

WLC 2016 : World LUMEN Congress. Logos Universality Mentality Education Novelty 2016 |  
LUMEN 15th Anniversary Edition

## Education, Labour Market Status and Household Income Dynamics in Romania

Eva Militaru<sup>a\*</sup>

\* Corresponding author: *Eva Militaru, militaru@incsmpls.ro*

*<sup>a</sup>Senior researcher, National Research Institute for Labour and Social Protection, Bucharest, Romania, militaru@incsmpls.ro*

### Abstract

<http://dx.doi.org/10.15405/epsbs.2016.09.72>

During the last decade Romania experienced considerable economic and social instability and household income has been subject to changes both in level and structure, though not equally for all households. It seems that low income households are more exposed to the risk of losing parts of their income during economic downturn, but also middle or high income households may be affected. Household characteristics, such as education and labour market status, are amongst the main determinants of household income level and can be associated with income dynamics. This paper aims at studying the role played by education and labour market status in the dynamics of household income in Romania in the period between 2007 and 2010. Our approach is twofold; we study the distribution and the income mobility patterns over time between income classes, paying attention to education and labour market status of household members. We attempt to analyse the extent to which education and labour market status count for the evolution of household income. A special focus has been on low income households. We base our analysis on EU-SILC data and we employ growth incidence curve analysis and transition matrices to determine the movement of households along the income distribution. Our results show that income dynamics is strongly related to education, as almost two thirds of the low income households are poorly educated and remain trapped in the same relative position on the income distribution over the years. Precarious labour market attachment as well is a drawback in income mobility.

© 2016 Published by Future Academy [www.FutureAcademy.org.uk](http://www.FutureAcademy.org.uk)

**Keywords:** Income dynamics; income mobility; education; labour market status; low income households.



## **1. Introduction**

When the economic crisis of 2008 was beginning to show up, Romania was in the middle of a flourishing economic period, with average income growth for all categories of population, accompanied though by increases of income inequalities. Afterwards, during early crisis, household income has declined on average and the income distribution has become more equalitarian in 2010 than it used to be in 2007. Low income households have benefited more from growth (in 2007 and 2008) and have lost less during the economic crisis than the rest of the households. The income dynamics has been driven not solely by the developments of the market income levels, but also by the profound changes in the tax-benefit system, which have been affecting the income distribution especially after 2010 along with the deepening of the crisis.

This paper attempts to study the developments regarding income distribution in the period between 2007 and 2010, focussing on household characteristics and income mobility. Our aim is the investigation of the role played by education and labour market status in the income dynamics and income mobility patterns of households. We base our analysis on the presumption that certain households persist in having low levels of income irrespective of the overall developments (economic growth or decline) and that we can identify these households by characteristics such as education and labour market status which determine their income behaviour.

The rest of the paper is structured as follows. After a brief review of the previous empirical findings regarding household income dynamics in Romania, we shall continue with the description of the distributional effects of income growth, based on the growth incidence curves approach and the identification of households at the bottom of the income distribution following education and labour market status, in the second section. The next section deepens the longitudinal perspective and we study a panel of households along the four year span and discuss on the educational and labour market status of households who chronically remain at the bottom of the income distribution. The paper ends with some concluding remarks.

## **2. Empirical Findings on the Developments of Income Distribution in Romania**

Previous studies regarding income distribution in Romania have been extensively concentrated on the analysis of income inequalities. For example, Precupetu (Precupetu & Precupetu, 2013) has examined the dynamics of income inequalities in post-communist Romania (after 1990) and studied the social impact of income inequalities and the effectiveness of social policies in combating inequalities. Molnar (2010) has focused on the calculation and analysis of income inequality indices and has decomposed inequality in between-group and within group components, by groups of main household characteristics, showing that education and labour market status are the most important factors driving between group inequalities. Zamfir et al. (2010: 58-75) have studied the impact of remittances sent back from Romanians working abroad on income inequalities, overall and between urban and rural areas, and they have shown that remittances were conducive to inequality reduction both between and within rural and urban areas. Militaru and Stroe (2010) have investigated, following a growth incidence curve approach, the income dynamics in Romania between 2000 and 2007, concluding that the

economic growth which characterized the country's development during those times was beneficial for the poor. The regional distribution of income has been analysed by Dachin and Mosora (2012) who pointed out that the employment structure of regions and the prevalence of subsistence agriculture shape the distribution of household incomes by regions. The effects of the economic crisis on income distribution in the rural areas have been investigated by Dachin and Sercin (2012) and revealed that household income in rural areas is less reactive to crisis than compared to the urban area. The economic mobility of households is strongly associated with the educational attainment of the household members, as Militaru et al. (2012) have substantiated through their analysis on mobility of households between income quantile groups, which shows that education is protective against downward income mobility and favours upward income mobility.

### 3. Income Dynamics and Household Characteristics, 2007-2010

#### 3.1. Income dynamics

##### *Methodology and data*

The distributional effects of growth between 2007 and 2010 have been examined using the growth incidence curves (GIC) approach (Ravallion & Chen, 2003; Bourguignon, 2010; Palmisano & van de Gaer, 2013). These curves basically compare the pre and post growth income distribution, by **estimating the mean income growth against income quantiles and one can judge based on the shape of the curves** whether the income growth between two points in time was more beneficial for certain parts of the income distribution.

Because it is important to know if the low income state is chronic and what are the household characteristics that profile this persistent low income group, we have chosen to plot the non-anonymous GIC, which takes into account the joint distribution of initial and terminal incomes, or the initial income and the income change (Bourguignon, 2010). Individuals or households are ordered according to their initial income quantile  $p(y_{t-1})$  and we compute the quantile specific mean incomes growth rates, each quantile comprising the same individuals/ households in  $t$  as in  $t-1$  (Grimm, 2005).

$$g_t(p(y_{t-1})) = \frac{y_t(p(y_{t-1}))}{y_{t-1}(p(y_{t-1}))} - 1, \forall p \in (0,1)$$

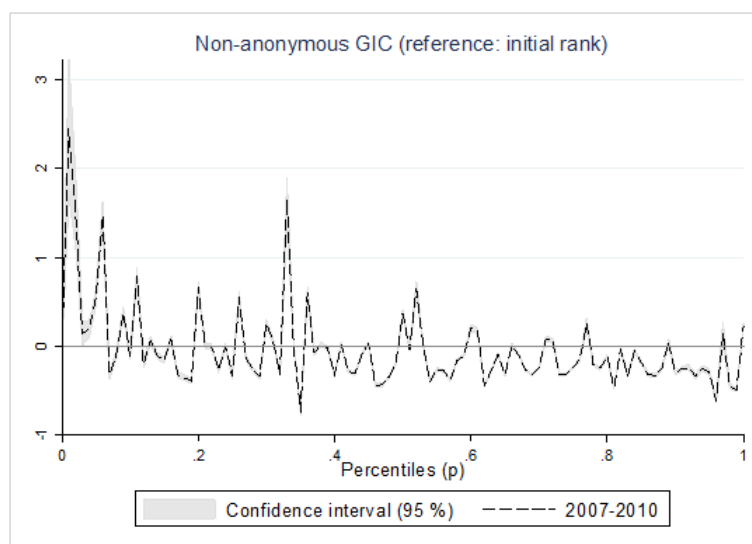
where  $g_t(p(y_{t-1}))$  is the mean income growth of the individuals/ households initially in the  $p^{th}$  quantile,  $y_t(p(y_{t-1}))$  is the income of the individuals/ households initially in the  $p^{th}$  quantile at  $t$  and  $y_{t-1}(p(y_{t-1}))$  is the income of the  $p^{th}$  quantile at  $t-1$ .

The data we use for growth incidence curve analysis is EU-SILC survey data (European Union Survey on Income and Living Conditions) for Romania. We have used the longitudinal component of the EU-SILC for Romania, the four year panel sub-sample (2008-2011, approx. 1850 households). The income reference data for EU-SILC is the calendar year before the data collection, therefore we have analysed 2007 to 2010 incomes. The household income is equivalised following the modified OECD

equivalence scale to account for household size and composition. As a measure of living standard we have used the household disposable income, which comprises all market income plus social transfers, net of taxes and social contributions. Household income is expressed in constant prices of 2007, and the bottom and top 1% of the sample were dropped in order to eliminate outliers (Palmisano, van de Gaer, 2013).

### Results

A general observation is concerning the fact that the mean household disposable income has dropped by approximately 17% (real change, in 2007 constant prices) from 2007 to 2010, the economic crisis affecting roughly all households. The pattern of the non-anonymous growth incidence curve, which plots the income change taking into account the initial economic condition of the individuals, appears progressive, as the bottom of the income distribution has lost less than the rest of the distribution and below the mean income loss estimated for all households. The curve is clearly positive for the bottom 10%, around zero for the rest of the distribution up to the 80%, and negative for the top 20% of the income distribution. In other words, the initially poor gain some income between 2007 and 2010, while the initially rich lose proportions of their income and the individuals initially located at the middle of the distribution as well (see Fig.1).



**Fig. 1.** Growth Incidence Curve (non-anonymous), Romania, 2007-2010, (reference: initial rank. *Source:* own calculations using EU-SILC data, 2008-2011)

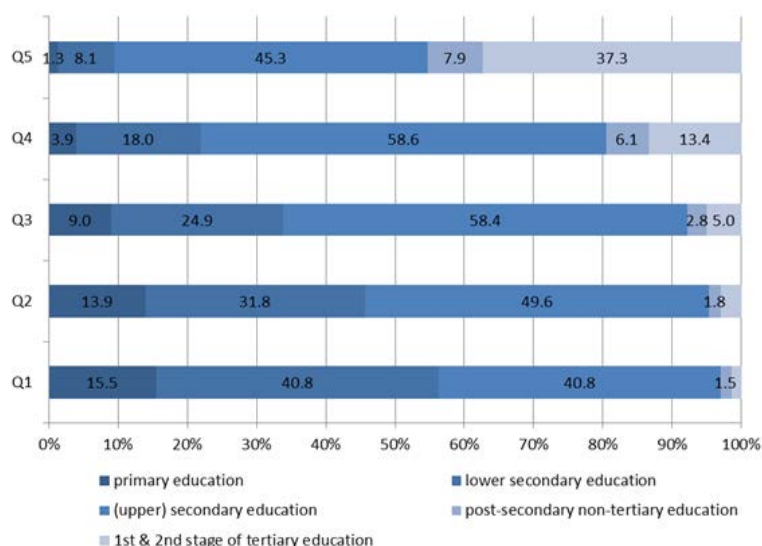
### Income Distribution and Household Characteristics

The role that household characteristics play in shaping the income distribution has been investigated through the study of characteristics by income quintiles. This means that households were ordered ascendingly by their disposable income and then, the so constructed distribution has been divided equally in five groups, each comprising 20% of all the households. The poorest 20% of the households are found in the 1<sup>st</sup> quintile, and so on, the richest 20% of the households are positioned in the 5<sup>th</sup> quintile. Our focus shall be oriented towards the 1<sup>st</sup> and 2<sup>nd</sup> quintiles, in other words, the bottom 40% of the income distribution. As we have mentioned before, we have paid attention to the following dimensions: educational attainment of household members and labour market status of the household

members. We have based our analysis on EU-SILC data, the longitudinal component for the years 2008, 2009, 2010 and 2011, as described earlier in section 3.1. Income reference period is one calendar year before data collection, thus data on labour market status and education do not correspond to the income period. Therefore, we have estimated the labour market status during income reference period by the main monthly activity status, assuming that the status that has occurred most frequently during the twelve months has been the main activity status for the entire year. The education variable is collected for the current period and we assumed that it did not change since the income reference period.

### *Education*

As it can be seen in the figure below (Fig. 2), most of the household members from the bottom 40% of the income distribution (1<sup>st</sup> & 2<sup>nd</sup> quintile) have upper secondary or lower secondary education. At the top of the income distribution (top 40%), still upper secondary education prevails, but tertiary education gains grounds.



**Fig. 2.** Education of the household members, by quintiles based on equivalised household disposable income, 2010 % (Source: own calculations using EU-SILC data 2011)

The labour market attachment of the household members is, alongside education, the most important determinant of the income level. We have investigated the distribution of households by the labour market status of the household members and quintile groups based on equivalised household disposable income (see Table 1). Only for the bottom 40% of the households, more than 10% of the household members are self-employed or family workers, while the share of employees is well below the middle and top quintiles. The share of inactive people, i.e. fulfilling domestic tasks and caring responsibilities, disabled or/ and unfit to work, etc. is also considerable at the bottom 40%, almost 16% for the bottom 20% and 11% for the rest (20%-40%). We should mention that in Romania, self-employment and especially self-employment in agriculture provides merely a subsistence living and stands for the most widespread form of informal employment, with low compliance to social insurance schemes and income tax evasion.

**Table 1.** Labour market status of household members, by quintiles based on equivalised household disposable income, 2010 %

	employee	self-employed (including family workers)	unemployed	in retirement	in education	other inactive
Q1	7.4	28.4	4.9	12.3	7.2	15.7
Q2	22.8	11.4	2.5	24.7	9.6	10.6
Q3	33.3	6.2	2.0	28.4	9.0	7.2
Q4	41.2	4.8	1.1	29.1	7.3	3.8
Q5	51.7	5.2	0.4	24.8	6.3	1.5

Source: own calculations using EU-SILC data 2011

The results for 2007, 2008 and 2009 show similar distributions as the above 2010 data, no remarkable departure from this pattern is visible.

#### 4. Economic Mobility, Education and Labour Market Status

##### *Methodology and Data*

We complement our income analysis with a longitudinal perspective on income dynamics, tracking the same set of households throughout a four year time period. We are interested in the investigation of the positional mobility of a household/individual's income over time throughout the income distribution. The arguments in favour of income mobility are numerous and the extent to which income mobility is socially desirable highly depends on how this multi-faceted concept is defined (Jantti & Jenkins, 2013). A higher degree of income mobility could be favourable for long-term inequality reduction, but it could at the same time increase income risks, as income flows could become instable. In the framework of equality of opportunity, a weak association with the original income, meaning that each individual has the same chances of becoming rich regardless of his initial income level, is beneficial (Peragine, Palmisano & Brunori, 2013). In this paper, we shall treat solely the issue of intra-generational mobility, following a representative panel of Romanian households between 2007 and 2010.

A considerable amount of studies on income mobility relies on the traditional approach of constructing transition matrices which are useful tools for summarizing the mobility content of distributional transformations (Fields & Ok, 1999). The main disadvantage of using transition matrices is that they neglect the individual income variations that take place within a specified income group. However, our conclusions will complement those already drawn in the previous section concerning the mobility profile investigated by means of non-anonymous income growth incidence curves.

Income mobility is assessed through the movement of households along the income distribution which is divided into quintiles based on household income, equivalised following the modified OECD scale, so each individual in a household has the same income (the equivalised income of the household). We construct the transition matrices by computing the discrete Markov transitions probabilities between time  $t$  and  $t+\Delta t$ :  $P$ , as the maximum likelihood estimator for the probability of moving from state  $i$  to state  $j$ , thus  $p_{i,j} = y_{i,j}/y_i$ , where  $y_{i,j}$  is the total number of transitions from state  $i$  to state  $j$  over the time  $\Delta t$  and  $y_i$  is the total number of individuals found in state  $i$  at the previous moment  $t$ . The space of states is defined by the income quintile groups.

Following the frame of our paper which concentrates on the bottom 40% of the income distribution, we calculate bottom 40% entry and exit rates, i.e. the proportion of individuals who were initially (at  $t$ ) outside (in) the poorest 40% group and moved to (out) of this group (after  $\Delta t$ ).

In order to have a synthetic assessment of mobility as a summary of all individual transitions rather than of those who are in a certain income group, we have calculated the Shorrocks mobility index (1978) based on transition matrices as:  $M = [n - \text{trace}(P_{ij})] / (n - 1)$ , where  $P_{ij}$  is the transition matrix, the  $\text{trace}(P_{ij})$  is the sum of the elements of the main diagonal of  $P_{ij}$  and  $n$  is the number of income groups. We have calculated the mobility index for each of the one year transitions and examined its changes in time.

We use EU-SILC longitudinal component data collected from 2008 to 2011, with income reference years from 2007 to 2010. We analyse the sample (approx. 1850 households) which is common for all four years; therefore we are able to calculate the one year transition matrices and the three year transition matrix as well. The sample is representative for the entire population. The results are presented below.

#### 4.1. Main Findings

The transition matrices calculated based on household disposable income (see Table 2) show that there is a persistency at the bottom of the income distribution, as households who were in the bottom 40% of the income distribution at the initial moment, are more likely to be in the same relative position after one year. More than two thirds of the households remain in low income groups from one year to another. However, the mobility pattern has changed in time. Between 2007 and 2008 when Romania has not yet been hit by the economic crisis, the income mobility not only of lower quintiles was higher than compared to the years to come. The mobility is particularly visible between neighbour income groups.

During crisis, most of the households preserve their relative positioning throughout the income distribution, in spite that the poorer households gain some income, while the rich part of the distribution loses some fraction of its income.

**Table 2.** One year movement between income quintile groups, transition matrices, %

	Initial / final income quintile groups	Q1	Q2	Q3	Q4	Q5
2007-2008	Q1	72.5	22.9	3.0	0.5	1.0
	Q2	15.1	58.8	22.0	3.5	0.7
	Q3	1.8	23.8	51.5	20.0	2.8
	Q4	2.2	2.5	23.8	55.9	15.7
	Q5	1.3	0.3	2.2	22.6	73.6
2008-2009	Q1	82.0	13.5	2.5	1.4	0.6
	Q2	13.8	66.1	15.0	4.2	0.9
	Q3	2.9	15.4	60.9	19.5	1.3
	Q4	0.6	3.7	15.0	66.9	13.8
	Q5	0.7	0.3	3.3	11.9	83.8
2009-2010	Q1	80.2	15.5	3.3	0.8	0.3
	Q2	9.2	73.0	14.4	3.2	0.2
	Q3	4.4	7.1	74.9	12.0	1.6
	Q4	0.8	2.7	13.7	73.2	9.6
	Q5	0.3	0.3	1.9	11.5	85.9

Note: Quintiles are based on equivalised household disposable income.

Source: own calculations using the longitudinal component of EU-SILC data, 2008-2011

The overall mobility index ranges from 0.46 for 2007-2008 to 0.28 for 2009-2010, pointing towards a less intense movement between income groups in times of crisis. The same idea particularized to the bottom 40% income group comes from the examination of exit and entry rates from and into this income group. So, the exit as well as the entry rate to this group decrease in crisis (see Table 3). However, throughout the entire period under analysis, 23.8 % of those who were initially (in 2007) in the low income quintiles have managed to exit by 2010 towards higher income groups and 13.4% of those who initially were not belonging to the poorest income group eventually fell into this category.

**Table 3.** Exit and entry rates from and in the lowest 40% income group, %

		2007-2010	2007-2008	2008-2009	2009-2010
exit rates from B40		23.8	15.5	12.9	11.4
entry rates in B40		13.4	11.6	8.5	5.5

*Note:* Quintiles are based on equivalised household disposable income.

*Source:* own calculations using the longitudinal component of EU-SILC data, 2008-2011

If we look at the picture of overall movements between 2007 and 2010 (see Table 4 below), it seems that 62.1% of the households who were in 2007 in the 1<sup>st</sup> quintile, were still at the very bottom of the distribution in 2010. Nevertheless, almost one third of them succeeded in moving to the 2<sup>nd</sup> quintile and around 8% to the middle quintile. As we have previously seen, in their case, the level of income generally increased slightly during these years. The 2<sup>nd</sup> quintile households were not benefiting of income growth, they actually have preserved their real income, and therefore almost 20% of them switched their position in the income distribution with households who were initially in the 1<sup>st</sup> quintile.

**Table 4.** Movement between income quintile groups, transition matrix, 2007-2010, %

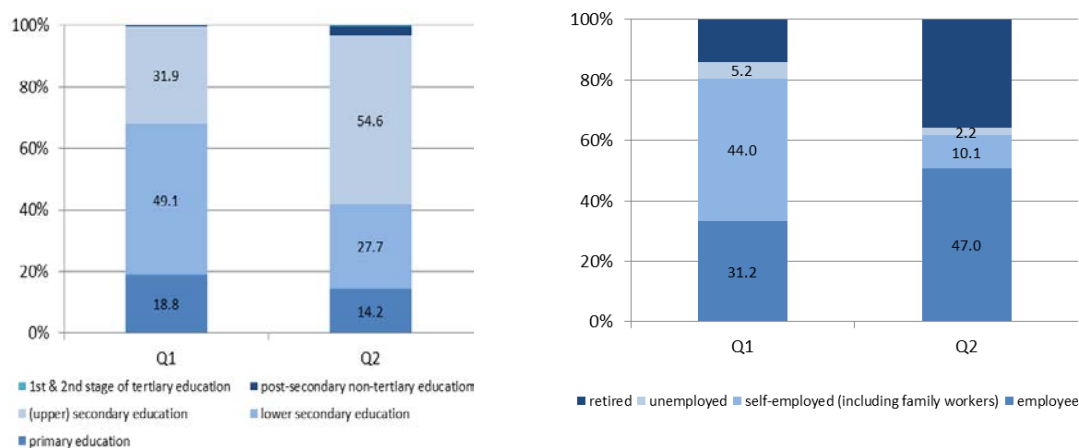
Initial / final income quintile groups	Q1	Q2	Q3	Q4	Q5
Q1	62.1	27.7	7.9	0.8	1.5
Q2	19.5	43.3	29.0	7.0	1.3
Q3	4.9	23.3	42.2	24.9	4.7
Q4	2.2	4.4	24.6	47.4	21.5
Q5	1.3	0.9	3.8	26.8	67.2

*Note:* Quintiles are based on equivalised household disposable income.

*Source:* own calculations using the longitudinal component of EU-SILC data, 2008-2011

As we have seen, for a considerable proportion of households, persistency at the bottom of the income distribution is a common fact. We have also investigated the characteristics of these households who have chronically remained at the bottom, regardless of the economic developments that took place (economic growth in 2007 and 2008 and economic decline in 2009 and 2010). As it is shown in the figure below (Fig. 3), low education is a characteristic of around 70% of the households that persist in the 1<sup>st</sup> quintile.





**Fig. 3.** Persistency at the bottom of the income distribution, main household characteristics: education and labour market status, 2007-2010, % (Note: Quintiles are based on equivalised household disposable income. Source: own calculations using the longitudinal component of EU-SILC data, 2008-2011)

Approximately half of the households that have been trapped in the 2<sup>nd</sup> quintile have at most lower secondary education. The relationship with the labour market is precarious for more than 50% of the households who were at the very bottom of the income distribution between 2007 and 2010. Most of the adult members of these households are self-employed or family workers, particularly in agricultural activities, being trapped in an unproductive and often informal employment. Informality is a survival strategy for most of those who work as self-employed or unpaid family workers in agriculture, and they gather the majority of the informal workers in Romania. The 2<sup>nd</sup> quintile group's composition is completely different, as almost half of the adult household members are employees and one third are retired. The introduction of a minimum social assistance pension in 2009 has improved to some extent the living standard of pensioners, thus the likelihood of finding them in the 1<sup>st</sup> quintile has lowered. The analysis is conditional on the labour market status during the first year of analysis; in the following years, the most remarkable changes in the individuals' status concern the transition from employment to unemployment, as a consequence of decreasing labour demand during the economic crisis.

It seems that the households trapped at the bottom perform (with respect to the characteristics mentioned above) worse off than the average of all households at the bottom for each year. This is to say that better education and a closer relationship with the labour market significantly increase the mobility chances of a household on the income ladder.

## 5. Concluding Remarks

The study has focused on the investigation of income dynamics in Romania, its aim being that of giving a description of the distributional changes in household income levels and of exploring the main characteristics of the households in relation to their income dynamics. We have focused on characteristics such as education and labour market status of household members in order to investigate whether there can be established a link between these variables and income immobility and persistency at the bottom of the income distribution.

Our results have shown that for the period between 2007 and 2010, the disposable income at household level has dropped for almost all households. Conditional on the initial ranking of the

households in the non-anonymous growth incidence analysis framework, the examination of income dynamics shows that the initially poor have slightly increased their disposable income, while the initially rich lost fractions of their income.

We have given a special attention to the bottom of the income distribution and compared these households with those from the middle and top of the distribution with respect to some household characteristics that are generally conducive to low levels of income. Not surprisingly, low education and weak labour market attachment (vulnerable employment, informal employment, and inactivity) are the main differentiating features between bottom 40% households and the rest. The analysis has also revealed the fact that the bottom 40% group is not homogeneous, as the 1<sup>st</sup> quintile group differs to some extent in certain dimensions from the 2<sup>nd</sup> quintile group. There are striking similarities from one year to another, meaning that the households at the bottom of the income distribution hold roughly the same characteristics each year.

We have tracked the same set of households along the four year time span (2007-2010). The traditional approach of transition matrices between income groups has been employed in order to assess the positional mobility of the households on the income distribution. We have observed higher income mobility in the pre-crisis year (2008) and an increased immobility in the years of economic crisis, when the entry and exit rates from the lowest 40% income group have dropped. More than 60% of the 1<sup>st</sup> quintile group households and almost half of the 2<sup>nd</sup> quintile group households are trapped in the same position for four years. It is clear that their educational attainment and their links with the labour market are more precarious than of the households that are transitory at the very bottom.

### **Acknowledgement**

The results presented in this paper are part of the study conducted by the author for the World Bank Project: Shared Prosperity in the EU11.

### **References**

- Bourguignon, F. (2010). Non-anonymous Growth Incidence Curves, Income Mobility and Social Welfare Dominance: a theoretical framework with an application to the Global Economy. G-MonD, Working Paper no.14.
- Dachin, A., Mosora, L.C. (2012). Influence factors of regional household income disparities in Romania. *Journal of Social and Economic Statistics*, 1(1), Summer 2012.
- Dachin, A., Sercin, A. (2012). Effects of the economic crisis on rural household incomes in Romania. Paper presented at the 3rd International Symposium "Agrarian Economy and Rural Development - realities and perspectives for Romania", Bucharest, Romania.
- Fields, G., Ok, E.A. (1999). *The Measurement of Income Mobility: An Introduction to the Literature*. Cornell University ILR Collection.
- Grimm, M. (2005). Removing the anonymity axiom in assessing pro-poor growth. Ibero-America Institute for Economic Research Discussion Paper No. 133.
- Jantti, M., Jenkins, S.P. (2013). Income mobility. IZA DP no. 7730, Discussion Paper Series.
- Militaru, E., Stroe, C. (2010). Poverty and Income Growth: Measuring Pro-Poor Growth in the Case of Romania. *Proceedings of the 11th WSEAS Mathematics and Computers in Science Engineering*, WSEAS Press.
- Militaru, E., Zamfir, A.M., Mocanu, C., Lungu, E.O. (2012). Does education influence income mobility in Romania? paper presented at the NTTS 2013 Conference.
- Molnar, M. (2010). Income distribution in Romania. MPRA Paper No. 30062.
- Palmisano, F., van de Gaer, D. (2013). History dependent growth incidence: A characterisation and an application to the economic crisis in Italy. *ECINEQ WP 2013 – 314*.

- Peragine, V., Palmisano, F., Brunori, P. (2013). Economic Growth and Equality of Opportunity. Policy Research Working Paper 6599, The World Bank.
- Precupetu, I., Precupetu, M. (2013). Growing inequalities and their impacts in Romania. Country Report, GINI Growing inequalities' impact.
- Ravallion, M., Chen, S. (2003). Measuring Pro-Poor Growth. *Economics Letters*, 78(1), 93-99.
- Zamfir, A. M., Mocanu, C., Militaru, E., Pirciog, S. (2010). Impact of Remittances on Income Inequalities in Romania. In U. Schuerkens, ed., *Globalization and Transformations of Social Inequality*, London: Routledge Taylor& Francis Group.