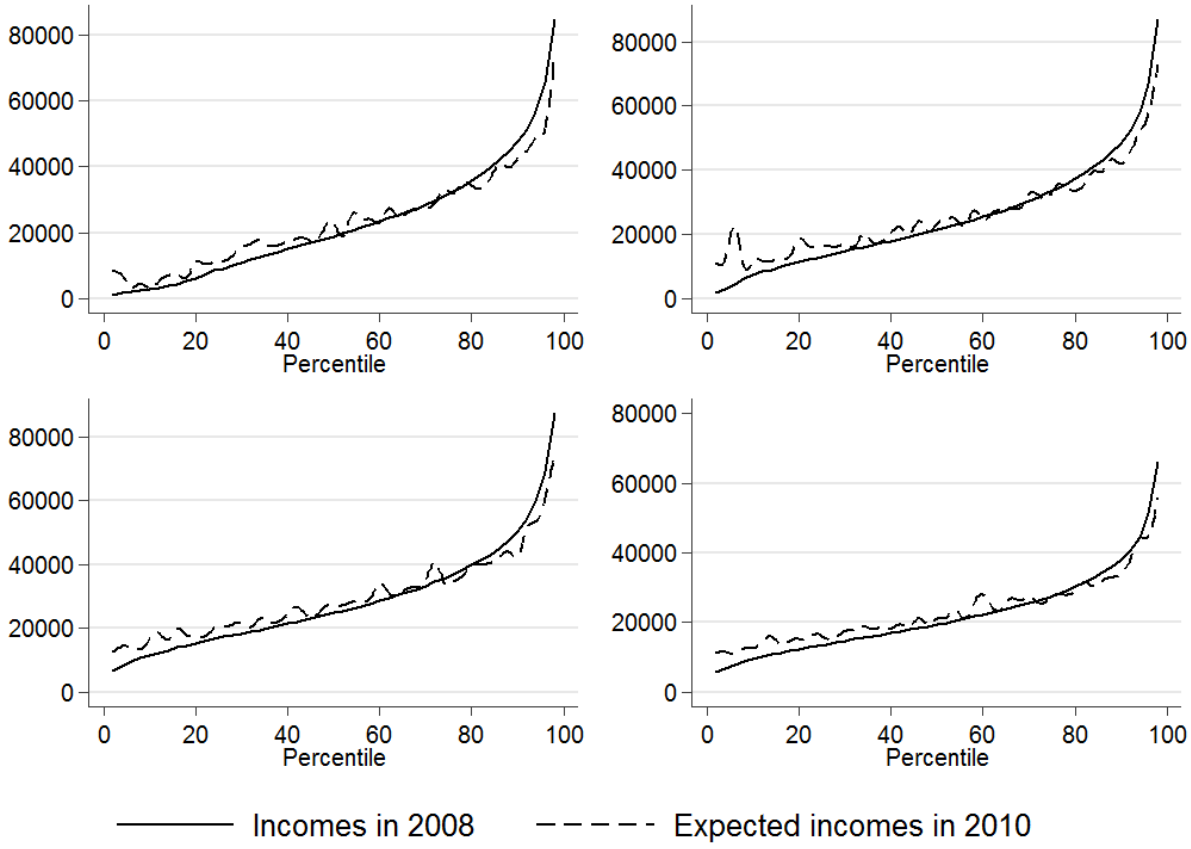
[10] In calculating confidence intervals for non-anonymous GICs, we have followed Jenkins and Van Kerm (2011).They use a non-parametric block (panel) bootstrap procedure, which accounts for sample dependence due to the longitudinal nature of the EU-SILC data. We do not account for the complexity of EU-SILC sample design because data about stratification and clustering are lacking.

for those initially in B40 group was 7.1% annually for EDI and 13.2% annually for EFI. This suggests that incomes of those, who were at the bottom part of the population in 2008 were increasing both due to their improving pre-tax pre-transfer incomes as well as due to the increased social transfers. The figure also confirms the result from transition matrices analysis that the old-age benefits had a strong positive impact on the 2008 first decile group.

We can also see from Figure 4 that incomes of the many richer percentile groups in 2008 (the richest 28% of the population in case of EDI) were in fact decreasing, so during the 2008-2010 period we observe a process of convergence or catching-up between the poorer and the richer part of the income distribution. In order to assess the speed of this convergence process, Figure 5 follows Van Kerm (2006) proposal to compare initial (observed in 2008) income parade (incomes corresponding to each 2008 percentiles) with expected incomes in 2010 for each 2008 percentiles. The expected 2010 incomes are obtained by multiplying the initial incomes at each percentile by their growth rates estimated in Figure 4. The results suggest that the observed pace of convergence is non-negligible, especially for a such short period as studied.

It would be also interesting to explore whether income dynamics of B40 group is related to inequality of opportunity defined as a distribution of advantages, which depends on the distribution of "circumstances" (e.g., biological characteristics, socioeconomic background, place of birth, ethnic origin, etc.) that are beyond the control of individuals (see, Romer 1993, 1998; Ferreira and Gignoux 2011). Given availability of the data on circumstances, in principle it is possible to construct a classification of persons into "types" sharing the same set of circumstances. It is then possible to estimate Opportunity Growth Incidence Curves (OGIC) for each of the types as well as Individual OGICs plotting the rate of growth in the distribution of opportunities for individuals in the same position in the distribution of opportunities (Peragine et al. 2013). Unfortunately, the EU-SILC contains variables related to circumstances (such as parental education and occupation) only in cross-sectional, but not in the longitudinal data sets, so this type of analysis is not feasible with EU-SILC data. However, in the next section we study the inequality of opportunity in Poland in 2010 using the 2011 EU-SILC cross-sectional data.

Figure 5. Incomes in 2008 and expected incomes in 2010, EFI (top left), EMI (top right), EPBI (bottom left), EDI (bottom right), Poland, 2008-2010.



6. Inequality of opportunity in Poland in 2010

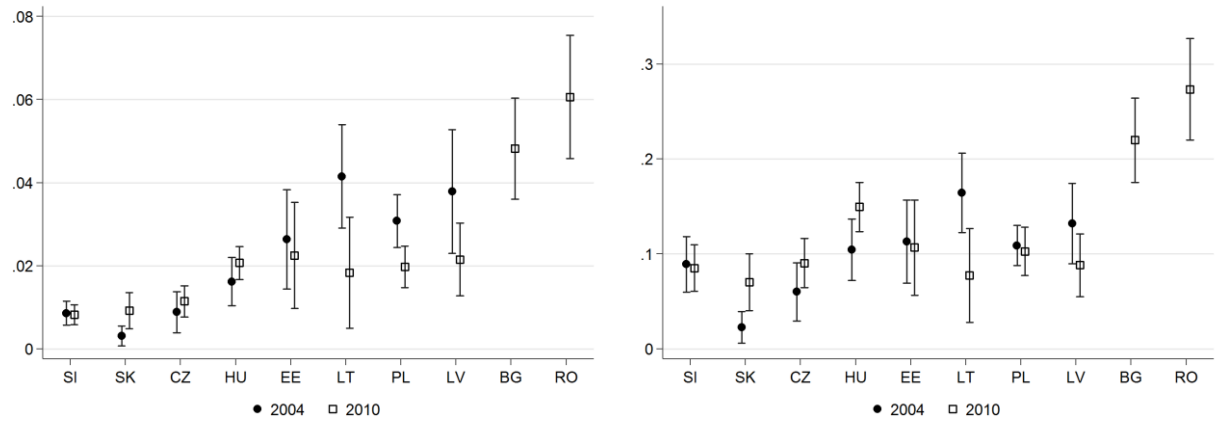
Inequality of opportunity (IO) measurement aims at separating the impact of circumstances and effort on individual outcomes (Roemer 1993, 1998). Circumstances are defined as the factors for which the individual cannot be held responsible, while effort refers to variables, which are within the realm of individual's control such as schooling choices, labour supply decisions and others. According to Roemer (1993, 1998), the goal of policy equalizing opportunities is to eliminate unfair inequalities, which result from the impact of circumstances on outcomes, but allowing outcomes to be sensitive to effort. For measuring IO, we use a parametric ex-post approach proposed by Ferreira and Gignoux (2011). Their approach is based on measuring inequality among mean income of types defined as are groups of individuals sharing the same circumstances. In order to measure mean income of types, Ferreira and Gignoux (2011) use OLS to estimate a log-linearized reduced-form models with outcomes (in our case incomes as defined by EFI, EMI, EPBI and EDI) as dependent variable and circumstances as independent variables. In the next step, they calculate exponentiated predicted incomes for types and apply the mean logarithmic deviation (MLD or Theil(0) inequality index)

to measure IO. MLD computed on the basis of incomes predicted in this way is treated as the absolute measure of IO, *AIOP*, while the ratio of AIOP to the total income inequality as measured by MLD is treated as relative IO measure, *RIOP*.

We use data from the ad-hoc modules on intergenerational transmission of disadvantages. These modules were implemented in 2005 and 2011 rounds of the EU-SILC survey, which allows for computing IO measures for 2004 and 2010. As circumstances we use the educational levels of the respondent's parents (low, medium, high), occupation of the respondent's father (ten occupational categories), the information about the respondent's origin (local, born in the other EU country, or rest of the world) and the information about the financial situation of the household during the respondent's childhood (measured on the following scale: very bad, bad, moderately bad, moderately good, good, very good). In the IO analysis, we include only households whose head is between 26 and 50 years old.

Figure 6 shows AIOP and RIOP measures for all EU new member states in 2004 and 2010. Together with the Baltic countries and Hungary, Poland displays moderate level of AIOP. It is lower than in Bulgaria and Romania, but higher than in Slovenia, Slovakia or Czech Republic. We can also see that between 2004 and 2010 absolute IO declined significantly in Poland, although this result may be a statistical artefact caused by problems in EU-SILC implementation in the first year of its operation in Poland (see section 2 of this paper). Relative IO in Poland is similar to that of most of other CEE countries; Bulgaria and Romania are clear outliers with much higher levels of RIOP.

Figure 6. Absolute IO (left panel) and relative IO (right panel) in Poland and other new EU member states, 2004 and 2010



Note: countries are sorted according to the ascending income inequality levels observed in 2004. Vertical bars show 95% confidence intervals.
Source: Brzezinski (2015), own computations using EU-SILC data.

Table 4 presents results of the reduced-form OLS regressions, which relate various income variables with the set of available circumstances.

Table 4. Reduced-form OLS regressions of various income variables on circumstances, Poland, 2010.

	EFI	EMI	EPBI	EDI
Medium education (F)	0.105***	0.108***	0.0778**	0.0665**
	(0.0399)	(0.0397)	(0.0308)	(0.0302)
High education (F)	0.155**	0.158**	0.115**	0.110**
	(0.0698)	(0.0696)	(0.0539)	(0.0530)
Medium education (M)	0.155***	0.149***	0.0846***	0.0808***
	(0.0373)	(0.0372)	(0.0288)	(0.0283)
High education (M)	0.345***	0.336***	0.259***	0.262***
	(0.0629)	(0.0627)	(0.0486)	(0.0477)
Manager (F)	0.404***	0.407***	0.378***	0.325***
	(0.0664)	(0.0662)	(0.0514)	(0.0504)
Professional (F)	0.457***	0.484***	0.416***	0.374***
	(0.0682)	(0.0680)	(0.0527)	(0.0517)
Technician (F)	0.384***	0.391***	0.377***	0.341***
	(0.0593)	(0.0591)	(0.0458)	(0.0450)
Clerk (F)	0.322***	0.323***	0.291***	0.260***
	(0.0774)	(0.0772)	(0.0599)	(0.0588)
Salesman (F)	0.218***	0.228***	0.203***	0.192***
	(0.0649)	(0.0647)	(0.0501)	(0.0492)
Craft trade (F)	0.225***	0.226***	0.206***	0.196***
	(0.0394)	(0.0393)	(0.0304)	(0.0299)
Machine operator (F)	0.191***	0.198***	0.176***	0.171***
	(0.0424)	(0.0423)	(0.0328)	(0.0322)
Elementary occupation (F)	0.0494	0.0493	0.0640	0.0662*
	(0.0531)	(0.0529)	(0.0409)	(0.0402)
Armed/military (F)	0.458***	0.459***	0.367***	0.307***
	(0.115)	(0.115)	(0.0890)	(0.0874)
Financial sit.: very bad	-0.203	-0.198	-0.153	-0.151
	(0.123)	(0.123)	(0.0953)	(0.0937)
Financial sit.: bad	-0.201**	-0.186**	-0.113*	-0.127**
	(0.0824)	(0.0821)	(0.0637)	(0.0627)
Financial sit.: moderately bad	0.0222	0.0321	0.0284	0.0258
	(0.0709)	(0.0706)	(0.0548)	(0.0540)
Financial sit.: moderately good	0.0680	0.0720	0.0780	0.0667
	(0.0633)	(0.0631)	(0.0489)	(0.0483)
Financial sit.: good	0.0678	0.0718	0.0688	0.0527
	(0.0630)	(0.0628)	(0.0487)	(0.0481)
Origin: other EU	0.859	0.856	0.715	0.523
	(0.617)	(0.615)	(0.477)	(0.468)
Origin: others	-0.267	-0.275	-0.242	-0.289
	(0.432)	(0.430)	(0.334)	(0.328)
Constant	9.684***	9.682***	9.903***	9.672***
	(0.0680)	(0.0678)	(0.0526)	(0.0519)
Observations	4311	4311	4322	4319
R^2	0.108	0.109	0.113	0.101

Note: Omitted categories: low father education, low mother education, father occupation: skill agricultural; country of birth: local. (F) refers to fathers, (M) refers to mothers. Standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
Source: own computations using EU-SILC data.

Results from Table 4 show that for all our income variables higher incomes are associated with higher levels of parental education. High level of mother's education has the strongest positive effect on incomes of respondents. The effect of parental education is in general decreasing as we move from EFI to EDI, suggesting that tax and benefit system in Poland has some IO-reducing effect. Compared to the base category of skill agricultural labourer, most of other father's occupations are correlated more strongly with children's income. The only category, which is insignificant or only weakly correlated with children's income is "elementary occupation". Qualitative variable describing financial situation during childhood seems to have a rather smaller impact than other variables. Having origins outside Poland is not correlated in a significant way with respondent's income.

Table 5 gives estimates of AIOP and RIOP measures for all our income concepts (an estimate of income inequality according to MLD is also provided). These results confirm that the Polish tax and benefit system reduces somewhat the extent of inequality of opportunity. The effect of social benefits excluding pensions is much bigger in this respect than the effect of the tax system.

Table 5. AIOP and RIOP measures for various income concepts, Poland, 2010.

	MLD	AIOP	RIOP
EFI	0.291	0.0380	13.07
EMI	0.289	0.0384	13.28
EPBI	0.206	0.0244	11.83
EDI	0.193	0.0207	10.70

Source: own computations using EU-SILC data.

Finally, we conclude our discussion of inequality of opportunity in Poland with the analysis of the so-called opportunity-deprivation profiles. As defined by Ferreira and Gignoux (2011), an opportunity-deprivation profile is a ranking of types ordered by their mean income levels, up to some chosen population share threshold (e.g. 10%). Table 6 provides opportunity-deprivation profile for Poland assuming that the outcome variable is EDI and that the types are defined using information on three circumstances – mother's and father's education and father's occupation. The table provides estimates of the population share of each type, their mean yearly income, and of the ratio of the type's mean income to the overall population mean income. Only types represented by more than 1 observation in the sample are included

and the threshold for cumulative population share of the most opportunity-deprived types is 25%.

Table 6. Opportunity-deprivation profile for Poland, EDI, 2010

Father's education	Mother's education	Father's occupation	Population share	Mean income	Share of overall mean income
Medium	High	Skill agricultural	.0004	11637.7	.433
High	Medium	Elementary	.0006	16379.7	.610
High	Low	Professional	.0008	16825.43	.626
Low	Low	Manager	.0004	17807.47	.663
Low	Medium	Technician	.0006	18502.63	.689
High	Medium	Skill agricultural	.0028	18765.43	.699
Low	Low	Skill agricultural	.1323	19026.73	.708
Low	Medium	Skill agricultural	.0086	19207.92	.715
Low	Low	Elementary	.0434	19642.26	.731
Low	Medium	Elementary	.0058	19996.70	.745
Low	Low	Machine operator	.0499	20681.93	.770

Source: own computations using EU-SILC data.

The results from Table 6 suggest that low parental education or having a father who was a skilled agricultural worker are the circumstances that characterize the most opportunity-deprived groups in the Polish society.

7. The determinants of staying in B40, moving out of it and moving into it

In this section, we analyse the socio-economic, demographic and other correlates of persistent stay in B40 group, moving out of it into the top 60% of the population and moving down into B40 from the top 60%. Table 7 presents the socio-economic characteristics of the B40 group in 2008. The membership in B40 and top 60% is defined in terms of EDI. The persistent stayers in B40 is defined as persons, who belong to B40 in each year during the analysed period. We use a logit model to explain the probability of persistently staying in B40 over the 3-year period from 2008 to 2010 covering the crisis period, with independent variables measured at the beginning of the period (2008).[11] The set of independent variables includes sex, age group, size of the household, household share of children, household share of elderly, education attained, employment status, occupation category, degree of urbanization of residence area and

[11] The analyses from this section repeated for the 4-year period from 2007 to 2010 can be found in the Appendix (Table 3).

regional indicators. Many of these variables were shown to be important elements of the B40 static profile (World Bank 2013).

Table 7. Composition of the B40 income group, Poland, 2008

	B40 group	All population
Female	52.99	51.98
Age group		
Age 0-15	19.58	16.90
Age 16-30	20.94	21.30
Age 31-40	12.06	13.95
Age 41-50	14.92	14.44
Age 51-60	14.55	16.04
Age 61-70	8.85	8.63
Age 71+	9.11	8.74
Household has 4+ members	61.44	55.67
Household share of children	0.16	0.14
Household share of elderly	0.14	0.13
Education		
Primary and less	28.80	18.39
Lower secondary education	6.33	4.79
Upper secondary education	57.82	57.10
Post-secondary education	2.45	4.05
Tertiary education	4.60	15.67
Employment		
Employed, permanent contracts	14.23	28.59
Employees, temporary contracts	9.80	10.17
Self-employed	15.61	11.88
Unemployed	7.35	4.93
Retired	21.57	21.91
Students	9.77	7.95
Inactive	21.67	14.58
Degree of urbanization		
Densely populated area	26.30	38.91
Intermediate populated area	15.23	14.84
Thinly populated area	58.47	46.25
N	6,837	15,774

Source: own computations using EU-SILC data.

In the second model estimated in this section, the dependent variable is the probability of moving out from B40 group (probability of exiting B40). The third model studies the probability of moving down from the top 60% to B40 (probability of entering B40). For these models, we pool (*t*-1)-to-*t* income pairs for the period 2008-2010, that is we analyse income transitions between 2008 and 2009 and between 2009 and 2010. Following Van Kerm and Pi Alperin (2013), the observations for these models are weighted with EU-SILC period *t* longitudinal base weights. The independent variables for these models are measured at *t*-1. In case of the third model concerned with the probability of entering B40, we include some additional dummy variables: health shock and unemployment shock. The first one takes the value of 1 when a person responded negatively to the question whether she is limited in activities be-

cause of health problems in year *t*-1, but positively in year *t*. The second variable is defined similarly with respect to the question about being unemployed. These variables are included in the model concerned with entering B40 to answer the question of whether unexpected, negative life events like unemployment or worsening of health increase the probability of falling into B40 group in Poland.

The results of estimations are presented in Table 4. We first analyse results for persistent stay in B40. In comparison with the youngest age group (16-30 years old), the increased probability of staying chronically in B40 over 2008-2010 is associated with the middle age groups (31-40 and 41-50 years old). On the other hand, the oldest group (71+ years old) has substantially lower probability of staying persistently in B40. Household shares of children and the elderly are highly positively correlated with being chronically in B40. The impact of the educational attainment is consistent with expectations – the higher the level of education, the lower the probability of being permanently in B40. With respect to the employment status, the strongest correlation is observed for being unemployed and inactive. Both statuses sizeably increase the probability of the persistent stay in B40. Finally, living in thinly populated area is also significantly associated with being stuck at the bottom of the distribution. We have also performed estimations with the employment variable categorized with respect to the occupation type (results not shown). The major result from this estimation is a strong correlation between chronic stay in B40 and being employed in agriculture and in elementary occupations.

We now turn to the second model estimating the probability of exiting B40. A surprising result for this model concerns the negative impact of tertiary education on the probability of exiting B40. This may suggest that although persons with tertiary education are less likely to be found among B40 temporary and permanent member, there are some persons with tertiary education, which are stuck at the lower part of the distribution in the sense that they are less likely to move upward than persons with a low level of education.[12] This may be due to being stuck in some opportunity-restricting occupations. Other counterintuitive results for this model, concerning the positive correlation between the probability of exiting B40 and being employed on a temporary contract or being retired, seem to be period-specific as it does not appear in results for the 4-year panel covering the period 2007-2010 (see Appendix, Table 3).

[12] Note that this result is valid also for the 4-year panel covering 2007-2010 (see Appendix, Table 3).

Table 8. Average marginal effects from the logit model. 3-year panel covering 2008-2010 for model in column 1, pooled transitions over 2008/2009 and 2009/2010 for models in columns 2-3; only persons aged 16+

	Probability of being persistently in B40	Probability of moving out from B40	Probability of moving down into B40
Female	0.0105	0.00347	0.00696*
	(0.00906)	(0.00413)	(0.00415)
Age group			
Age 31-40	0.0364**	-0.0276***	0.00786
	(0.0185)	(0.00789)	(0.00771)
Age 41-50	0.0383**	-0.00750	-0.0000782
	(0.0174)	(0.00785)	(0.00705)
Age 51-60	-0.0192	-0.0214***	-0.000531
	(0.0177)	(0.00770)	(0.00735)
Age 61-70	-0.0282	-0.0318***	0.00459
	(0.0237)	(0.00975)	(0.0105)
Age 71+	-0.107***	0.00169	0.0256*
	(0.0232)	(0.0140)	(0.00979)
Household has 4+ members	-0.0321***	0.0170***	0.00561
	(0.0106)	(0.00475)	(0.00485)
Household share of children	0.227***	-0.0319**	0.0265*
	(0.0334)	(0.0151)	(0.0143)
Household share of elderly	0.131***	-0.0566***	-0.0333***
	(0.0207)	(0.0109)	(0.00992)
Education			
Lower secondary education	-0.111***	-0.00834	0.0181
	(0.0314)	(0.0129)	(0.0146)
Upper secondary education	-0.165***	-0.00197	0.00950
	(0.0148)	(0.00631)	(0.00592)
Post-secondary education	-0.289***	-0.00909	0.00263
	(0.0251)	(0.0122)	(0.0117)
Tertiary education	-0.360***	-0.0313***	-0.0267***
	(0.0170)	(0.00767)	(0.00713)
Employment			
Employees, temporary contracts	0.0845***	0.0395***	0.00133
	(0.0166)	(0.00844)	(0.00734)
Self-employed	0.183***	0.0206***	0.0159**
	(0.0161)	(0.00722)	(0.00719)
Unemployed	0.288***	0.00659	0.0464***
	(0.0249)	(0.00898)	(0.0121)
Retired	0.125***	0.0164**	0.00319
	(0.0185)	(0.00817)	(0.00792)
Students	0.174***	-0.00206	-0.000800
	(0.0269)	(0.00911)	(0.00985)
Inactive	0.227***	0.0241***	0.0167**
	(0.0161)	(0.00713)	(0.00734)
Degree of urbanization			
Intermediate populated area	0.0550***	0.00887	-0.00130
	(0.0141)	(0.00657)	(0.00606)
Thinly populated area	0.134***	0.00705	0.00468
	(0.0110)	(0.00511)	(0.00467)
Health shock	-	-	0.0190**
			(0.00963)
Unemployment shock	-	-	0.0929***
			(0.0245)
N	12028	24110	24110

Note: Omitted categories are: age group 16-30, primary and less education, permanently employed, densely populated area. Regional dummies are included, but not shown. Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Own computations using EU-SILC data.

Finally, we analyse the results for the probability of entering the B40 group. Being women is positively associated with entering the B40 group, but the effect is very small. The share of elderly for households in the top 60% has a small preventing effect on entering B40. This is probably due to the beneficial effect of old-age benefits in this group of households. The opposite correlation can be found for the household share of children. Having tertiary education decreased the probability of entering B40, compared to having only primary and less education. The coefficients for unemployment and labour market inactivity are positive and statistically significant. Finally, both health shock and unemployment shock seem to have positive impact on the probability of entering B40, which is relatively strong in case of unemployment shocks. This is likely due to the fact that unemployment benefits are rather low in Poland – in 2009, for example, the standard unemployment benefit amounted to around 27% of the average labour earnings. Regarding health shocks, further analysis shows that among the persons, whose health deteriorated during the period under study the permanent employment dropped by about 3.5 percentage points, while unemployment and labour market inactivity grew, respectively, by 0.8 and 1.7 percentage points. This may at least partially explain the observed impact of health shocks on the downward movement into the B40 group.

It should be added that our results concerning the association between unemployment and health shocks and the probability of entering the B40 group hold only for the period of crisis, as they disappear in our analysis covering the longer period from 2007 to 2010 (cf. Appendix, Table 3).

8. Conclusions

This paper has used the longitudinal EU-SILC data to study the income dynamics of B40 in Poland over the period 2007-2010. We have studied positional income mobility using transition matrices, anonymous and non-anonymous income growth using growth incidence curves, inequality of opportunity in 2010, and the determinants of persistent stay in B40, exiting and entering B40 using regression models. The major results are the following. There is a substantial positional income mobility in Poland, but it is rather short-distance mobility. Upward mobility from B40 to the highest deciles is relatively rare. Old-age benefits seem to have the biggest positive impact on positional mobility in Poland, especially for the first decile. The impact of other social benefits is smaller, while income taxes are negligible with respect to mobility. The analysis of the anonymous growth incidence curves suggests that social transfers other than old-age benefits played an important role during the crisis in preventing income

losses for some income groups belonging to the B40. The persons who were poor when the crisis hit Poland in 2008 experienced high rates of growth over subsequent two years. The analysis of the determinants of permanent stay in B40 reveals that the most important factors include the proportion of children and the elderly in the household, the lower level of education and being unemployed or inactive. The probability of entering B40 during the period of crisis was increased by health and unemployment shocks.

We have also found that the extent of inequality of opportunity in Poland in 2010 was reduced mostly by social benefits other than pensions and that the effect of tax system on inequality of opportunity is also positive, but smaller. Regarding observable circumstances that seem to characterize the most opportunity-deprived groups in the Polish society, our results suggest that they are related to low parental education and having a father who was an agricultural worker.

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Appendix. Additional results

Table 1. Decile transition matrices: Poland, various income concepts, 2008-2010 (percentages)

	Destination group, 2010									
Origin group, 2008	1	2	3	4	5	6	7	8	9	10
	EFI									
1	67.4	20.5	3.7	2.1	2.9	2.4	0.5	0.6	0.0	0.0
2	12.3	52.1	17.7	8.1	3.0	4.8	0.5	1.0	0.5	0.1
3	7.0	10.8	36.4	18.0	13.7	6.8	4.2	2.7	0.0	0.5
4	5.7	4.3	16.0	27.9	17.9	13.8	7.4	4.8	1.1	1.3
5	3.5	3.9	11.1	18.1	25.1	12.6	11.6	8.1	3.7	2.3
6	1.1	3.4	6.5	7.5	16.6	25.7	22.4	9.7	4.9	2.2
7	0.9	1.2	3.3	10.5	8.7	14.5	25.7	20.1	11.7	3.4
8	1.4	1.7	2.7	2.6	7.0	11.1	15.2	26.9	23.0	8.4
9	0.6	1.4	1.5	2.4	3.1	5.6	7.1	22.0	37.3	19.0
10	0.2	0.6	1.1	3.1	1.9	3.2	5.1	4.1	17.9	62.9
	EMI									
1	53.2	20.1	8.1	7.1	4.4	4.0	1.5	0.8	0.6	0.2
2	13.9	38.9	18.8	10.3	8.9	1.8	4.3	2.4	0.1	0.7
3	7.7	15.0	30.9	17.3	14.3	5.2	5.1	2.9	0.7	0.8
4	7.7	9.5	16.0	28.8	15.6	9.3	6.7	4.2	1.1	1.2
5	6.5	5.3	7.8	15.8	25.3	17.6	9.1	6.3	3.7	2.6
6	2.2	5.3	6.3	8.0	14.7	25.4	19.8	11.0	5.9	1.4
7	3.1	2.9	5.9	5.4	7.0	16.2	26.3	17.9	10.9	4.2
8	3.6	1.7	2.2	3.2	3.5	11.6	17.4	28.9	20.8	7.2
9	1.9	0.8	2.1	2.2	3.9	6.3	6.3	19.7	37.0	19.7
10	0.3	0.5	1.9	1.9	2.3	2.5	3.5	5.8	19.3	61.9
	EPBI									
1	52.2	18.2	7.5	9.0	5.6	3.1	1.6	2.2	0.3	0.1
2	18.1	36.2	16.9	14.3	3.9	4.2	3.4	1.5	0.8	0.8
3	10.9	15.5	28.9	15.8	12.5	8.5	3.0	2.4	1.7	0.7
4	5.4	11.6	19.1	27.7	15.6	8.0	5.3	4.8	1.8	0.7
5	3.5	7.2	9.9	15.3	24.6	16.0	9.6	8.7	3.5	1.6
6	3.9	4.4	6.2	7.4	15.6	26.4	18.7	9.0	4.3	4.3
7	2.1	2.7	5.8	4.4	7.8	16.2	24.4	21.4	10.6	4.6
8	1.6	1.9	2.1	1.8	6.6	9.7	21.0	26.6	21.1	7.6
9	2.1	1.3	1.7	3.0	5.9	5.2	9.4	18.1	36.2	17.1
10	0.5	0.7	1.7	1.3	1.8	4.0	2.7	5.1	19.9	62.3
	EDI									
1	48.9	18.6	10.6	9.2	5.2	2.9	1.9	1.3	1.1	0.2
2	18.8	33.7	16.1	15.3	4.4	5.1	2.9	1.6	1.4	0.8
3	10.8	18.8	25.9	15.9	11.7	7.4	3.7	3.7	1.2	0.9
4	6.6	9.9	19.4	22.6	16.1	11.8	5.5	5.4	1.0	1.8
5	3.9	5.7	10.3	19.7	24.6	13.3	10.1	7.7	4.2	0.4
6	3.5	5.4	4.5	7.1	13.4	23.9	18.4	13.3	5.0	5.6
7	2.8	3.5	4.2	4.0	8.3	17.2	24.3	18.7	11.9	5.1
8	1.7	2.4	4.1	2.1	10.1	9.1	20.2	25.9	17.8	6.6
9	1.7	0.9	3.2	2.8	4.1	5.3	10.0	17.0	37.6	17.4
10	1.6	0.7	1.8	1.3	2.2	4.1	2.9	5.2	18.9	61.3

Note: The decile groups are ordered from the poorest to the richest one.
Source: Own computation using EU-SILC data.

Table 2. Indices of positional mobility for B40, Poland, 2008-2010

	EFI	EMI	EPBI	EDI
Percentage staying in B40	77.5	75.8	76.9	75.3
B40 exit rate	22.5	24.2	23.1	24.7
B40 entry rate	15.0	16.1	15.4	16.5

Note: B40 exit rate is defined as the fraction of individuals in B40 in 2007 that are not in B40 in 2010. B40 entry rate is defined as the fraction of individuals not in B40 in 2007 that are in B40 in 2010.
Source: Own computation using EU-SILC data.

Table 3. Average marginal effects from the logit model. 4-year panel covering 2007-2010 for model in column 1, pooled transitions over 2007/2008, 2008/2009 and 2009/2010 for models in columns 2-3; only persons aged 16+

	Probability of being persistently in B40	Probability of moving out from B40	Probability of moving down into B40
Female	-0.00692	0.00190	0.00134
	(0.0118)	(0.00476)	(0.00491)
Age group			
Age 31-40	0.0211	-0.0423***	0.00425
	(0.0243)	(0.00877)	(0.00886)
Age 41-50	0.0386*	-0.0162*	0.00315
	(0.0231)	(0.00917)	(0.00838)
Age 51-60	-0.0281	-0.0276***	-0.000864
	(0.0235)	(0.00934)	(0.00850)
Age 61-70	-0.0349	-0.0479***	0.00715
	(0.0294)	(0.0112)	(0.0117)
Age 71+	-0.133***	-0.0191	0.0324**
	(0.0270)	(0.0149)	(0.0160)
Household has 4+ members	-0.0398***	0.0102*	0.0102*
	(0.0143)	(0.00564)	(0.00557)
Household share of children	0.234***	0.00645	0.0303*
	(0.0421)	(0.0170)	(0.0168)
Household share of elderly	0.119***	-0.0342***	-0.0354***
	(0.0276)	(0.0122)	(0.0112)
Education			
Lower secondary education	-0.0869*	0.00993	-0.00687
	(0.0465)	(0.0195)	(0.0165)
Upper secondary education	-0.172***	0.00288	0.00420
	(0.0195)	(0.00726)	(0.00694)
Post-secondary education	-0.277***	0.000446	-0.00790
	(0.0343)	(0.0139)	(0.0133)
Tertiary education	-0.336***	-0.0290***	-0.0319***
	(0.0219)	(0.00887)	(0.00857)
Employment			
Employees, temporary contracts	0.191***	-0.00285	0.00212
	(0.0255)	(0.00913)	(0.00891)
Self-employed	0.111***	0.0214	0.00235
	(0.0331)	(0.0144)	(0.0124)
Unemployed	0.279***	-0.00718	0.0256*
	(0.0314)	(0.0104)	(0.0135)
Retired	0.103***	0.00594	0.00158
	(0.0228)	(0.00969)	(0.00870)
Students	0.126***	-0.0259***	0.00815
	(0.0374)	(0.00985)	(0.0132)
Inactive	0.169***	0.0172**	0.0215**
	(0.0202)	(0.00850)	(0.00857)
Degree of urbanization			
Intermediate populated area	-0.00600	0.00544	-0.00622
	(0.0165)	(0.00775)	(0.00741)
Thinly populated area	0.116***	-0.00520	0.00320
	(0.0147)	(0.00616)	(0.00592)
Health shock			-0.00300
			(0.0117)
Unemployment shock			0.0678
			(0.0425)
N	5965	17817	17817

Note: Omitted categories are: age group 16-30, primary and less education, permanently employed, densely populated area. Regional dummies are included, but not shown. Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Own computations using EU-SILC data.