Moldova

A Story of Upward Economic Mobility

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Abstract

During the early 2000s, Moldova experienced strong economic growth and poverty and inequality reductions. This paper aims at uncovering the patterns behind these poverty trends by looking at economic mobility and its associated factors in Moldova. The findings build on the synthetic panel approach and allow for a non-anonymous view of the process of poverty reduction. The data used for this country study on Moldova come from the Household Budget Survey, which is conducted on a yearly basis. The paper presents

transition matrices to look at the patterns of economic mobility across selected consumption thresholds, as well as descriptive statistics and a linear probability model aimed at identifying correlates of economic mobility. The findings show that the observed poverty reductions happened with little churning, and highlight the importance of education and employment on upward economic mobility in Moldova in the 2000s, as well as the role of public and private transfers.

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Moldova: A Story of Upward Economic Mobility¹

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1. Introduction

Moldova, in line with trends in many European and Central Asian countries, has experienced a significant decline in economic poverty and inequality in the past decade. Although it remains one of the poorest countries in the Europe and Central Asia region, it has achieved remarkable improvements in living standards for its population. This paper looks at economic mobility patterns in Moldova to uncover movements in and out of poverty masked by traditionally observed net poverty changes; in other words, it focuses on the underlying contemporaneous movements in and out of poverty (i.e. churning) in the country, providing additional insights into the dynamics of poverty and vulnerability. Furthermore, findings from this paper identify factors associated with upward economic mobility, but also linked to pockets of poverty, which can inform policy makers in their efforts to reduce poverty and promote a more sustainable and inclusive growth process.

The empirical analysis makes use of data from the Household Budget Survey in Moldova and focuses on two different time periods: first, rapid economic growth between 1999 and 2004 and second, a more volatile economic environment before and during the global financial crisis between 2006 and 2011. Using a synthetic panel methodology developed by Dang et al. (2014), results show that economic mobility was largely upward in Moldova in the 2000s: very few people and households experienced movements down. Following the crisis, which hit the country hard, movements upward continued but overall mobility slightly declined.

This paper also identifies correlates of upward economic mobility to understand differences between households that were able to move out of poverty and into higher socioeconomic groups, and those that did not. Results suggest that household demographics and individual characteristics such as education and labor market status had a systematic impact on economic mobility. Larger households are associated with a lower probability of upward economic mobility; furthermore, higher dependency rates, particularly of adults over 65 years, are related to a lower probability of moving up. Higher levels of education are strongly associated with upward economic mobility and labor market outcomes at the household level also matter for mobility. A higher household employment rate in the services and manufacturing sectors correlates with increased upward mobility. In addition public and private transfers played a substantial role in lifting people out of economic poverty. Here, receiving pensions and remittances at the beginning of the second period (2006) is more closely associated with mobility.

This paper is organized as follows. Section 2 discusses the broader macroeconomic environment behind the development progress in Moldova and highlights stylized facts of poverty reduction during the early and late 2000s. In section 3 we present a general framework to analyze issues of economic mobility and introduce methods used for the data analysis. Section 4 introduces data from the Household Budget Survey in Moldova and presents individual and household characteristics for different groups, including the poor. Section 5 concentrates on patterns of economic mobility in Moldova. Section 6 explores determinants for different transitions on the household and individual level and identifies key factors which influence movements in and out of poverty but also into the middle class. Finally section 7 summarizes key findings and presents broad policy areas to further promote economic mobility in Moldova and continue reducing poverty.

2. Country Context: Sustained Economic Growth in the 2000s

The 2000s were a decade of sustained economic growth in Moldova, up to the global economic crisis. After a tough decade in the 1990s in which economic downturns were frequent, GDP growth averaged around 6 percent per year from 2000 to 2008, until the global economic crisis hit. Growth collapsed by 6 percent in 2009 and remittances, which accounted for around 31 percent of GDP in 2008, fell dramatically in 2009 and remained at 22 percent of GDP by 2011.

Moldova has recovered from the global economic crisis, but growth is still volatile (Figure 1). Following the crisis, GDP growth rates averaged 6 percent in 2010 and 2011. In 2012, however, growth stopped, linked to the financial and sovereign debt crisis in the euro area and a severe drought that affected agricultural production. In 2013, the agricultural sector rebounded, increasing GDP by 9.4%.

Figure 1. Apart from the crisis, Moldova had sustained economic growth during the 2000s
Real GDP growth (percent)

Source: WDI data.

Despite significant progress and strong economic growth, Moldova remains one of the poorest countries in Eastern Europe and Central Asia. As shown in Figure 2, GDP per capita in Moldova in 2011 was only higher than that of three countries in ECA: Tajikistan, Kyrgyz Republic and Uzbekistan. In fact, Moldova's GDP level is similar to that of two of the poorest countries in Latin America: Honduras and Nicaragua.

Figure 2. Moldova is one of the poorest countries in the region

Source: ECATSD's calculations based on WDI data.

Labor markets

Labor markets in Moldova have undergone significant changes in the 2000s (Figure 3). Labor force participation of men and women decreased, slightly more sharply during the crisis. Unemployment rates have fluctuated significantly over the decade. Due to the economic downturn, unemployment went from 4 percent in 2008 to 7 percent in 2010, with a declining trend in more recent years, registering 5.1 percent by the end of 2013.²

Aside from an overall decline in employment during the 2000s, there have been changes in its sectoral composition (Figure 4). Agricultural sector employment has declined at an annual average rate of 8 percent, while sectors such as construction and finance, real estate and business have been on the rise in terms of employment. Later on we show that this shift away from the agricultural sector to manufacturing and services – with expanding employment in these sectors - is associated with movements out of poverty.

² Data from WDI.

Figure 3. Labor market outcomes over the 2000s in Moldova

Source: WDI and ILO, KILM data.

Figure 4. Employment by sector, thousands

Source: ILO, KILM data.

Remittances

Moldova receives large inflows of remittances (Figure 5). Prior to the economic crisis, remittances represented over 30 percent of GDP in Moldova. During the crisis period, they collapsed to 22 percent of GDP, with a decline also of absolute remittances inflows. It is estimated that the stock of emigrants represents around 22 percent of the total population.³ Migrants are mostly well educated and work in the Russian Federation (around 65 percent) and the European Union (around 20 percent).

Figure 5. Moldova receives large inflows of remittances, which were impacted by the crisis
Remittances as a share of GDP (right axis) and in millions of US dollars (left axis)

Source: WDI.

Poverty and Inequality Trends

Analyses of consumption poverty trends over the long term in Moldova need to account for survey methodological changes. The Household Budget Survey for Moldova, from which poverty numbers are obtained, had a substantial change in methodology in 2006. Changes included improvements to the questionnaire and changes in sampling and survey design. As a result, the poverty series for Moldova cannot be used to assess long-term poverty changes, but the analysis has to be divided into two periods: pre 2006 and post 2006. Therefore, the analysis that follows on poverty, inequality and economic mobility analyzes two separate periods with methodological consistency within each one of them.⁴

Following sharp increases in poverty during the Russian financial crisis of 1998, Moldova achieved a remarkable reduction in economic poverty, particularly during the first half of the 2000s (Figure

³ Source: IMF International Financial Statistics database, World Bank DEC Prospects group, World Bank Migration and Remittances Factbook 2011; own calculations.

⁴ The consumption aggregate used, based on the harmonized regional ECA poverty dataset, excludes health, durables and housing expenses. 2005 was excluded due to data concerns regarding household and individual characteristics.

6). From 1999 to 2004 poverty in Moldova declined by 31 percentage points, from 78 to 47 percent, using the World Bank Europe and Central Asia regional poverty line of \$2.5/day. Although the rest of the note is based on regional thresholds for poverty and the middle class (further described below), it is key to note that the strong declining poverty trend is also observed in the national poverty numbers, which point to a reduction from 68 percent in 2000 to 27 percent in 2004.

Progress in poverty reduction continued in the second half of the 2000s, but at a slower pace. From 2006 to 2011 poverty (based on the regional \$2.5/day poverty line) declined from 23 percent to 18 percent. The sharpest decline occurred from 2006 to 2007; between 2007 and 2009, which covers the crisis years, poverty rates changed by half a percentage point only, actually increasing slightly in 2008.

Figure 6. Poverty declined significantly in Moldova, particularly in the early 2000s

Regional extreme poverty line (\$2.5/day) and national general poverty line, 2000-2004 and 2006-2011

Source: Calculations based on HBS data.

Notes: The poverty series breaks between 2004 and 2006 given methodological changes to the survey, which included changes in the sampling design of the Moldova HBS and a more comprehensive consumption diary. The national poverty line was also adjusted to reflect these changes, in contrast to the regional constant \$2.5/day line. Although the two periods are, again, not comparable, these changes could explain the reversed gap in the poverty rates captured by the national and regional headcount ratios.

Poverty is mostly a rural phenomenon in Moldova (Figure 7). Urban poverty rates - at the extreme poverty line for ECA of \$2.5/day - were 3.5 percent in 2011, compared to 14.1 percent for rural areas. The gap between urban and rural poverty widened in the late 2000s, particularly in 2008 and 2009 at 16.2 percentage points, as urban poverty continued its decline and rural poverty increased or remained stagnant. The gap started to narrow in 2010 and 2011 as the economic recovery process took place.

Figure 7. The decline in poverty was strong in both urban and rural areas

Poverty trends in Moldova (regional poverty line of \$2.5/day), 1999 to 2004 and 2006 to 2011

Source: Calculations based on HBS data.

Overall, mean consumption growth alone drove most of the poverty changes observed in the period of fastest poverty reduction. Decomposition analysis proposed by Datt and Ravallion (1992) allows isolating the effects of consumption growth from those of distributional changes (i.e., shifts in the consumption distribution without mean consumption growth). Results show that of the total reduction in poverty of 31 percentage points from 1999 to 2004 (going from 78 percent to 47 percent), over three-quarters are attributed to consumption growth alone (Figure 8). Changes in inequality during this period, although with significantly more modest effects, also contributed to less poverty. For the second period, however, growth and falling inequality played an equal and substantial role in achieving the 14 percentage point reduction in poverty. As depicted next in the growth incidence curves, this likely reflects lower mean growth rates in the second period, but still relatively higher rates of consumption growth for the poor.

Figure 8. Growth drove poverty changes in 1999-2004, lowering its contribution in the second period (poverty line of \$2.5/day)

Source: Calculations based on HBS.

Therefore, on the same note, the incidence of economic growth was pro-poor during the period. Consumption growth was high in Moldova, particularly in the first half of the 2000s, and benefitted the poor and less well-off. In both periods under study, consumption for those at the bottom of the consumption distribution was significantly higher than the mean. The negative slope of the annual growth incidence curves for both periods confirms that the poor benefited disproportionately more from economic growth (Figure 9). Similar patterns are observed for urban and rural areas, although with slightly higher growth in urban areas for those at the bottom of the distribution (see Annex Figure A1).

The incidence of growth between 2006 and 2011 contributed not only to poverty reduction, but also to boosting shared prosperity and falling inequality. Between 2006 and 2011, consumption growth of the bottom 40 percent in Moldova was high at 5.7 percent, and higher than mean consumption growth at 2.9 percent (Figure 10). Inequality, measured by the Gini coefficient, declined in both periods, and in both urban and rural areas (Figure 11). The Gini coefficient fell from 0.42 in 1999 to 0.33 in 2004, and from 0.33 to 0.28 between 2006 and 2011. Other measures of consumption inequality, including consumption ratios at various percentiles of the distribution, are consistent with a story of falling inequality.

Figure 9. Consumption growth was high in Moldova, particularly for those at the bottom
Growth Incidence Curves for Moldova, 1999-2004 and 2006-2011

Source: Calculations based on HBS data.

Figure 10. The bottom 40 percent benefitted more from growth than the overall population, 2006-2011

Source: ECSTSD's preliminary calculations based on ECAPOV data. Welfare aggregate is consumption plus durables and health. Geometric mean is used to calculate average growth rates.

Figure 11. Inequality in Moldova also declined

Gini coefficient, 1999-2004 and 2006-2011

Source: Calculations based on HBS data.

The rest of the paper focuses on economic mobility and aims at disentangling the observed net poverty changes and identifying correlates of upward economic mobility in Moldova. Given that observed net poverty changes can mask gross movements in and out of poverty, analysis on economic mobility can help determine if this was the case in Moldova during the 2000s. Second, this paper identifies correlates of upward economic mobility both during the periods of strong poverty reduction, as well as in the more recent periods. This can help us understand which characteristics are associated with households' ability to improve their living standards, and how have they changed as the pool of poor in Moldova becomes smaller.

3. Economic Mobility: Concepts and Methods

Economic mobility refers to the transformation of an initial welfare distribution (e.g., income or consumption) into another. Measures of mobility can be studied in the intra- or inter-generational domain, depending on whether we are focusing on distributions of welfare across generations - for a parent and a child - (inter-generational mobility) or for the same individual or household in two time periods (intra-generational mobility). This study focuses on **intra-generational mobility** by analyzing consumption movements for households in Moldova over time, looking at both upward mobility (e.g. households escaping poverty) and downward mobility (e.g., households falling into poverty). Analyzing economic mobility can provide valuable information, particularly on churning and vulnerability (movements in and out of poverty), that traditional net poverty changes cannot. The concept of mobility used in this study allows for the construction of poverty transition matrices that can be associated with other relevant and interrelated household or individual dynamics, such as labor market profiles and demographic characteristics. In addition, the analysis can go beyond a poverty focus to provide insights into the complete welfare distribution, particularly movements into the middle class.

One of the main limitations of studying intra-generational mobility is data availability. Understanding economic mobility requires longitudinal welfare data since findings relate to mobility patterns of one and the same household over time. In particular, the dearth of panel data has been a barrier to the mobility literature and presented a considerable challenge to advancing our knowledge of these dynamic processes. The recent methodology developed by Dang et al. (2014), using a variant of small-area estimation techniques, proposes an alternative to panels by creating “synthetic panels” out of repeated cross-sectional data. The “synthetic panel” method is an imputation methodology of welfare that uses two rounds of cross-sections and time invariant individual and household characteristics to explore mobility at a more disaggregated level than cohorts. It is based on assumptions on error correlation across periods, which at the extreme are either zero correlation (upper bound: high mobility scenario) or full correlation (lower bound: low mobility scenario). Therefore, the method provides bounds of economic mobility. Previous studies have relied on the lower-bound estimate of economic mobility as a “conservative” estimate of economic mobility in a country (see World Bank 2013).⁵

⁵ The lower bound builds on the assumption that positive (negative) consumption shocks in the first period repeat during the second period. Thus movements across the welfare distribution are limited and in the extreme society becomes extremely immobile.

Box 1. The synthetic panel methodology: Description and application to this regional work

Economic mobility has gained relevance in academic and wider policy discussion over the last years. Despite significant reductions of economic poverty during the early 2000s in most countries in Europe and Central Asia, few studies currently exist on this process. Did poverty rates decrease as poverty reduction was a one-way street with households predominantly escaping poverty? Or is there significant churning with large numbers of households falling back into poverty offsetting transitions out of poverty? From a policy perspective it makes a large difference if a country which reduced poverty by 5 percent experiences either of these scenarios since each requires very different policy responses. Here, estimates of economic mobility allow for a better design of policies that can support economic development in a sustainable and inclusive way.

Data requirements to analyze patterns of economic mobility are not trivial and require the use of innovative methodologies. A proper study requires household-level information for one and the same household for at least two periods, not only for income or consumption, but also for other variables that can affect changes in income or consumption. Unfortunately, the availability of panel surveys that contain this type of information is quite limited, and even when existent, many times they suffer from high attrition rates and relatively short survey periods.

The synthetic panel methodology overcomes these shortcomings and builds on an imputation methodology to construct synthetic panel data with predicted consumption using two different rounds of cross sections (Figure 12). This way a new data set is created which provides information on consumption for one and the same household in two different time periods. The approach relies on time-invariant individual and household characteristics. Consumption in each period is modeled as the sum of two components: a first one associated with **time-invariant characteristics**, and a second one capturing non-observable factors. To create the predicted consumption in the second round ($\hat{C}2$) for households whose consumption were only observed in the first round ($C1$), we generate a new component based on how their time-invariant characteristics are associated with consumption, but in the second round ($F2(X1)$). Adding up this new component to the non-observable factors ($\hat{e}2$), we obtain the predicted consumption in round two. With these two consumption measures ($C1$ and $\hat{C}2$), we construct transition matrices to analyze patterns of economic mobility between two rounds.

Figure 12. Synthetic panel approach in a nutshell

Depending on the assumptions made about the non-observable characteristics, the method generates a high and a low mobility scenario. For the low mobility scenario, non-observable characteristics do not change in time (such that the correlation of $\hat{e}2$ and $e1$ is 1), whereas for the high mobility scenario they change between rounds (i.e., the correlation of $\hat{e}2$ and $e1$ is 0). More intuitively, low mobility implies that if a shock or unobservable characteristics affect consumption in the first period, it continues to do so in the second one, and in the same direction. For instance if the existence of social networks (friends and relatives) allows households to find better jobs and generate higher incomes and consumption levels and this positive impact remains constant over time such that social networks also increase consumption levels in the second period, the country experiences a low mobility scenario. High mobility implies that there is no relationship between shocks in time. **Dang et al. (2014)** show that these two boundaries sandwich the true estimate of economic mobility.

The quality of the imputation improves as time-invariant characteristics capture more variation in consumption. In particular the distance between the lower and the upper bound decreases if the functional component increases relative to the non-observable factors. Yet the empirical model is only supposed to include information which does not change over time. More specifically, the empirical model uses the logarithm of consumption as dependent variable and then explores a set of independent variables which mostly relate to the household head. For instance, information on gender, birth cohort and educational attainment but also the region of residence and the location (urban and rural) are assumed to be time-invariant. Furthermore the model only includes households with household heads who were between 25 and 55 years of age in the first period; this way behavioral changes due to life events such as retirement do not complicate the construction of a consumption measure for the second period. Notwithstanding these limitations, synthetic panels allow the use of existing data in a novel way to better understand patterns of economic mobility and its determinants.

Findings in this study mostly relate to the low mobility scenario and describe a more conservative view of economic mobility. Under the assumption that returns to non-observable factors such as social networks or non-cognitive ability are highly correlated over time, the low mobility scenario underestimates true economic mobility but overestimates immobility in society (those who remain in the same welfare status over time including chronic poverty). As a result and similar to the work pursued by the LAC team, the lower mobility bound generates poverty transition matrixes which describe a conservative view of economic mobility.

The identification of determinants correlated to transitions out of poverty is based on actual household consumption for the first period and imputed consumption for the second period. Here, the imputed consumption level for the second period relates to the low mobility scenario, which assumes perfect correlation in error terms between the first and second period (more specifically $\hat{C}_2 = F_2(X_1) + e_1$). The regression model then distinguishes between two different groups of household: first, households which remained in poverty for the first and second period; and second, households which managed to escape poverty between the first and second period. Using a set of time-invariant and time-variant individual and household characteristics as independent variables the analysis highlights systematic differences between the first and second group of households, which can be used to better understand poverty dynamics on the level of households.

Estimates of economic mobility are also possible during the crisis period. The synthetic panel methodology identifies the functional relationship between consumption and time-invariant characteristics for each period separately. Thus structural changes during the crisis period are well accounted for when determining patterns of economic mobility. Yet, uncertainty about non-observable factors during the crisis period increases. Do social networks still allow for higher incomes and consumption or do friends and relatives loose in importance as economic or political instability impact the structure of society? Under the second scenario, the economy moves to a high(er) mobility scenario and the true estimate of economic mobility will be relatively closer to the upper bound.

In response to methodological challenges, Dang and Lanjouw (2013) introduce a new approach to determine bounds of economic mobility based on point estimates and confidence intervals. Compared to the lower and upper bound estimates, point estimates have the potential to generate a more precise measure of mobility which accounts explicitly for sampling and modeling errors. For the lower bound approach, the degree of bias depends on how far the true correlation between the error terms in both periods is from 0. If the true correlation term is close to 0, we have better estimates, and vice versa. Here, the point estimates approach incorporates the true correlation of error terms. One of the key caveats behind the point estimates approach is that the current framework can be used to obtain the profiling of household poverty mobility (i.e., classifying households into different socioeconomic groups), but cannot be used to estimate mobility measures that are constructed based on the continuous variable of imputed consumption level.

To assess economic mobility in Moldova in the periods of analysis, this paper relies on the “synthetic panel” methodology. Although Moldova has a panel component in its HBS data, the paper will rely on this method to eliminate concerns of panel attrition and to explore longer periods of time than what the panel component allows (see Annex A1 and Annex A2 for more details). The study makes use of the available panel data, however, to further add to the literature testing the validity of the “synthetic

panel” methodology. Validation results (summarized in Box 2 and further detailed in Annex A2) support the usefulness of the method for analyzing economic mobility. Results for this study will be presented for the lower bound as other studies have done, but transition matrices for upper bound mobility will be included in the appendix to provide a more complete picture of economic mobility estimations for Moldova.

Four distinct consumption groups have been defined to study economic mobility in Moldova following the World Bank regional thresholds for Europe and Central Asia (Figure 13). First, those with consumption below the \$2.5 threshold are categorized as the *poor*. Second, we identify a group of households corresponding to those with consumption between \$2.5 and \$5 per day. For the ECA region, the \$5 day is considered a *moderate poverty* line, so the paper uses that label in the next sections.⁶ We set a third threshold at \$10/day, consistent with regional analysis and with middle class analysis done in Latin America and the Caribbean, also a middle-income region (see World Bank 2013). This gives us two economic groups. One with consumption between \$5 and \$10, which in the region is referred to as “*vulnerable*” to poverty, and one with consumption over \$10/day (the “*middle class*”), which includes also the rich and overall has a probability smaller than 3 percent of falling into poverty. The paper will use this terminology – poor, moderate poor, vulnerable and middle class – in the rest of the analysis. Figure 13 plots the consumption distributions for the years under analysis and the abovementioned thresholds of \$2.5, \$5 and \$10 per day. The figure shows that, even in the later period, a relatively small section of the distribution falls over the \$10/day threshold in Moldova.

The share of the population within each threshold has changed over time (Table A1). As the proportion of households in poverty has declined (from 23 percent in 2006 to 10 percent in 2011), the share of households with consumption levels between \$2.5 and \$5/day – the moderate poor - has significantly increased, preempting the results on economic mobility presented later. Significantly more households are also considered to live with between \$5 and \$10/day (27 percent in 2006 and 39 percent in 2011). Even in the latest year of 2011, individuals in the middle class (above \$10/day) represent around 6 percent of the total population.

⁶ For Moldova, one of the poorest countries in the region, this group could be better categorized as the vulnerable, i.e. out of poverty based on the regional line but with a high probability (nearly 20 percent) of falling back into poverty, instead of “moderate” poor. In fact, analytical work based on the methodology of Lopez Calva and Ortiz (2012), which calculates the middle class and the middle class threshold based on the concept of low probability of falling back into poverty over a four year time period (10 percent), resulted in a middle class threshold for Moldova of around \$6.73/day for the period 1999 to 2004. As mentioned, this study uses a \$10/day thresholds to characterize the middle class, meaning that the criteria used to classify the middle class is more strict but regionally comparable than what the Lopez Calva and Ortiz method suggests.

Figure 13. Consumption thresholds for each economic category for Moldova in the consumption distribution, 1998-2004 and 2006-2011

Source: Authors' calculations based on harmonized regional HBS data (consumption aggregate excludes housing, durables and health expenditures). Notes: The Household Budget Survey for Moldova had a substantial change in methodology between 2005 and 2006. Changes included improvements to the questionnaire and the sampling. As a result, the poverty series for Moldova cannot be used to assess long-term poverty changes, but the analysis is divided into two periods: pre 2006 and post 2006.

4. Profiling Socioeconomics Groups in Moldova

Characteristics of households differ significantly across socioeconomic groups, particularly in education and sector of employment (Table A1). In 2011, the poor have larger households, higher dependency rates for both young and old dependents (but particularly for children), and are significantly more concentrated in rural areas. However, some of the largest differences between the group in poverty and the rest of the groups are in the share of household members with incomplete secondary education or less (40 percent for those under the \$2.5/day threshold compared to, for example, 8 percent for those with consumption over \$5/day). Similarly, although household employment rates do not differ greatly across groups, the poor have a higher dependence on the agriculture sector (with a household employment rate in agriculture of 53 percent vs. 19 percent for these same groups). Consistent with this, there is a higher share of households receiving wage income in the better-off groups than those in poverty. In terms of public and private transfers, the key difference lies in a larger share of better-off households receiving remittances, compared to the poorest.

Box 2. Validating the synthetic panel methodology with Moldova panel data

The methodology of synthetic panel is tested and validated using panel data for Moldova for the periods 1999-2002 and 2001-2004. The data is divided into two different randomly-generated subsamples: subsample A is used as a reference point whereas results from the synthetic panel model build only on subsample B. Estimated bounds generated in the synthetic panel exercise from subpanel B are compared to the true transitions observed from the descriptive statistics of subsample A.

The basic consumption model uses the welfare aggregate as dependent variable. The poverty line is fixed to 2.5 PPP 2005 USD. The set of independent variables only includes time-invariant characteristics regarding the household and the household head, specifically: dummy for female headed households, birth cohort dummies from cohort 1945-1950 to cohort 1970-1975, education categories and dummy for rural areas, region dummies.

Results in Figure 14 show that all estimated bounds are able to “sandwich” the true panel value across all specified models. These results, along with other validation exercises for other countries, provide strong support in that the analysis carried out in this paper captures, to some extent, the true mobility patterns observed in the country. Further details and tests are provided in Annex A1 and Annex A2.

Figure 14. Transitions in and out of poverty, true value vs. synthetic panel results

Panel 1: 1999-2002

Panel 2: 2001-2004

Source: World Bank staff calculations using HBS data.

5. Economic Mobility in Moldova: Impressive Record of Upward Mobility

Moldova experienced high upward economic mobility in the first half of the 2000s. The transition matrix presented in Table 1 shows the percentage of households that moved across consumption categories – for example, out of poverty - in the period from 1999 to 2004. The analysis shows that a large share of households (29 percent) moved from poverty to living in moderate poverty (between \$2.5 and \$5/day) in this period. Similarly, around 10 percent of households crossed the \$5/day threshold. Overall, results point to significant upward mobility, jumping from one category to the next (no skipping

of categories) and to no downward movements during this period. As mentioned, these results are based on the lower-bound estimate and provide information on a low mobility (conservative) scenario (see Table A5 and Table A6 for upper bound estimates); true transitions will be in between the two bounds.

During 2006 and 2011 upward mobility continued to be strong. Around 9 percent of individuals moved out of poverty into the next higher economic class, and an also large share (13 percent) made it to living between \$5 and \$10/day (Table 2). Overall, those living above \$5/day, including the middle class, are substantially higher in this period. Based on lower bound estimates, downward mobility took place in less than 1 percent of the population.

Table 1. A large share of people escaped poverty in the early 2000s

Transition matrix for intra-generational mobility in Moldova, 1999 to 2004 (percent of individuals)

		Destination (2004)				
		<\$2.5	\$2.5-\$5	\$5-\$10	\$10+	Total
Origin (1999)	<\$2.5	48.2	29.0	0.8	0.0	78.1
	\$2.5-\$5	0.0	5.8	9.7	0.2	15.7
	\$5-\$10	0.0	0.0	2.0	2.4	4.4
	\$10+	0.0	0.0	0.0	1.8	1.8
<i>Total</i>		48.2	34.9	12.5	4.4	100.0

Source: Calculations based on HBS data.

Note: Results presented are for the lower-bound mobility estimates using the synthetic panel methodology by Dang et al (2011). See Table A5 for upper-bound results.

Table 2. Movements out of poverty continued in the second half of the decade

Transition matrix for intra-generational mobility in Moldova, 2006 to 2011 (percent of individuals)

		Destination (2011)				
		<\$2.5	\$2.5-\$5	\$5-\$10	\$10+	Total
Origin (2006)	<\$2.5	13.9	9.0	0.0	0.0	22.8
	\$2.5-\$5	0.1	30.2	13.1	0.0	43.4
	\$5-\$10	0.0	0.3	22.8	4.3	27.4
	\$10+	0.0	0.0	0.1	6.2	6.3
<i>Total</i>		14.0	39.5	36.0	10.5	100.0

Source: Calculations based on HBS data.

Note: Results presented are for the lower-bound mobility estimates using the synthetic panel methodology by Dang et al (2011). See Table A6 for upper-bound results.

Focusing on the crisis period more closely – time period between 2008 and 2011 - shows a slight decrease in upward mobility. Compared to a total of 9 percent of individuals moving out of poverty from 2006 to 2011, only 3.8 percent made it out in this narrower period covering the crisis (Table 3). The share of the population moving up from other economic categories was also smaller. Overall, a larger share of people can be categorized as “stayers” in the period 2008-2011, as downward economic mobility remained very low. These results stand even if adjusting for the number of years covered in each period.

Table 3. Upward mobility decelerated during the crisis

Transition matrix for intra-generational mobility in Moldova, 2008 to 2011 (percent of individuals)

		Destination (2011)				Total
		<\$2.5	\$2.5-\$5	\$5-\$10	\$10+	
Origin (2008)	<\$2.5	12.5	3.8	0.0	0.0	16.3
	\$2.5-\$5	0.2	35.4	8.1	0.0	43.8
	\$5-\$10	0.0	0.4	29.6	2.2	32.3
	\$10+	0.0	0.0	0.1	7.5	7.6
Total		12.8	39.7	37.9	9.7	100.0

Source: Calculations based on HBS data.

Note: Results presented are for the lower-bound mobility estimates using the synthetic panel methodology by Dang et al (2011).

Overall, upward mobility in Moldova was more pronounced in the first half of the 2000s, and during the crisis more people were “stayers”. Figure 15 summarizes the transitions matrices presented before and confirms significant movements upward, little downward economic mobility and a growing share of “stayers” particularly closer to the crisis years.

Figure 15. The share of “stayers” increased during the crisis period

Share of the population with upward and downward mobility, and stayers

Compared to other countries in the ECA region, Moldova was a higher performer in upward economic mobility. It was one of the countries with the highest movements upward in the region and, for countries with available data for the crisis period (circa 2008 and circa 2010) it had the highest share of households moving up.⁷

However, it is important to note that the methodology used to estimate these transitions may be underestimating downward mobility in Moldova. Results from the high mobility scenario suggest that up to 10 percent of individuals may have fallen down one category between 1999 and 2004, half of which moved down to poverty (Annex Table A5 and Table A6). Similarly, for the period 2006 to 2011, almost 17 percent of the population may have fallen downwards, the majority of which crossed down the \$5/day threshold, while others moved down from the middle class. In sum, although the majority of movements were indeed upwards in Moldova during the 2000s, some households might have remained stuck in one socioeconomic class or might have actually moved down. As previously mentioned, true transitions during these periods lie between the lower and the upper bound results.

6. Who Moved Up: The Role of Initial Household and Individual Characteristics

Given the high upward economic mobility experienced in Moldova coupled with a large share of “stayers”, it is key to better understand the factors and characteristics of households that are correlated with these patterns. This study aims at doing this in two ways. First, we look at the initial characteristics of households that moved out of poverty. Second, we estimate three different linear probability model to better understand which factors are associated with an increased probability of escaping poverty, moderate poverty and of upward mobility more broadly. Differences between these two approaches highlight first and second order effects in the reduction of economic poverty. Of particular interest is the role of human capital (education) and labor market status.

Descriptive statistics

Descriptive statistics on selected indicators show that household demographics, location and education seem to matter for promoting upward economic mobility (Table A2 for full descriptive statistics and Figure 16 for selected indicators). Individuals who moved out of poverty lived, in the initial year, in smaller households than those which stayed in poverty, and had lower child and elderly dependency rates. Further, they were less often located in rural areas. In the period 2006 to 2011, for example, of people staying stuck in poverty 74 percent lived in rural areas; conversely, only 48 percent of those escaping poverty in that period were located in rural areas, suggesting that living in rural areas is associated with fewer movements out of poverty. Higher human capital accumulation is also associated with upward mobility. In the most recent period under analysis, of people who were able to escape poverty 11 percent had higher education, compared to 2 percent among those who remained stuck as poor.

⁷ This refers to findings of the regional component of the economic mobility research that this paper is part of. See summary findings in the overview piece “Economic Mobility in Europe and Central Asia: Exploring Patterns and Uncovering Puzzles” (2014).

Figure 16. Upward economic mobility is associated with initial year household characteristics
Share of households in type of transition (\$2.5/day) by characteristic

a. Household characteristics and human capital

b. Labor market outcomes

Source: Calculations based on HBS data.

Note: *Poor* refers to those with consumption levels lower than \$2.5 per day. Results presented are for the lower-bound mobility estimates using the synthetic panel methodology by Dang et al (2011). Results for falling into poverty are not presented as samples sizes are small.

Labor market outcomes are also associated with transitions out of poverty. Differences in households' employment rate are not large across groups, however, the sector of employment does seem to matter. Households who stayed poor had a relatively higher share of members employed in agriculture (44 percent and 50 percent in 1999 and 2006, respectively), and relatively fewer members employed in manufacturing or services, compared to other groups. Further, households escaping poverty more often received wage income. A higher share of households receiving remittances in 2006 stayed out of poverty

by 2011. In general, given that household employment rates are not strikingly different across the various transitions suggests that it is the type and quality of employment that matters more for mobility in Moldova.

Comparing patterns in the two periods suggests that rural areas have become pockets of poverty. Since 2006, there is a relatively larger share of rural households and households with high employment in the agricultural sector that were not able to escape poverty and thus stayed poor. A profiling of the poor (Table A1) also suggests that they became increasingly rural over the decade and dependent on agriculture (with the share of households members employed in this sector at 38 percent in 2006, compared to 53 percent in 2011). This pattern could be partly related to the climatic shock that agricultural households endured during this period, but likely also reflects chronic poverty which might require more targeted policies to overcome.

Linear probability model

The study also conducts further regression analysis to explore conditional correlates of economic mobility. We use a linear probability model to test conditional correlates of the probability of exiting poverty (\$2.5/day) and the regional moderate poverty line (\$5/day) thresholds, as well as the probability of upward mobility in general (i.e. moving up one economic category). Variables in the analysis include demographic characteristics (age and gender of head of household), household size and location, and dependency rates. In addition, the analysis considers the education level of members of the household, the household employment rate and the receipt of several sources of income (for the latter, data available for some years only). Regional fixed effects are also included. The analysis is carried out for the period 1999 to 2004 based on initial characteristics, and similarly for 2006 to 2011. Given that there were large movements out of poverty in the first period, the correlates of escaping poverty are likely to be different than in the second period in which the pool of poor was smaller (and possibly comprised of a larger share of chronic poor). Findings from the different regression models are shown in Table A3.

Demographic characteristics are associated with economic mobility in Moldova. Consistent with the unconditional analysis, larger households are associated with a lower probability of upward economic mobility across specifications. The effect is particularly strong (5 percentage points for each additional household member) for escaping poverty between 1999 and 2004. Further, higher dependency rates, particularly of adults over 65 years, are related to a lower probability of moving up. No consistent patterns across periods and specifications are found in terms of age and gender of the household head, and living in rural areas. For the latter, however, there is a significant lower probability of upward mobility in the period 2006-2011. This might include the effect of the agricultural crisis which hit rural areas particularly hard.

Higher levels of education are strongly associated with upward economic mobility in Moldova. The higher the share of household members with only primary education, the lower the probability of moving up the economic ladder in Moldova (estimated at around 16 percentage points lower for moving out of poverty). This effect disappears for the second period, in which tertiary education becomes the key correlate for economic mobility by increasing the likelihood of escaping poverty and the regionally

defined moderate poverty threshold. During the early 2000s, tertiary education is associated with a significant and strong probability of escaping poverty and moderate poverty (14 percentage points each), and moving up one category (11 percentage points). Even stronger results in terms of magnitude are found for tertiary education in period 2006 to 2011 (27 percentage points for escaping poverty and 20 percentage points for moderate poverty). These findings also reflect the structural change away from agriculture to manufacturing and services which increases returns to higher educational attainment.

Labor markets matter for mobility. Focusing on the sector of employment, combined with the intensity of household employment in that sector, provides additional insights into the role of labor markets on economic mobility. A higher household employment rate in the services sector correlates with increased upward mobility: In the first period, a one unit increase in the share of members working in the services sector is associated with a probability of escaping poverty of around 20 percentage points; for the more recent period, working in services continues to be important but now as a correlate of escaping moderate poverty. Working in manufacturing is also associated with a higher probability of escaping moderate poverty in both periods. Overall, receiving wage income is a key correlate of upward mobility for the first period, but does not seem to have a particularly strong effect in more recent years. Instead, receiving pensions and remittances in 2006 – without controlling for the amount received - is more closely associated with escaping poverty (for pensions, although effect is weak) and escaping moderate poverty (for remittances). For remittances, the probability of escaping moderate poverty is 12 percentage points higher for receiving households, although they are not associated with moving out of poverty. This partly reflects the fact that households in poverty have a much lower probability of receiving remittances at all compared to other households in the welfare distribution.

How does the crisis period differ from the pre-crisis period?

Comparing the time period before the global economic crisis hit Moldova to the crisis period provides further insights into economic mobility dynamics. This analysis seems particularly important since poverty reduction in Moldova has previously benefited significantly from remittances from Russia and the European Union. To understand if patterns of economic mobility changed before and during the global economic crisis, this study conducts an additional exercise on the period up to the crisis (2006-2009) and during the crisis (2009-2011).

As mentioned, there were fewer people moving up during the crisis. Around 18 percent of individuals experienced upward economic mobility between 2006 to 2009, going down to 10 percent during the crisis period (see Annex Table A7 and Table A8). This was compensated not by downward economic mobility, but by a higher share of stayers across socioeconomic groups.

Many correlates of economic mobility remain significant before and during the crisis. Dividing the 2006 to 2011 period still captures a significant and negative association of economic mobility with household size, old-age dependency rate and tertiary education (the latter for the crisis period) (see Annex Table A4).

Female headed households in the initial year had a consistently lower probability of upward economic mobility during the crisis. From 2009 to 2011, the probability of escaping poverty and moderate poverty is significant and negative (-23 percentage points and -4 percentage points, respectively) for female-headed households compared to their male counterparts. This strong effect for moving out of poverty could be linked to the observation that female headed households have a much higher propensity of receiving remittances which reduced significantly during the global financial crisis.

Living in rural areas before the crisis lowered the probability of escaping poverty by 2009. This is likely capturing the fact that the crisis hit rural areas harder than urban areas and once more illustrates the important role of remittances in the country. Furthermore this suggests that the domestic (and international, Russia) crisis in the agricultural sector had a negative impact on upward economic mobility.

Remittances and pensions have a stronger role in upward mobility. For remittances, results capture a strong and positive association, before and during the crisis, for moving out of the regional moderate poverty line (\$5/day). Individuals in households receiving remittances in the initial year of both periods had a higher probability (around 8 percentage points) of crossing the \$5/day threshold, than households not receiving. The effects are not significant for those in poverty. Pensions, in turn, have a strong and positive association with upward mobility. For households receiving pensions in 2009, the probability of moving up the economic ladder increased by 24 percentage points by 2011. This could be partly linked to increases in pensions by the government in response to the financial crisis.

7. Conclusion

This paper explored the underlying economic mobility patterns behind the significant reduction in poverty, including moderate poverty, in Moldova during the 2000s and identified factors associated with upward economic mobility and thus transitions out of poverty. The results revealed that a high share of poor and moderately poor households were able to improve their living standards and escape poverty, while few non-poor households fell into poverty; this trend continued post crisis, but decelerated. While Moldova remains one of the poorest countries in the region, it presents one of the highest levels of upward economic mobility across European and Central Asian countries over the past decade. However, despite progress, many households in Moldova remain vulnerable to shocks and thus to falling into poverty.

In order to strengthen the capacity of the poor and moderate poor to escape poverty in a sustainable way, this paper sought to better understand the factors associated with income growth and upward movements. In Moldova, the main differences between households that were able to escape poverty from those that were not are education and labor market status (more than being employed – as household employment rates are not too different across groups - the sector of employment mattered). Higher educational attainment among household members and employment in the services and manufacturing sectors—vis-à-vis agriculture—were strongly associated with upward mobility. Furthermore, whether or not households received remittances or pensions also played a role. Findings from this paper can provide guidance on policies areas which have the potential to further strengthen transitions out of poverty.

Promoting upward economic mobility requires a policy agenda focused on skills and preparing workers for new jobs. This includes providing individuals with strong generic skills through quality basic education, but also preparing workers with market-driven skills for today's labor market, in particular, for the increasing share of new jobs outside the agricultural sector. This can enable larger groups of society, particularly the less well-off, to benefit from the ongoing sectoral transformation. Further, policies should remove barriers and disincentives to labor force participation and, in particular, to formal employment, as well as eliminate obstacles to internal labor mobility to allow workers to go where the jobs are.

A successful policy agenda should also strengthen the role of public and private transfers in reducing the long-term vulnerability of households. For remittances, this includes fostering a more productive use of these transfers to increase the long-term capacity of households to improve their living standards. In the case of social protection, it is key to ensure that they improve the ability of households to weather shocks and avoid downward economic mobility, but also that they do not give rise to disincentives to (formal) employment.

Finally, findings and their policy implications can be very relevant to inform the agenda on the World Bank twin goals: reducing poverty and promoting shared prosperity. Even though economic mobility analysis focuses on tracking households over time – in contrast, for example, to the shared prosperity indicator of boosting income growth of the bottom 40 percent – understanding the relevance of

assets like human capital, the intensity with which their use in, for instance, the labor markets, and others, can provide powerful insights for poverty reduction and shared prosperity.

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Table A1. Profile by socioeconomic group, 1999, 2006 and 2011

	1999				2006				2011			
	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+
Share of the population	77.6	16.3	4.3	1.7	23.4	43.9	27.1	5.6	9.6	45.6	38.6	6.2
<i>Demographics and location:</i>												
Household size (no. of members)	3.8	3.1	3.5	2.9	4.2	3.6	3.0	2.6	4.3	3.5	3.1	2.2
Household depend. rate (<14 & >65)	71.3	49.4	56.4	60.2	81.2	64.5	50.4	35.5	83.0	65.7	45.6	25.2
Household depend. rate (>65)	21.3	19.3	15.3	24.2	25.9	24.3	20.7	12.5	25.0	29.0	17.3	9.4
Household depend. rate (< 14)	49.9	30.1	41.0	36.0	55.2	40.1	29.7	23.0	58.0	36.7	28.2	15.8
Rural	66.5	47.1	47.4	78.4	63.9	59.5	44.2	41.0	83.9	68.1	40.0	23.9
<i>Labor market (household level):</i>												
Household empl. rate	63.8	62.2	70.6	60.9	61.6	62.7	61.9	68.5	72.7	66.2	67.0	69.7
Household empl. rate in agriculture	35.9	20.8	27.6	37.2	37.6	29.1	18.8	14.7	53.4	37.4	18.9	10.3
Household empl. rate in manufacturing	9.3	13.7	18.2	5.2	4.0	5.9	5.9	6.7	2.2	4.4	6.6	5.1
Household empl. rate in services	18.6	27.7	24.9	18.5	20.0	27.7	37.2	47.2	17.1	24.4	41.5	54.4
<i>Education - share hh members (15+):</i>												
Primary education	22.0	13.5	12.9	21.3	30.8	16.8	10.0	6.1	39.5	21.1	8.2	3.5
Secondary education	61.8	55.6	54.4	51.1	55.9	59.9	54.7	45.9	48.6	58.0	57.8	33.9
Tertiary education	7.3	20.5	23.5	18.4	4.8	12.7	23.9	37.5	3.0	7.9	24.4	47.7
<i>Share of households receiving:</i>												
Pensions	9.2	14.0	8.4	4.1	26.5	22.9	19.3	14.7	27.8	30.5	22.7	15.2
Social benefits	2.2	2.9	3.1	0.0	13.0	10.1	9.4	7.4	11.9	14.8	10.9	10.0
Wages	29.8	45.9	46.6	13.3	34.2	38.5	45.9	50.8	27.5	33.7	54.1	67.1
Remittances	..	..	..	..	15.5	21.3	26.7	38.1	16.0	24.6	26.3	33.7

Regions:

Chisinau	13.4	33.6	40.5	21.2	15.2	20.5	33.4	41.2	2.7	12.4	35.8	55.7
Tighina	7.4	3.6	1.0	0.6	4.4	4.2	3.6	2.8	7.5	9.4	8.0	6.4
Ungheni	12.2	9.0	5.2	0.2	7.3	5.6	7.4	9.7	13.4	14.5	14.3	12.3
Chisinau county	11.5	6.6	3.4	0.6	5.6	11.8	12.8	9.1	7.3	8.6	6.7	3.6
Balti	7.0	15.2	7.8	0.9	14.8	14.4	13.4	11.0	6.7	10.6	7.2	4.1
Cahul	5.9	2.9	13.0	25.6	6.8	9.0	5.3	4.5	4.4	2.9	2.8	1.5
Edinet	17.7	9.8	8.8	25.7	5.6	5.5	5.1	2.9	10.9	7.9	4.6	2.9
Gagauzia	5.9	3.3	9.6	23.6	3.5	2.8	2.5	1.7	22.6	12.8	7.4	3.5
Lapusna	6.2	1.5	0.5	0.0	14.1	9.5	4.6	5.2	5.7	6.3	5.3	4.3
Orhei	7.8	6.6	5.4	1.2	13.8	8.6	6.3	4.6	6.2	4.6	2.4	1.8
Soroca	5.1	7.9	4.8	0.4	9.1	8.0	5.6	7.2	12.7	9.9	5.7	4.0

Source: Calculations based on HBS data.

Table A2. Profile of individuals by type of transition, characteristics of initial year in the period

	1999			2006		
	stayed poor	escaped poverty	non-poor	stayed poor	escaped poverty	non-poor
<i>Demographics and location:</i>						
Household size (number of households members)	4.3	3.8	3.5	4.6	4.1	3.6
Household dependency rate (under 14 and over 65 years)	69.5	59.9	46.7	68.4	57.6	45.4
Household dependency rate (adults over 65)	5.8	2.5	4.4	3.9	1.2	2.7
Household dependency rate (children under 14)	63.7	57.3	42.2	64.5	56.4	42.6
Rural	64.1	58.5	42.3	74.2	47.7	48.8
<i>Labor market outcomes (household level):</i>						
Household employment rate	74.9	77.2	75.9	71.7	65.7	71.3
Household employment rate in agriculture	44.4	37.1	27.5	49.8	29.6	25.7
Household employment rate in manufacturing	11.6	11.3	16.2	4.5	5.5	7.1
Household employment rate in services	19.0	28.8	32.3	17.5	30.6	38.5
<i>Education - share of household members (15+) with:</i>						
Primary education	21.1	11.2	8.9	36.2	18.4	11.1
Secondary education	73.0	77.0	67.8	61.5	70.4	66.7
Tertiary education	5.9	11.8	23.3	2.3	11.2	22.2
<i>Income sources - share of households receiving:</i>						
Pensions	0.5	0.5	0.9	0.4	2.7	0.9
Social benefits	2.2	2.6	2.4	15.4	10.3	8.5
Wages	31.3	46.7	52.7	44.2	51.6	53.0
Remittances	0.1	0.1	0.2	17.9	11.9	26.6

Regions:

Chisinau	14.3	17.6	39.7	7.9	24.4	28.5
Tighina	8.5	17.9	5.4	8.3	2.0	11.7
Ungheni	4.6	9.7	12.1	13.6	19.9	13.1
Chisinau county	6.0	4.6	5.0	5.7	8.1	6.8
Balti	18.5	15.3	10.6	6.5	3.4	5.1
Cahul	8.5	2.6	5.6	3.6	1.6	2.6
Edinet	8.2	2.7	0.9	11.9	14.2	7.4
Gagauzia	11.0	4.3	6.3	13.9	16.3	7.5
Lapusna	2.4	6.4	4.7	10.3	7.1	7.0
Orhei	5.8	7.1	2.5	6.5	0.0	3.9
Soroca	12.3	11.7	7.2	11.9	3.0	6.5

Source: Calculations based on HBS data.

Table A3. Regression analysis: linear probability model on correlates of upward mobility for the time period 1999 to 2004 and 2006 to 2011

	Period 1999-2004			Period 2006-2011		
	Exiting \$2.5/day	Exiting \$5/day	Upward mobility	Exiting \$2.5/day	Exiting \$5/day	Upward mobility
Female headed households	-0.0294 (-1.26)	0.0273 (1.78)	0.00127 -0.06	-0.0771 (-1.53)	-0.0678** (-2.74)	-0.0358 (-1.42)
Age 25-29 (base)						
Age 30-34	0.0544 (1.42)	0.0200 (1.02)	0.0808* -2.36	0.0594 (0.81)	-0.0111 (-0.23)	-0.00292 (-0.06)
Age 35-39	0.0914* (2.55)	0.0316 (1.67)	0.111*** -3.44	0.0842 (1.23)	0.064 -1.37	0.0524 -1.11
Age 40-44	0.109** (2.93)	0.0327 (1.63)	0.0966** -2.92	0.123 (1.67)	0.117* -2.31	0.0722 -1.49
Age 45-49	0.0897* (2.37)	0.0359 (1.81)	0.0964** -2.87	-0.0294 (-0.41)	0.0793 -1.58	0.00708 -0.15
Age 50-54	0.0892* (2.09)	0.0341 (1.45)	0.0721 -1.93	-0.175* (-2.41)	-0.0227 (-0.46)	-0.118* (-2.52)
Age 55+	0.140 (1.64)	0.114* (2.15)	0.225** -3.1	-0.153 (-1.42)	-0.0474 (-0.75)	-0.0971 (-1.67)
Rural	-0.0111 (-0.38)	-0.0149 (-0.85)	-0.0234 (-0.89)	-0.0845 (-1.46)	-0.0438 (-1.67)	-0.0870*** (-3.43)
Household size	-0.0449*** (-5.44)	-0.0170* (-2.42)	-0.0352*** (-3.92)	-0.0242 (-1.78)	-0.0342*** (-5.02)	-0.0170* (-2.13)
Household dependency rate (children under 14)	-0.0296 (-1.25)	-0.0428** (-2.98)	-0.0425 (-1.89)	-0.0619 (-1.64)	-0.0125 (-0.45)	-0.0108 (-0.44)
Household dependency rate (adults over 65)	-0.159*** (-3.57)	-0.0613* (-2.51)	-0.184*** (-4.43)	-0.719*** (-4.60)	-0.104 (-1.28)	-0.160** (-3.00)
<i>Secondary education (base)</i>						
Primary education	-0.166*** (-5.96)	-0.0613*** (-4.15)	-0.173*** (-6.39)	-0.0823 (-1.65)	0.0284 -1.17	0.0523 -1.93
Tertiary education	0.143*** (3.53)	0.139*** (5.17)	0.107*** -3.42	0.267** (3.17)	0.196*** -3.83	0.0402 -1.01
<i>Household employment rate in:</i>						
Manufacturing	0.0801	0.0853**	0.0797	0.0313	0.201**	0.0694

	(1.58)	(2.80)	-1.8	(0.22)	-2.68	-1.01
Services	0.201*** (4.49)	0.0532 (1.85)	0.158*** -3.89	0.129 (1.47)	0.187*** -3.55	0.0397 -0.85
Agriculture	0.0834* (1.98)	0.0436 (1.56)	0.077 -1.93	-0.0707 (-0.95)	0.0626 -1.47	-0.0395 (-0.97)
Households received wages (dummy)	0.143*** (6.63)	0.0419*** (3.32)	0.107*** -5.55	-0.0790 (-1.89)	0.00279 -0.13	0.00597 -0.28
Household receives pensions (dummy)	0.0985 (0.93)	-0.0543 (-1.07)	-0.015 (-0.17)	0.304* (2.07)	-0.063 (-1.14)	0.125 -1.39
Household receives remittances (dummy)	0.0898 (0.35)	0.0983 (0.70)	0.161 -0.73	0.0250 (0.49)	0.124*** -5.02	-0.00554 (-0.24)
Household receives social benefits (dummy)	0.0978 (1.67)	0.0410 (0.85)	0.0926 -1.76	-0.0390 (-0.64)	0.0159 -0.52	-0.0345 (-1.04)
Constant	0.313*** (5.66)	0.110** (2.87)	0.309*** -6	0.879*** (8.18)	0.316*** -4.61	0.464*** -7.03
Observations	2746	3449	3641	631	1982	2909

Source: Calculations based on HBS data.

Note: Regression model includes region- fixed effects and accounts for weights.

Table A4. Regression analysis: linear probability model on correlates of upward mobility during the pre- crisis period 2006 to 2009 and crisis period 2009 and 2011

	Period 2006-2009			Period 2009-2011		
	Exiting \$2.5/day	Exiting \$5/day	Upward mobility	Exiting \$2.5/day	Exiting \$5/day	Upward mobility
Female headed households	-0.0592 (-1.29)	-0.0114 (-0.50)	0.0112 (0.48)	-0.231*** (-4.95)	-0.0406* (-2.50)	-0.0463*** (-3.57)
Age 25-29 (base)						
Age 30-34	-0.0758 (-1.17)	-0.0298 (-0.67)	-0.0552 (-1.21)	0.0900 (1.14)	0.0191 (0.59)	0.0152 (0.69)
Age 35-39	-0.0526 (-0.77)	-0.0143 (-0.33)	-0.0301 (-0.68)	0.296*** (3.48)	0.0274 (0.85)	0.0828*** (3.34)
Age 40-44	-0.0608 (-0.87)	0.0391 (0.84)	-0.0245 (-0.55)	0.223* (2.44)	0.0546 (1.49)	0.0757** (2.98)
Age 45-49	-0.0561 (-0.84)	0.0263 (0.56)	-0.0308 (-0.70)	0.223* (2.46)	0.0511 (1.36)	0.0923*** (3.34)
Age 50-54	-0.234*** (-3.34)	-0.0661 (-1.48)	-0.147*** (-3.39)	0.235* (2.49)	0.0276 (0.77)	0.0562* (2.28)
Age 55+	-0.298*** (-3.82)	-0.0397 (-0.69)	-0.141** (-2.68)	0.240 (1.76)	-0.0294 (-0.75)	0.0386 (1.01)
Rural	-0.245*** (-4.47)	-0.114*** (-5.54)	-0.177*** (-8.25)	0.0903 (1.17)	0.0347 (1.60)	0.0756*** (3.96)
Household size	-0.0115 (-0.96)	-0.0205*** (-3.58)	-0.0109 (-1.58)	-0.0194 (-1.31)	-0.0168** (-2.88)	-0.00479 (-0.83)
Household dependency rate (children under 14)	-0.0540 (-1.69)	-0.0153 (-0.69)	-0.0178 (-0.86)	-0.0643 (-1.54)	0.000705 (0.03)	-0.00367 (-0.19)
Household dependency rate (adults over 65)	-0.536*** (-3.43)	-0.175** (-3.13)	-0.162*** (-3.59)	-0.151 (-1.01)	-0.0746* (-2.02)	-0.0696 (-1.83)
<i>Secondary education (base)</i>						
Primary education	-0.0967* (-2.42)	0.0206 (1.11)	0.0109 (0.50)	-0.0579 (-1.06)	-0.0232 (-1.17)	-0.00132 (-0.06)
Tertiary education	0.0491 (0.45)	0.0374 (0.81)	-0.0952** (-2.68)	0.293 (1.23)	0.361*** (6.23)	0.144*** (5.53)
<i>Household employment rate in:</i>						
Manufacturing	0.102	0.146*	0.0868	0.142	0.0771	0.0895

	(0.81)	(2.16)	(1.33)	(0.64)	(1.03)	(1.88)
Services	0.0597 (0.73)	0.128** (2.66)	0.0133 (0.31)	0.362** (3.05)	0.0427 (1.11)	0.0478 (1.71)
Agriculture	-0.0476 (-0.69)	0.0584 (1.70)	-0.0361 (-1.06)	0.0687 (0.73)	-0.00842 (-0.24)	0.0126 (0.42)
Households received wages (dummy)	-0.0653 (-1.81)	-0.0120 (-0.65)	-0.00795 (-0.41)	-0.0669 (-1.40)	-0.000448 (-0.03)	-0.0268 (-1.77)
Household receives pensions (dummy)	0.117 (0.69)	-0.0174 (-0.37)	0.0365 (0.45)	0.162 (0.75)	0.188 (1.64)	0.241** (2.64)
Household receives remittances (dummy)	0.0441 (0.97)	0.0799*** (3.73)	-0.00653 (-0.31)	0.104 (1.57)	0.0759*** (3.73)	0.0304 (1.86)
Household receives social benefits (dummy)	-0.0198 (-0.36)	-0.0147 (-0.65)	-0.0372 (-1.41)	-0.0123 (-0.19)	-0.0262 (-1.29)	-0.0479* (-2.53)
Constant	0.937*** (9.65)	0.367*** (6.09)	0.529*** (9.14)	0.0439 (0.32)	0.00360 (0.08)	-0.0526 (-1.56)
Observations	631	1982	2856	365	1572	2641

Source: Calculations based on HBS data.

Note: Regression model includes region- fixed effects and accounts for weights.

Figure A1. Growth Incidence Curves in Total, Urban and Rural areas, 1999 to 2004 and 2006 to 2011

a. 1999 to 2004

b. 2006 to 2011

Table A5. Transition matrices for intra-generational mobility in Moldova, upper bound estimates 1999 to 2004

1999-2004	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+
<\$2.5	34.1	32.8	9.9	1.3
\$2.5-\$5	5.1	6.6	3.4	0.6
\$5-\$10	1.3	2.3	0.7	0.1
\$10+	0.7	0.8	0.3	0.0

Source: Calculations based on HBS data.

Note: Results presented are for the upper-bound mobility estimates using the synthetic panel methodology by Dang et al (2011).

Table A6. Transition matrices for intra-generational mobility in Moldova, upper bound estimates 2006 to 2011

2006-2011	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+
<\$2.5	0.7	12.9	8.8	0.4
\$2.5-\$5	0.7	20.3	21.1	1.4
\$5-\$10	0.1	9.8	16.0	1.5
\$10+	0.0	1.9	3.9	0.5

Source: Calculations based on HBS data.

Note: Results presented are for the upper-bound mobility estimates using the synthetic panel methodology by Dang et al (2011).

Table A7. Transition matrices for intra-generational mobility in Moldova, lower bound estimates 2006 to 2009

2006-2009	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+
<\$2.5	16.5	6.3	0.0	0.0
\$2.5-\$5	0.9	34.1	8.4	0.0
\$5-\$10	0.0	1.1	22.9	3.4
\$10+	0.0	0.0	0.3	6.0

Source: Calculations based on HBS data.

Note: Results presented are for the upper-bound mobility estimates using the synthetic panel methodology by Dang et al (2011).

Table A8. Transition matrices for intra-generational mobility in Moldova, lower bound estimates 2009 to 2011

2009-2011	<\$2.5	\$2.5-\$5	\$5-\$10	\$10+
<\$2.5	11.2	3.4	0.0	0.0
\$2.5-\$5	0.2	36.4	5.0	0.0
\$5-\$10	0.0	0.9	34.1	1.4
\$10+	0.0	0.0	0.9	6.5

Source: Calculations based on HBS data.

Note: Results presented are for the upper-bound mobility estimates using the synthetic panel methodology by Dang et al (2011).

Annex A1. Synthetic Panel Methodology.

Over the last years the issue of economic mobility has moved into the focus of academic research and the wider policy discussion. In addition to the static picture which creates a snapshot of socioeconomic poverty, the analysis of economic mobility allows for the identification of dynamic patterns of poverty and describes determinants underlying movements into and out of poverty.

One of the key obstacles for research in this field has been the limited availability of panel data to follow households over time. Even then problems of identification occur since many panels suffer from high attrition rates and relatively short survey periods. The previous literature on economic mobility has overcome these challenges, so far, by exploring patterns of mobility of cohorts over time. In response, the synthetic panel methodology by Dang et al (2014) shows at least three major advantages: first, the approach allows for the study of mobility across a longer time period and is no longer restricted to the availability of panel data; second, the increased sample size mitigates problems of small sample panels such that subgroups of the population can be analyzed; third, the methodology eliminates worries of attrition in panel data.

The synthetic panel methodology builds on an imputation methodology of economic welfare for the missing time period. First, it requires two rounds of cross-section data and second, a set of time-invariant individual and household characteristics which are collected for both survey rounds. Later the deterministic component for the second period is estimated using structural parameters and then the deterministic part is constructed based on specific assumptions on the degree of mobility in society. This way results provide an estimate for the lower bound and the upper bound of economic mobility.

First step: Consumption model for both periods.

Estimate a model of log consumption in each round (time 1 and time 2), using only time-invariant covariates. Here, the beta vector of estimated coefficients characterizes the structural relationship between time-invariant explanatory variables in time 1 (time 2) and the endogenous measure of welfare y_1 (y_2). The vector of explanatory variables x_1 corresponds to x_2 ; time-invariant individual characteristics remain constant over time and the beta vector defines the structural relationship for a specific year.

Second step: Imputation of the deterministic component.

For individuals observed in time period 1, we impute consumption in period 2 using their time-invariant characteristics and structural parameters obtained from the consumption model in period 2. Use explanatory variables from the first time period (which correspond to characteristics in the second time period) and predict the measure of welfare this household would have achieved in time period 2. Obviously, this prediction relies on the validity of the beta vector which defines structural parameter in both periods.

Third step: Construct the stochastic component.

The upper and lower bound of economic mobility are defined based on the correlation in the error terms between the two time periods. In general, the correlation of the errors between time periods (e_1 and e_2 for the first and second period) is non-negative. Unobserved characteristics which increase welfare in the first period also increase welfare in the second period (positive correlation).

- a) *Upper bound of mobility: $\text{Corr}(e_1, e_2) = 0$ with high mobility.* Random draw with replacement for each household in period 1 from empirical distribution of residuals in period 2. Repeat procedure and average; then add to the deterministic consumption component from step 2.
- b) *Lower bound of mobility: $\text{Corr}(e_1, e_2) = 1$ with low mobility.* Estimates of residuals in first period for each household are directly used to obtain residual for second period. Again, add the deterministic and stochastic component of consumption.

Calibration of residual correlation

The true value of economic mobility lies within the interval which assumes zero correlation for the lower and perfect correlation for the upper bound. Here an empirical analysis on the error term confirms a positive correlation between error terms within one individual (household) over time.

Using data from the Moldova Household Budget Survey, Table A9 summarizes previous findings on the residual correlation for two different time periods (1999 to 2002 and 2001 to 2004)⁸. The estimated correlation ranges between 0.17 and 0.54.

Table A9. Residual correlation for Moldova.

table A	1999	2000	2001	2002	table B	2001	2002	2003	2004
1999	1				2001	1			
2000	0.25	1			2002	0.39	1		
2001	0.35	0.42	1		2003	0.30	0.47	1	
2002	0.17	0.22	0.36	1	2004	0.27	0.42	0.54	1

Altogether, the residual correlation depends on (at least) three different factors: first, the empirical specification of the basic consumption model; second, the years under observation; and third, the length of the time period. The structure of the consumption model determines the extent in how far independent variables capture heterogeneity across observations and what remains unexplained by the model. In the context of the synthetic panel methodology the set of variables is restricted to time-invariant characteristics such that the stochastic component still captures a lot of information. The time period under observation matters since the wider macroeconomic environment has a strong impact on the isolation of systematic variation across individuals or households. In times of economic uncertainty and instability observable characteristics are often less suited to describe systematic changes in a country since idiosyncratic shocks have a strong influence on outcomes. In a similar way the length of the time period matters. If the distance between two observations in time increases, the probability that individuals and households are hit by idiosyncratic shocks increases and the residual correlation decreases.

⁸ A similar analysis for Georgia suggests that between 2009 and 2011 the residual correlation was around 0.36. In relative terms this characterizes high mobility scenario which also reflects the wider macroeconomic development in the country.

Annex A2. Validation exercise: synthetic panel methodology of Dang et al (2011)

The methodology of “synthetic panel” is tested and validated using panel data for Moldova for the periods. The analysis creates two different subsamples: subsample 0 is used as a reference point whereas results from the synthetic panel model build only on subsample 1. Estimated bounds generated in the synthetic panel exercise from subpanel 1 are compared to the true transitions observed from the descriptive statistics of subsample 0.

The basic consumption model uses the welfare aggregate as dependent variable. The household consumption aggregate, consistent with the regional standardized aggregate for ECA, excludes rent, health and durables. The poverty line is fixed to 2.5 PPP USD.

The set of independent variables only includes time- invariant characteristics regarding the household and the household head. The test uses four different consumption models to test for sensitivity and performance. This way results illustrate how the explanatory power and especially regional characteristics have an impact on the estimated bounds from the synthetic panel exercise. The following variables are included in each model:

- **Model 1:** Dummy for female headed households, birth cohort dummies from cohort 1945-1950 to cohort 1970-1975, education categories and dummy for rural areas.
- **Model 2:** in addition to variables in model 1, eleven different region dummies which capture *any* heterogeneity on the regional level.
- **Model 3:** in addition to variables in model 1, this specification includes detailed information calculated on the region level, such as the mean consumption level, the standard deviation of consumption, the share of HH with at least secondary education, the employment rate, old-age and young-age dependency ratios and an interaction term between education in the region and educational outcomes for the household head (all calculated on the region level using all individuals in the sample).
- **Model 4:** in addition to variables in model 1, this specification includes information on the number of children (defined in terms of age cohort), a squared term on the number of children, interaction term of children with rural areas and an interaction term between educational categories and rural areas. Furthermore, the specification is flexible enough to allow for returns to education to vary with the birth cohort by including a large set of interaction terms between educational categories and birth cohorts.

The sample selection and the estimation procedure (using bootstrapping to generate bounds) require a random number generator which uses a common seed (seed 123456) for all calculations. Here the number of repetitions is set to 200.⁹

⁹ Instead of using one sample we could instead estimate bounds several times and produce a distribution.

The following Tables A10 and A11 relate to estimation results from the synthetic panel methodology and show the upper and lower bound on poverty transitions between two different time periods. Results show that for the first panel, the majority of bounds capture the true value, with the exception of three transitions for models 1 and 3 (in gray). For the second panel, all estimated bounds are able to “sandwich” the true panel value across all specified models. These results, along with other validation exercises for other countries, provide strong support in that the analysis carried out in this paper captures, to some extent, the true mobility patterns observed in the country.

Table A10. Panel 1 to 4 (331 observations, only sample 1), years 1999 to 2002

		model 1		model 2		model 3		model 4	
True transitions (sample 0)	Transition	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
45,8	Poor to poor	59,9	41,6	55,9	41,4	78,9	65,2	58,8	44,6
36,1	Poor to non poor	21,3	29,6	25,3	39,8	2,3	16,0	22,4	36,6
6,0	Non poor to poor	0,0	8,6	0,0	8,1	6,0	13,6	0,8	8,1
12,1	Non poor to non poor	18,8	10,2	18,8	10,7	12,8	5,2	18,1	10,7
	R-squared	0,11		0,22		0,25		0,27	

Table A11. Panel 3 to 6 (300 observations, only sample 1), years 2001 to 2004

		model 1		model 2		model 3		model 4	
True transitions (sample 0)	Transition	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
45,8	Poor to poor	55,1	35,4	53,7	38,0	62,0	44,2	59,2	39,0
28,5	Poor to non poor	21,8	41,5	23,2	38,9	14,9	32,7	17,7	38,0
3,6	Non poor to poor	0,5	9,0	0,5	7,6	0,6	10,0	0,9	9,2
22,1	Non poor to non poor	22,5	14,0	22,6	15,5	22,4	13,1	22,2	13,9
	R-squared	0,19		0,28		0,27		0,25	