DISCUSSION PAPER SERIES

IZA DP No. 5449

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January 2011

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zur Zukunft der Arbeit
Institute for the Study
of Labor

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IZA Discussion Paper No. 5449
January 2011

ABSTRACT

Using Pseudo-Panels to Measure Income Mobility in Latin America*

This paper presents a comparative overview of mobility patterns in 14 Latin American countries between 1992 and 2003. Using three alternative econometric techniques on constructed pseudo-panels, the paper provides a set of estimators for the traditional notion of income mobility as well as for mobility around extreme and moderate poverty lines. The estimates suggest very high levels of time-dependent unconditional immobility for the Region. However, the introduction of socioeconomic and personal factors reduces the estimate of income immobility by around 30 percent. There are also large variations in country-specific income mobility (estimated to explain some additional 10 percent of inter-temporal income variation). Analyzing the determinants of changes in poverty incidence within cohorts revealed statistically significant roles for age, gender and education of the household head, the latter subject to distinctive effects across levels of attainment and transition in and out of poverty.

JEL Classification: D3, I3, O1

Keywords: income mobility, poverty, pseudo-panels, Latin America

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* The findings and interpretations in this paper are those of the authors and do not necessarily represent the views of the Inter-American Development Bank, the World Bank or its corresponding executive directors. Alejandro Hoyos provided valuable assistance.

1. Introduction

Latin American nations persistently rank among the most unequal in the world in terms of distribution of earnings and wealth. Discussion of this problem has produced agreement on some of its causes: the Region's disappointing distributive performance has been due to pervasive levels of macroeconomic vulnerability, inequality in political voice and problems of social exclusion that are rooted in history (World Bank, 2004; IDB, 2007). However, the notion of mobility has not yet taken a central place in this discussion. That mobility has not played a role in the discussion of inequality for the Region reflects a lack of both appropriate data and methodological tools. In the literature in the developed world, the traditional framework for analyzing mobility demands data requirements that Latin America has not been able to fully supply yet, namely panel data. Only recently have pseudo-panel methods begun to be developed to, at least partially, overcome this data limitation. This paper is an attempt to apply these new methodological developments to a broad set of data from Latin America and in this way collaborate in putting this discussion on the empirical research agenda of inequality in the Region.

The role of mobility in the analysis of inequality has already been emphasized in the economic literature (see Fields, 2005, and Galiani, 2006, for recent reviews). Static measures of inequality, however, are insufficient to portray the well-being of individuals in a society and must be complemented by the dynamics of mobility. The welfare of individuals in two societies with similar levels of income inequality but different patterns of income mobility would be expected to differ. Individuals in the society with higher mobility would enjoy greater incentives to exert effort and climb up the income distribution than individuals in the society with lower mobility. The aggregation of these individual incentives would in turn be translated into higher productivity in the overall economy, with subsequent beneficial outcomes.

Macroeconomic vulnerability, coupled with the lack of an effective social protection network in the Region, imposes a considerable risk for individuals to slip into poverty (as reported, for instance, in Argentina by Corbacho, García-Escribano and Incahuste, 2003). This form of individual vulnerability is associated with downward absolute mobility along the welfare distribution. Fields et al. (2005) have found that, in upper segments of the income distribution, there is no conclusive evidence that individuals either realize large gains during booms or experience large losses during recessions. That is to say that downward mobility might therefore

not take place equally across the whole income distribution or, if it does, it happens at different rates.

Exclusion implies an inherent difficulty for individuals who want to move out of dire conditions by neglecting them access to services, consumption goods and assets. Societies with a higher incidence of exclusion should then report lower upward mobility than societies with more equal opportunities (as reported for Chile by Scott, 2000). Along similar lines, high and persistent inequality is consistent with lower mobility, although the causal relationship still requires an empirical investigation.

The analysis of mobility and the mechanisms through which it operates constitute important tools for policymaking. When governments know the details about the most effective ways of moving people up or preventing them from falling down the income ladder, the design of policies becomes more effective. Also, when governments better understand the tools to cope with downward mobility, the welfare losses associated can be at least ameliorated. That is, an understanding of the factors behind mobility becomes a must.

This paper is a contribution to the limited literature on regional income mobility. There are several reasons for choosing a regional focus, but the most important one, from a policymaking stance, is that it allows for country-specific effects to be compared with sub-regional and Region-wide effects. Of course, the analysis of regional mobility has shortcomings of its own, such as the need to exclude countries and periods from the analysis due to data limitations, as explained below. After this introduction, Section 2 defines mobility along the lines of the categorization in Fields (2005) and discusses the methodology used to estimate *absolute* income mobility, *conditional* mobility (after controlling for personal, socioeconomic and geographical features of households), country-specific income mobility and poverty mobility (defined as slipping into or moving out of a poverty threshold). Section 3 describes the construction of a pseudo-panel composed of 14 Latin American countries for the period 1992-2003. The section also describes income and poverty trends for the constructed cohorts, which are innovatively constructed as biannual averages. This strategy ensures a pseudo-panel balance and avoids estimation caveats faced by unbalanced panels. Section 4 discusses the results and Section 5 provides concluding remarks.

2. The Estimation of Mobility

The measurement of income mobility, which started with Lillard and Willis (1978), basically involves the establishment of a relationship between past and present income:

$$y_{i,t} = \beta y_{i,t-1} + \mu_{i,t} \qquad (1)$$

where $y_{i,t}$ is the total income for household *i* at time *t*, μ_{it} is a disturbance term and the parameter β, the coefficient of the slope in a regression of the income over its lagged value, is the measure of mobility. Fields (2005)[1] refers to this as *time-dependence* mobility and it will be the focus of our paper. A value of β equal to 1 represents a situation with no income convergence; a value of β below 1 corresponds to a situation in which there is convergence, while zero represents an extreme case in which mobility would be total (as there would be no relationship between past and present incomes). Although there are no ex-ante restrictions on the range of values that β should take, they are regularly within the [0,1] interval. Additionally, the mobility estimator obtained from (1) is called *unconditional* in the sense that it does not take into account the presence of covariates (other than past income) that may explain present income. When the estimation is performed with additional controls, we have the time-dependence conditional estimation of mobility:

$$y_{i,t} = \beta y_{i,t-1} + \delta X_{i,t} + \mu_{i,t} \qquad (2)$$

where *X* is a vector of covariates and δ is intended to measure the impact of those covariates on income. Given that this sort of analysis attempts to follow individuals (or households) over time, the quintessential data tool has been panel data. Unfortunately, such data have only recently become available in Latin America, and the few data panels presently in existence cover only short periods.[2] This has constituted an important barrier to the analysis of mobility in the Region. The development of pseudo-panel techniques that was initiated by Deaton (1985) has been an

[1] Fields (2005) also summarizes other definitions of mobility: positional movement (a measure of individual's changes in economic positions); share movement (a measure of changes in individual's shares of incomes); income flux (size of the fluctuations in individual's incomes but not their sign); directional income movement (how many people move up or down and by how many dollars); mobility as an equalizer of longer-term incomes (a comparison of the inequality of income at one point in time with the inequality of income over a longer period). Time-dependence mobility is the definition most vastly used.

[2] This is the case of a three-period Chilean panel available in the CASEN survey of 1996-1998-2006 or a two-period panel in El Salvador, for rural areas. A panel can also be constructed for Mexico, using the *Encuesta Nacional de Empleo Urbano (ENEU*), which has a rotating panel, with households followed for five consecutive quarters. Also

interesting alternative to overcome this data limitation. A pseudo-panel is formed creating synthetic observations obtained from averaging real observations with similar characteristics (regularly, birth year) in a sequence of repeated cross sectional data sets. In this way, the synthetic units of observations can be thought as being "followed" over time. The model then requires an appropriate modification:

$$\bar{y}_{c(t),t} = \beta_c \bar{y}_{c(t-1),t-1} + \delta_c \bar{X}_{c(t),t} + \mu_{c(t),t} \qquad (3)$$

where the individual index, *i*, has been replaced by a cohort index, $c_{(t)}$, that is time-dependent. Analogously to equation (1), the slope β_c is the parameter of interest. The literature has then focused on exploring the conditions under which such a parameter can be consistently estimated, provided the data limitations imposed by a set of repeated cross-sections (instead of real panel data). The works of Browning, Deaton and Irish (1985), Moffit (1993), Collado (1997), Girma (2000), McKenzie (2004), Verbeek and Vella (2002) and Antman and McKenzie (2005), among others, have provided such sets of conditions that the interested reader can explore.

Not surprisingly, there are pros and cons about the use of pseudo-panels for the analysis of mobility. At least three arguments may be cited in its favor. The first is that they suffer less from problems related to sample attrition (because the samples are renewed at every period). The second is that, being constructed by averaging groups of individual observations, they also suffer less from problems related to measurement error (at least at the individual level). A third argument in favor of the use of pseudo-panels, a more practical one, is that because of the wide availability of cross-sectional data it is possible to construct pseudo-panels that are appropriately representative, covering long periods back in time, substantially more than what can be covered by real panels. The main argument against its use has to do with the fact that the decision about the clustering of observations in cohorts depends on a trade-off (number of cohorts vs. number of observations in each cohort) on which the literature has not yet been conclusive. The larger the number of cohorts, the smaller is the number of individuals per cohort. On the one hand, one would like to have a large number of cohorts so that the regressions performed with the resulting pseudo-panels suffer less from small sample problems. On the other hand, however, if the number of observations per cohort were not large enough, the average characteristics per cohort

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Argentina (1988 to date), Brazil (1980 to date), Peru (1991-1997), and Venezuela (1994-1999) have household surveys with similar design. See Fields et al. (2007) for additional details.

would fail to be good estimates for the population cohort means. In addition, Antman and McKenzie (2005) note two caveats from the use of pseudo-panels. They may introduce biases if the average cohort household fails to account for changing trends in household dissolution and creation (such as,for instance, migration). Also, intra-cohort mobility is utterly ignored. In this vein, Girma (2000) indicates that intra-cohort homogeneity in pseudo-panels (consistent with the notion of "representative" agents) is too strong an assumption.[3] In any case, Bourgignon, Goh and Kim (2004) demonstrate that results from pseudo-panel and panel data may lay reassuringly close. Their results refer to individual earnings and poverty dynamics for Korea, although they warn about the validity of certain assumptions underpinning their estimates (mainly, that labor mobility is independent of individual earnings).

The pseudo-panel approach has been recently undertaken in the Latin American Region to estimate mobility as defined above, at least by Navarro (2006) for Argentina and by Calónico (2006) for a set of eight countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Uruguay and Venezuela).[4] The latter found low mobility patterns for all these countries during the period 1992-2002. When trying to compare the results from both papers for Argentina we still found some differences. First, the papers use different time spans. While Navarro computed mobility for the period 1985-2004, Calónico did so for 1992-2003. Second, the studies differ in the concept of income that is used. While Calónico uses monthly labor incomes, Navarro based her analysis on hourly wages received by individuals in their main occupation. Third, Navarro narrows her estimations to the conglomerate of Gran Buenos Aires in Argentina in order to construct a much larger pseudo-panel. All in all, Navarro (2006) presents a higher degree of income mobility than Calónico (2006), a result supported by Albornoz and Menendez (2004) and Fields and Sánchez-Puerta (2005) using panel data for Argentina. Likewise, Antman and McKenzie (2005) report for specific age-education cohorts in Mexico between 1987 and 2001 little mobility between the earnings of rich and poor households but rapid convergence in the average household's earnings, suggesting higher levels of conditional mobility.

[3] Girma's proposed method, a pair-wise quasi-differencing approach, allows for estimated parameters to vary freely across groups and allows for the presence of unobserved individual specific heterogeneity within each cohort. However, it imposes an equicorrelation structure within a group-time cell. In other words, it also imposes some degree of homogeneity within groups.

[4] Also, the study of mobility using real panels has been undertaken in Fields et al. (2006) for Argentina, Mexico and Venezuela; and Albornoz and Menendez (2004) for Argentina.

Other studies have explored income (earnings) mobility in the context of pro-poor growth, typically using panel data. Gottschalk (1997), Fields and Ok (1999), Ravallion and Chen (2003), Grim (2007), among others, explore whether economic growth has favoured the poor in the United States, the United Kingdom and other OECD countries, as well as China, Peru and Indonesia. They typically find different growth rates of earnings among the poor and the non-poor. Increasing mean individual and family earnings consistent with decreasing poverty coexist with increasing inequality and limited mobility. Interestingly, in Peru and Indonesia, Grim (2006) underscores the relevance of transfer policies as he observes significant mobility among originally poor households moving out of poverty and non-poor households moving into poverty despite low or negligible economic growth rates. In contrast, Gottschalk (1997) reports that despite an increase of 27 percent in per capita incomes, poverty in the US between 1973 and 1994 increased from 11.1 percent to 14.5 percent.

Our study complements previous work in both scale and scope. We examine 14 countries during the period 1992 to 2003, analyzing not only the mobility estimator, β , but also changes in the "poverty incidence" for the pseudo-individuals, analyzing the determinants of them. For that purpose, for each cohort we compute the percentage of individuals whose income is below a "poverty threshold" (poverty incidence within the cohort) and then, denoting that percentage by *p*, we estimate the determinants of the changes in poverty incidence in the cohorts:

$$\Delta p_{c(t),t} = \delta_c \overline{X}_{c(t),t} + \mu_{c(t),t} \qquad (4)$$

In this way we are able to provide estimators of the role of initial conditions on income mobility and the transitions up and down poverty lines.

3. Data

The raw data for this study comes from national household surveys of 14 Latin American countries in the Region: Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Honduras, Mexico, Panama, Paraguay, Peru, El Salvador, Uruguay and Venezuela. Although household surveys are not uniform it is possible to harmonize them to make statistics comparable across countries and over time. This survey harmonization has been done by the Research Department of the Inter-American Development Bank using similar definitions of variables in each

country/year, and by applying consistent methods for data processing. Countries collect their surveys in different seasons, different years, with different frequencies and coverage (urban or national). Table 1 in Annex 1 details these features for the countries in our pseudo-panel.

To maximize the number of countries and periods we considered two-year periods (instead of annual periods) and restricted the panel to one survey round (or sub-period) per country and period. In this way, we selected the survey collected in the even year in each two-year period (that is, 1992 in the 1992-1993 period). Also, we selected the latest available round in a given year for those countries with multiple annual sub-periods (this was the case for Argentina, Colombia, Peru and Venezuela). Interestingly enough, countries in this pseudo-panel collect their surveys typically in the second half of the year, with 11 out of 14 countries collecting surveys during the fourth quarter of the year. It would be therefore expected that seasonality effects, if present, are similarly distributed in the pseudo-panel.[5] We respected the surveys' coverage and did not exclude countries with sub-national coverage (only Argentina and Uruguay have sub-national coverage).[6]

Although this design entailed a loss of information from available surveys in some countries, it allowed us to reach the best combination of number of countries (in this case, fourteen) with number of periods (in this case, six).[7] In other words, we dismiss the "excess" of information for some countries in favor of more countries and a lengthier pseudo-panel. Nonetheless, this implies that our interpretation of the dynamics is no longer tied to the customary annual period but to a two-year period. All in all, we construct the pseudo-panel with data from 14 countries using surveys between 1992 and 2003, focusing on household heads aged 21 to 65.

A particularly rigorous approach was taken to the harmonization of household income in the surveys to ensure a comparable definition of household incomes across countries. Based on

[5] In any case, we ensured that the income variable referred to the same reference period: the previous month to the collection of the survey. Other variables used in the analysis such as gender, sex, age, household position, household number are either unchangeable or subject to little (and presumably unbiased) change regardless of the choice of the survey round. It is unlikely that the selection of even years instead of odd years introduces any biases into our estimates. One would not argue that election years, or domestic and international shocks, for example, take place disproportionately in either odd or even years.

[6] In addition, the 1992 survey in Colombia was urban. In Argentina and Uruguay, the urban population covered in the survey represented 62 percent and 80 percent, respectively, of the total population in 2003.

[7] In fact, there is not a period between 1990 and 2006 for which all 14 countries in our sample collected their household survey. Only Argentina, Costa Rica and Venezuela collected household surveys between 1992 and 2003 without interruption.

each survey questionnaire, income from four main sources is considered: monetary labor income, non-monetary labor income, monetary non-labor income and non-monetary non-labor income (see Table 2 in Annex 1). Countries included in the pseudo-panel share the same sources of labor monetary income: labor (approximately 75 percent of the Region's average household incomes) and non-labor monetary incomes (accounting for the remaining 25 percent). Labor monetary incomes include salary and wages from the main and secondary activity, as well as tips, paid over-time, Christmas or New Year bonuses (called '*aguinaldo'*) and commissions. Non-labor income includes incomes from interest, dividends, pensions, remittances, transfers from other relatives and friends, disability incomes and other benefits. Once individual incomes are aggregated, household income is constructed by adding the incomes of all members of the household.

All incomes were deflated using the Consumer Price Index of each country and year, and we further adjusted incomes using Purchasing Power Parity, as reported in the World Development Indicators. Apart from the specific treatment that each country's National Institute of Statistics do to their Household Surveys (adjustments by national accounts or imputations for non response and missing values), no additional income adjustments were done in the harmonization process. [8] Countries that fail to report non-labor incomes in any of their household surveys were excluded from the pseudo-panel (as it was the case with Dominican Republic, Guatemala, Nicaragua and Ecuador). We also excluded from the analysis data from Brazil and Mexico for the year 1992 as their income variables showed dramatic fluctuations around that period, likely as a result of high inflation or currency fluctuations.

Birth cohorts include household heads born in seven-year spans, starting with those born between 1927 and 1933 and ending with those born between 1976 and 1982. Alternative cohort lengths were also attempted without significant changes in the estimated results (See Annex 2).[9] Cohorts are constructed based on year of birth, country of residence and gender. Our pseudo-panel averages observations pertaining to the same survey weighting each observation by the corresponding expansion factors in each survey. As a result, the constructed pseudo-panel follows eight birth cohorts over six periods. This comprises a total of 139,132 individual

[8] Reportedly, only MIDEPLAN does National Accounts adjustments in the CASEN survey in Chile.

[9] In particular, four and six-year spans were attempted and the estimates of the time-dependence mobility did not change substantively. Tables 1 and 2 in Annex 2 report these estimates. Neither the magnitude of the parameters, nor the significance of the controls nor the R^2 of each specification change substantively.

observations collapsed into 1,024 synthetic observations that constitute a representative sample of household heads for the 14 countries under consideration. This number of observations is the result of collapsing the dataset by country (14 countries), gender (1 for men and 0 for women) and the eight birth cohorts (from 1927-33 to 1976-82), for the six periods of analysis. That would imply a total of 14x2x8x6=1,344 synthetic observations. However, some countries had missing household surveys for some years (especially the earlier ones), and others were not usable due to the lack of a possibility to harmonize variables, as mentioned earlier. As a result the number of synthetic observations was reduced to 1,024. Table 1.below reports the distribution of synthetic observations by period and across birth cohorts as well as the distribution of initial observations from the household surveys used in the analysis (that is, before collapsing the dataset by country gender and cohort). Finally, the last column in Table 1 also shows the distribution of original observations after being expanded using population factor weights in the household surveys.

Table 1. Cohort Sizes

Year Birth Cohort	Period T1 1992-3	T2 1994-5	T3 1996-7	T4 1998-9	T5 2000-1	T6 2002-3	Total synthetic Individuals	Total Household Observations (unweighted)	Total Household Observations (weighted)
1927-33	12	20	26	22	0	0	80	4,493	18,876,806
1934-40	12	20	26	28	28	28	142	12,809	74,633,988
1941-47	12	20	26	28	28	28	142	17,795	107,681,592
1948-54	12	20	26	28	28	28	142	23,550	148,562,542
1955-61	12	20	26	28	28	28	142	27,527	188,099,586
1962-68	12	20	26	28	28	28	142	26,986	221,419,153
1969-75	12	20	26	28	28	28	142	17,672	227,347,847
1976-82	0	0	8	28	28	28	92	8,300	103,806,584
Total	84	140	190	218	196	196	1,024	139,132	1,090,428,098

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

This pseudo-panel exceeds both the depth and breath of other pseudo-panels for the Latin American region. Also, it shows the implications of striking a balance between a relevant number of cohorts and a meaningful size of cohort. An insufficiently large number of cohorts may cause pseudo-panel estimations to suffer from small sample problems, while an insufficiently large cohort size diminishes the quality of estimates for population cohort

characteristics (McKenzie, 2004). In the case of this pseudo-panel, the result of multiple periods, birth cohorts and cohort criteria is the small number of observations for some of the cells, which should be born in mind at the time of interpreting our estimates.

Another special consideration of this pseudo-panel design is in order as gender of the household head has been considered one of the variables to construct the pseudo-panels. The concern may arise in light of the sustained trend of increasing female participation in Latin American labor markets (which, according to CEPAL 2009, reached about 50% in 2007 jumping more than 10 percentage points from 1990). It is believed that this may have contributed to sizeable household structure transformations with corresponding socio-demographic transitions and sociological modernization processes such as increasing migration, divorce patterns and life expectancy in Latin America during the Nineties (Arriagada, 2007).

It should be noted, however, that these structural transformations do not necessarily imply substantive changes in the gender distribution of household headship. In fact, the largest changes have taken place *within* urban bi-parental households: the proportion of those households with both parents working have increased 8 pp in detriment of those where the spouse did not work. Between groups, however, the share of bi-parental households vis-à-vis nuclear households decreased more modestly by some 4 pp, fully absorbed by female-headed single households which went up from 13% to 17% of the total (out of which 3 pp are explained by working female heads and 1 pp by not working female heads).[10] In other words, female labor participation trends have not massively increased female headship, although have clearly improved their contributions to household budgets and decision-making (ILO/UNDP 2009, p. 50; Arriagada, 2007).

Table 2 provides the basic descriptive statistics of the pseudo-panel: socioeconomic and geographical characteristics of synthetic household heads of the constructed cohorts. The average per capita household income in the pseudo-panel is about US$456 per month with a standard deviation of US$419 in PPP-adjusted real terms. The average household head is 43 years old and

[10] Statistics on female-headed households in the present study are consistent with those regional results. Thus female-headed household shares have increased between 1992 and 2003 by an accumulated 4.4 percent points or an annual increase of 1.3 percent point. These increases are robust to periods and countries considered across Latin America: ILO/UNDP (2009) report an accumulated increase of 7.9 percent points or 1.1 pp annual increase for 19 Latin American countries between 1990 and 2007. Likewise, Chant (2002: table 1) reports an annual average increase in female headed households of 1.1% between 1987 and 1999 for eleven countries considered in our study. Buvinic and Gupta (1997, table 2) report also annual increases of 1.2% in the share of household headed by females for the Eighties decade.

has seven years of education. Regarding attainment, 10 percent of household heads have no education; 44 percent have primary education (either incomplete or complete); and 33 percent have started or completed secondary education. The remaining 14 percent have college education. The average household has almost two children. Table 2 also reports the distribution of observations by sub-regions.[11] The two measures of poverty incidence, also reported in Table 2, deserve special mention. They capture the fraction of households (or, equivalently, household heads) within each cohort whose per-capita household income falls below the two most common internationally utilized thresholds of 1 and 2 dollars a day.

Table 2. Data Descriptive Statistics

Variable	Number of observations (in pseudo-panel)	Mean	Standard Deviation	Average inter-period variation (%)
Log Per Capita Household Incomes	1,024	5.36	0.68	-3.64%
Poverty incidence (1 dollar a day)	1,024	0.45	0.16	1.60%
Poverty incidence (2 dollars a day)	1,024	0.64	0.11	0.87%
% Female-headed households	1,024	0.50	0.50	0.11%
Age	1,024	43.22	13.84	0.02%
Years of Education	1,010	7.15	2.26	0.89%
Schooling Attainment				
No Education	1,024	0.10	0.11	-10.10%
Primary incomplete	1,024	0.23	0.13	-6.56%
Primary complete	1,024	0.21	0.09	-4.37%
Secondary incomplete	1,024	0.19	0.10	3.97%
Secondary complete	1,024	0.13	0.07	3.99%
Tertiary incomplete	1,024	0.07	0.07	2.37%
Tertiary complete	1,024	0.07	0.05	-0.31%
Number of Children aged 0 to 16 years	1,024	1.84	0.69	0.75%
Number of other relatives living in the household	1,024	0.60	0.40	-2.29%
Dwelling Characteristics Index	616	-.265	1.93	15%
Sub-Region				
Southern Cone	1,024	0.38	0.49	---
Andean Region	1,024	0.29	0.46	---
Mexico and Central America	1,024	0.33	0.47	---

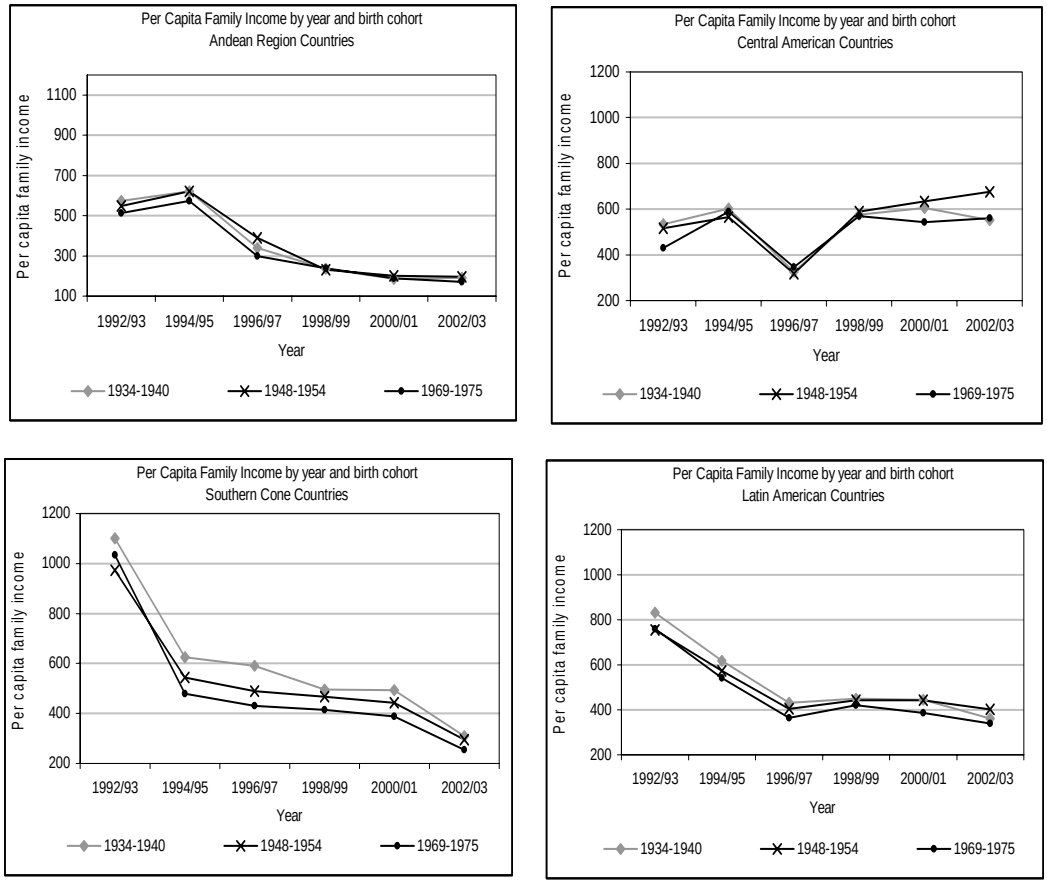
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

[11] The Southern Cone includes Argentina, Brazil, Chile, Uruguay and Paraguay; the Andean Region includes Bolivia, Colombia, Peru and Venezuela; Central America includes Costa Rica, El Salvador, Honduras, Mexico and Panama.

Interestingly, the variable measuring dwelling characteristics captures the quality of the living conditions of the households. The variable is computed using information about the quality of the materials used for the walls, the number of rooms, whether the household has a bathroom connected to a sewerage system inside the house or not, and access to a source of safe water and electricity. This variable, which we refer to as the Dwelling Characteristics Index, is constructed as the first principal component that explains most of the variance of the characteristics mentioned above. By construction, it has a zero-mean and a symmetric distribution around it. Table 2 also reports the distribution of observations by sub-regions and the average inter-period changes of the incumbent variables used in the analysis. Inter-period changes show that despite the number of years of education have only slightly increased on average, there are important changes in terms of educational attainment: sizeable decreases in the proportion of household heads with low education (primary or less) and significant increases in the proportion of secondary education household heads. Other demographic and personal characteristics have changed little. Living conditions (approximated by the Dwelling Characteristics Index) have improved substantially, even though their improvement does not follow a similar trend to that of per capita household incomes. These trends of decreasing aggregated or average incomes may conceal diverging trends indifferent regions of the income distribution, as reported by Gottschalk (1997) in the United States (see previous section). If that is the case, the incidence of poverty may not necessarily follow the same trend as that of average incomes, as is the case in Latin America during the 1990s (as indicated by trends in poverty and per capita GDP reported in CEPAL, 2007).

Figure 1 below depicts regional and sub-regional trends of per capita monthly household incomes, PPP-adjusted, for selected birth cohorts. Even when trends differ across sub-regions, within each of them the cohorts of young adults, prime-age and retirees follow similar patterns. This constitutes, although rudimentary, a prima facie evidence of low patterns of mobility in the region, along the lines of what Calónico (2006) found.

Figure 1. Income Trends by Sub-Region



Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Interestingly, these trends differ from nominal per capita household incomes and even PPP-adjusted national per capita GDP. For all the sub-regions and the Region as a whole, per capita income and GDP increased in the 1990s, as reported by CEPAL (2007), and were accompanied by a substantive decrease in poverty during the same period from 48 percent in 1990 to 39 percent in 2005. There are at least two reasons why these trends may differ. First, the latter trends refer to the average per capita income and inform little on the income trends of poor households. What we know about such changes (as reported below in Table 3) is that sizeable and symmetric movements take place into and out of poverty in the Region for the period considered. As a result, even if the incidence of poverty is to change, large overall change should not be expected, as there are substantive composition effects from both households leaving and

entering poverty. This evidence in Latin America confirms evidence reported in the United States pointing to diverging trends in GDP growth, mean earnings and poverty incidence (see Gottschalk, 1997). Second, while Figure 1 reports PPP-adjusted real trends, GDP trends refer to the nominal purchasing power of each national currency in its respective country. That is, Figure 1 reports the real purchasing power of local currencies in the international economy or, more specifically, how the purchasing power of a Chilean peso or a Venezuelan Bolivar, for instance, would fare in the US over time. That purchasing power has typically declined over time, partly due to the increasing inflationary trend in the US in the same period. Of course, this deterioration of international purchasing power of a household in a given country should not necessarily bear comparable effects in terms of its domestic purchasing power and, ultimately, poverty status.

4. Estimations of Income Mobility and the Determinants of Poverty Changes

In this section we provide estimates of income mobility (Equation 3 in Section 2) and the determinants of changes on poverty incidence within the cohorts (Equation 4 in Section 2). The observational unit is the household, with additional variables capturing the personal characteristics of the household head. The dependent variable used in our estimates is the log of per capita household incomes for the period under consideration, which Fields and Ok (1999) demonstrate to be the only measure of income movement to have a set of desired properties (scale invariance, symmetry, multiplicability and additive separability). As outlined in the data section, our variable results from the sum of labor and non-labor incomes of all household members divided by the total household size as reported by the household survey selected in each two-year period. Table 3 below reports estimates of time-dependence income mobility, measured as the elasticity of current incomes with respect to past incomes. The results are reported for the whole Region without any further controls, with sub-region specific controls (three sub-regions: Southern Cone, Andean Region and Mexico and Central America) and with country-specific controls. These correspond to the columns of Model I, Model II and Model III, respectively. To the extent that these models are controlling for intra-regional variability but not for individuals' characteristics, we consider these estimators as "unconditional" according to the terminology introduced in Section 2. The results confirm a very low degree of income mobility

for Latin America, as previously found in the literature. The estimate of the unconditional mobility indicator, β , is as high as 0.966 (when no control is considered).

Table 3. Estimates of Time-Dependence Income Mobility in Latin America, Unconditional Mobility

Dependent variable: log of real per capita household income (PPP) at time t	Model I	Model II	Model III
Estimated Income Mobility - Equation (3)			
β	0.966 [645.45]***	0.946 [342.54]***	0.949 [199.03]***
R-squared [12]	0.9981	0.9983	0.9986
Controlling for			
Sub-Regional Dummies	No	Yes	No
Country Dummies	No	No	Yes
Observations	800	800	800

Absolute value of t statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

The estimated mobility changes substantially after controls are introduced. Taking Model III as a point of departure and gradually adding controls for characteristics of the household head (age, gender and educational attainment), number of children 16 years old or less living at home and the dwelling characteristics index described above, the estimated mobility falls to almost two-thirds of its unconditional value.[13] This evidence suggests that a misleading attribution of demographic and socioeconomic impacts to past incomes may well generate a false sense of limited time-dependence income mobility.

[12] To estimate time dependence income mobility, the regression model uses the lagged of real per capita household income. For that reason the number of total observations is reduced to 800.
[13] Note that adding the dwelling characteristics index reduces the number of observations from 800 to 500. To discard the possibility of sample composition effects driving the results, we also estimated Models IV and V using only the 500 observations included in Model VI. The results are almost identical. The estimation of Model IV using the same sample as in model VI delivers β=0.632 [42.19]***, R^2=0.9994, while for Model V β=0.605 [41.95]***, R^2=0.9995.

Table 4. Estimates of Time-Dependence Income Mobility in Latin America, Conditional Mobility

Dependent variable: log of real per capita household income (PPP) at time *t*	Model IV	Model V	Model VI
Estimated Income Mobility - Equation (3)			
B	0.640	0.608	0.601
	[53.54]***	[52.47]***	[42.72]***
R-squared	0.999	0.999	0.999
Controlling for			
Characteristics of the household head (Age, gender and educational attainment)	Yes	Yes	Yes
Number of children (16 years old or less)	No	Yes	Yes
Dwelling Characteristics Index	No	No	Yes
Country dummies	Yes	Yes	Yes
Observations	800	800	500

Absolute value of *t*-statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

A country-specific analysis of mobility should reveal the existing heterogeneity across the Region. Table 5 reports country-specific estimates of mobility for Models I, IV, V and VI. As in the aggregate, the sole introduction of household head characteristics notably reduces the measured mobility. The most notorious cases are Panama and Uruguay where the estimators of mobility were reduced to less than one-third of their unconditional values. The further introduction of controls for children (16 years old or less) at home and dwelling characteristics further reduced the estimated conditional mobility, but to a lesser extent, in most countries (Brazil, Colombia and Costa Rica being interesting exceptions).

The estimates of income mobility in Table 5 are expressed as elasticities, which allows for a meaning comparison across countries with different starting income levels. Estimated elasticities vary widely across country, as predicted. High levels of conditional time-dependence income immobility (β exceeding 0.75) are found only in Brazil, Colombia and Costa Rica, while the rest of the Region shows higher levels of mobility (lower β). El Salvador is a special case since its unconditional (as well as conditional) (im)mobility parameter, β, exceeds 1. In any case, previous period's incomes predict very closely next period's lower incomes. Countries

such as Chile or Argentina show moderate immobility (β between 0.6 and 0.75) compared with other "mobile" countries (β below 0.6). These results confirm that higher mobility is found across countries when countries are considered separately than when countries are being pooled regionally (as was the case with results for Argentina using the separate estimations of Navarro (2006) separate and the pooled estimations of Calónico (2006)led estimations). Also, our results are consistent with the finding of restrained mobility in Chile reported by Contreras et al. (2004). Even though this limited evidence does not allow for generalizations, it may be that Region-pooled estimates average out different country-specific patterns of income mobility.

Table 5. Country-Specific Estimates of Unconditional and Conditional Time-Dependence, Income Mobility in Latin America

Dependent variable: log of real per capita household income (PPP) at time t	Unconditional	Conditional		
Country	Model I	Model IV	Model V	Model VI
	β	β	β	β
Argentina	0.975 [192.90]*** (N=70 : R^2=0.9981)	0.746 [2.84]*** (N=70 : R^2=0. 9980)	0.662 [2.40]** (N=70 : R^2=0. 999)	0.674 [1.96]* (N=70 : R^2=0. 999)
Bolivia	0.973 [125.66]*** (N=68 : R^2=0.9958)	0.423 [8.02]*** (N=68 : R^2=0. 9996)	0.289 [4.77]*** (N=68 R^2=0. 999)	0.244 [1.09] (N=26 R^2=0. 999)
Brazil	0.982 [840.59]*** (N=56 : R^2=0. 999)	0.803 [19.65]*** (N=56 : R^2=0. 9997)	0.829 [22.03]*** (N=56 R^2=0. 999)	0.855 [15.82]*** (N=56 : R^2=0. 999)
Chile	0.995 [333.34]*** (N=70 : R^2=0. 9994)	0.499 [4.65]*** (N=70 : R^2=0. 9998)	0.476 [4.35]*** (N=70 : R^2=0. 999)	0.605 [5.34]*** (N=56 : R^2=0. 999)
Colombia	0.964 [204.16]*** (N=70 : R^2=0.9983)	0.781 [19.11]*** (N=70 : R^2=0. 999)	0.822 [20.97]*** (N=70 : R^2=0. 999)	0.808 [22.41]*** (N=70 : R^2=0. 999)
Costa Rica	0.973 [238.98]*** (N=70 : R^2=0.9972)	0.689 [7.44]*** (N=70 : R^2=0. 9996)	0.693 [7.40]*** (N=70 : R^2=0. 999)	0.781 [5.52]*** (N=28 : R^2=0. 999)
Honduras	0.963 [123.32]*** (N=44 : R^2=0. 999)	0.482 [3.61]*** (N=44 : R^2=0. 9991)	0.187 [1.70]* (N=44 R^2=0. 999)	-- -- --

Mexico	0.945 [133.95]*** (N=56 : R^2=0.9969)	0.43 [14.29]*** (N=56 R^2=0. 9998)	0.432 [17.20]*** (N=56 R^2=0. 999)	0.431 [17.02]*** (N=56 : R^2=0. 999)
Panama	0.999 [281.24]*** (N=58 : R^2=0.9993)	0.248 [2.46]** (N=58 R^2=0. 9998)	0.079 [1.14] (N=58 R^2=0. 999)	-- -- --
Peru	0.996 [175.12]*** (N=44 : R^2=0.9986)	0.746 [7.58]*** (N=44 R^2=0. 9997)	0.060 [0.57] (N=44 R^2=0. 999)	-- -- --
Paraguay	0.955 [257.19]*** (N=42 : R^2=0.9994)	0.981 [9.30]*** (N=42 R^2=0. 9995)	0.904 [7.92]*** (N=42 R^2=0. 999)	0.537 [6.50]*** (N=42 R^2=0. 999)
El Salvador	1.005 [306.65]*** (N=28 : R^2=0.9997)	0.941 [5.11]*** (N=28 R^2=0. 999)	1.121 [4.64]*** (N=28 R^2=0. 999)	0.525 [2.81]** (N=28 R^2=0. 999)
Uruguay	0.932 [136.44]*** (N=70 : R^2=0.9963)	0.270 [7.91]*** (N=70 R^2=0. 9991)	0.269 [7.84]*** (N=70 : R^2=0. 999)	-- -- --
Venezuela	0.896 [151.62]*** (N=54 : R^2=0.9977)	0.582 [18.14]*** (N=56 R^2=0. 9990)	0.558 [15.52]*** (N=56 R^2=0. 999)	0.484 [12.73]*** (N=54 R^2=0. 999)
Controlling by Characteristics of the household head N. of children (16 years old or less) Dwelling characteristics	 No No No	 Yes No No	 Yes Yes No	 Yes Yes Yes

Absolute value of t statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys

Then, we develop an indicator that captures changes in poverty incidence within the cohorts over time, that is, mobility around a threshold that can be thought as a poverty line. We perform the exercise for the widely used international poverty cut-offs of US$1/day and US$2/day per person.[14] While some critiques view this methodology as either consistently underestimating the number of the poor (Reddy and Pogge, 2003) or grossly overestimating them

[14] World Bank (1990) introduced the use of these measures. The construction of the US$1/day line is based on an average of six country-specific extreme poverty lines (Bangladesh, Indonesia, Kenya, Morocco, Nepal and Tanzania) that are subsequently expressed in national 1985 PPP$ terms, and updated in 2000 to US$1.08 to reflect 1993 PPP$.

(Sala-i-Martin 2006),[15] Others consider that these income or consumption-based lines overlook other dimensions of poverty (UNDP 2006), and recommend the inclusion of early death, adult illiteracy, child malnutrition and the population's access to safe water in the calculation of poverty (which has, in effect, resulted in the construction of the Human Poverty Index). Notwithstanding the relevance of such criticisms, they are not the focus of the paper. We follow the vast tradition of considering the US$2/day per person international poverty line as an appropriate threshold for international comparisons across the typically middle-income economies in Latin America (and further compare them with estimates accruing from a US$1/day line). For the construction of such indicator we first compute the poverty incidence within each cohort or synthetic observation (that is, the percentage of households that have an average per capita income below the poverty cut-offs). Then, we subtract the poverty incidence of each synthetic observation in one period with the one observed in the previous period. With this procedure we obtain a measure of the changes in poverty incidence for each cohort. Having constructed the indicator of changes in poverty incidence for the pseudo-observations we then estimate the determinants of those changes using equation (4) in Section 2. Being the case that the dependent variable, by construction, is bounded between –1 and 1, the estimation is performed using a two-limit Tobit model with these two extremes as lower and upper limits respectively. The aggregate results are reported in Table 6.

[15] For a recent debate on the use of country-specific poverty lines and national accounts in the estimation of global poverty and inequality see Sala-i-Martin (2006) and Milanovic (2006).

Table 6. Determinants of Changes in Poverty Incidence in Latin America, Tobit Models, $1/Day and $2/Day

Dependent variable: Change in poverty incidence in the cohort	*1 U$S a day per person*			*2 U$S a day per person*		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Initial Poverty level	-0.348	-0.366	-0.561	-0.323	-0.339	-0.507
	[11.91]***	[11.33]***	[16.64]***	[12.06]***	[11.58]***	[16.96]***
Age	-0.019	-0.02	-0.017	-0.013	-0.014	-0.01
	[8.30]***	[8.71]***	[8.24]***	[7.08]***	[7.30]***	[5.88]***
Age^2	0.0002	0.0002	0.005	0.0001	0.0001	0.003
	[7.08]***	[7.16]***	[6.81]***	[5.56]***	[5.59]***	[4.26]***
Gender [=1 if male]	-0.003	-0.004	0.005	0.0001	-0.001	0.01
	[0.60]	[0.89]	[1.28]	[0.11]	[0.15]	[2.68]***
Primary incomplete or complete	0.143	0.113	-0.325	0.121	0.104	-0.34
	[2.56]**	[2.02]**	[3.74]***	[2.57]**	[2.20]**	[4.58]***
Secondary incomplete or complete	0.019	-0.065	-0.187	-0.012	-0.053	-0.199
	[0.38]	[1.10]	[2.85]***	[0.28]	[1.06]	[3.59]***
Superior incomplete or complete	-0.032	-0.099	-0.497	-0.058	-0.094	-0.534
	[0.61]	[1.75]*	[6.04]***	[1.30]	[1.91]*	[7.47]***
Number of Children	0.08	0.086	0.099	0.065	0.068	0.078
	[9.01]***	[9.49]***	[12.20]***	[8.90]***	[9.16]***	[11.63]***
Dwelling Characteristics Index	0.000	0.002	0.023	-0.001	0.001	0.019
	[0.02]	[0.52]	[5.45]***	[0.57]	[0.21]	[5.14]***
Constant	0.366	0.444	0.762	0.363	0.409	-0.01
	[6.42]***	[7.16]***	[10.05]***	[7.42]***	[7.63]***	[5.88]***
Sub-Regional dummies	No	Yes	No	No	Yes	No
Country Dummies	No	No	Yes	No	No	Yes
LR chi2	174.89	184.28	322.34	189.78	194.00	331.47
Log Likelihood	597.26	601.96	670.99	683.08	685.19	753.92
Observations	500	500	500	500	500	500

Absolute value of *t* statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

The most salient regularities on the estimations of the determinants of changes in poverty incidence are the role of age and gender of the household head, and the poverty incidence in the previous period for each pseudo-observation.[16] Results indicate that higher levels of initial poverty reduce the probability of poverty changes, in any direction, which is reminiscent of the notion of poverty traps (Barro and Sala-i-Martin 2003) and lack of poverty convergence (Ravallion 2009) at a country level: poorer countries have a "dynamic poverty disadvantage"

[16] The number of observations in the regression models varies due to data availability in the Dwelling Characteristic Index.

(Ravallion 2009: 29) regardless of human development levels as they do not grow faster than non poor countries and their growth is not pro-poor. Similarly, at a household level, poor households should expect higher poverty immobility than non-poor households. This is also true for extremely poor households. When estimating a quadratic impact of age, we found it to be statistically significant, with the relationship depicting a U-shape. The age of the household head at which the changes in poverty of her/his household are minimal is around the late 40s. As age increases, poverty mobility decreases up to the late forty's age peak; thereafter, age is associated with higher probability of poverty mobility (which, could be either into or out of poverty). Regarding gender, estimates suggest that the gender of the head of household is not a statistically significant determinant on the chances of either moving out of poverty or falling into it, although the effect varies when countries are being controlled for. In contrast, we find evidence of a positive impact of dwelling characteristics on changes in poverty incidence when controlling for countries.[17]

In theory, the role of number of children at home (or household size) in poverty mobility is unclear. A larger household size implies larger needs to cater for within the household, on the one hand, but also, typically, additional caretakers and higher incentives for adult members to work (as discussed in Cuesta, 2006). Which thrust dominates remains an empirical question. For the sample and period analyzed, our estimates show that the aggregated effect of number of children living in a household is to increase the probability of poverty changes (again, either in or out of poverty).

The role of education of the household head deserves particular discussion. We found positive, statistically significant and economically relevant impacts of education on the changes in poverty incidence, especially among those with primary education (either complete or incomplete), for the specifications that did not make country distinctions (that is, for Models 1 and 2).[18] This implies that primary education (either complete or incomplete) increases the probability of poverty changes. This result does not specify, however, the composition of poverty mobility, that is, whether moves out of poverty dominate over moves into poverty, or viceversa. Interestingly, when introducing the set of country dummies results are reversed. Now,

[17] As outlined above, the Dwelling Characteristics Index is constructed upon the basis of five observable (and comparable across countries) characteristics. When analyzing independently the role of those characteristics in changes in poverty incidence we found that most of the effect of the aggregate index is driven by the quality of the walls of the dwellings. These results are available from the authors upon request.

educational attainments from primary, secondary and tertiary education have all significant impacts on poverty mobility: in fact, they all have a negative impact, which suggests that education reduces poverty changes. In other words, households with higher educational accomplishments are less vulnerable to poverty mobility (in or out of poverty). A second key result is that the role of education on the chances of moving in and out of poverty seems to differ by country. An analysis of the same estimations at the country level promises to deliver interesting insights about it. Table 7 presents estimates of the determinants of poverty mobility at country level for the US$2/day poverty cut-off.

Reassuringly, country results confirm by and large the main conclusions on the impacts from initial poverty level, age, gender, household size and dwelling characteristics reported for the region as a whole in Table 6. Interestingly, education keeps playing a statistical significant role on poverty mobility by country. Tertiary education reduces the probability of poverty mobility at a statistically significant level and consistently across countries except for Chile, which increases that probability. In countries like Chile, Colombia, Costa Rica and Mexico, primary and secondary education also affects the probability of poverty mobility although in different directions. In Chile, again, educational attainment increases poverty mobility, while for the rest, educational attainment decreases poverty mobility.

[18] The base category is No Education.

Table 7. Determinants of the Changes in Poverty Incidence in Latin America Using $2/Day Poverty Line

Dependent variable: Change in poverty incidence in the cohort	*Country*									
	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Mexico	Paraguay	El Salvador	Venezuela
Initial Poverty level	-0.443	-1.168	-0.504	-0.129	-0.543	-0.835	-1.022	-0.815	-0.989	-1.24
	[2.15]**	[17.76]***	[5.79]***	[0.54]	[4.70]***	[8.21]***	[15.27]***	[8.07]***	[4.73]***	[12.09]***
Age	-0.019	-0.008	-0.003	-0.054	-0.017	-0.006	-0.023	-0.009	0	-0.001
	[1.43]	[1.14]	[0.94]	[3.43]***	[2.77]***	[0.71]	[4.02]***	[1.18]	[0.07]	[0.26]
Age2	0.0002	0.00007	0.00002	0.001	0.0001	0.00002	0.0002	0.0001	0.00001	0.00001
	[1.80]*	[0.86]	[0.54]	[3.25]***	[2.13]**	[0.20]	[3.27]***	[1.11]	[0.18]	[0.06]
Gender [=1 if male]	-0.01	0.048	0.007	-0.056	0.009	0.028	0.081	0.018	0.017	-0.002
	[0.43]	[3.42]***	[0.89]	[2.45]**	[0.86]	[2.84]**	[6.03]***	[1.20]	[0.84]	[0.27]
Primary incomplete or complete	-0.608	0.012	-0.284	2.227	-1.195	-1.064	-0.337	-0.319	-0.103	-0.199
	[0.41]	[0.18]	[1.24]	[3.03]***	[5.14]***	[4.05]***	[2.15]**	[1.29]	[0.60]	[1.20]
Secondary incomplete or complete	0.708	0.012	-0.038	1.762	-0.913	-1.29	-0.275	-0.195	0.198	-0.068
	[0.52]	[0.13]	[0.18]	[2.25]**	[4.59]***	[4.49]***	[1.81]*	[0.64]	[0.67]	[0.42]
Superior incomplete or complete	-0.114	-0.757	-0.382	1.318	-1.099	-0.747	-1.191	-0.691	-0.531	-0.436
	[0.08]	[7.54]***	[1.74]*	[1.98]*	[5.31]***	[2.75]**	[8.86]***	[2.61]**	[2.04]*	[3.29]***
Number of Children	0.083	0.078	0.051	-0.008	0.097	0.160	0.163	0.076	0.058	0.089
	[2.06]**	[4.88]***	[5.10]***	[0.15]	[4.87]***	[6.84]***	[10.96]***	[4.50]***	[2.96]***	[5.43]***
Dwelling Characteristics Index	0.022	0.006	0.014	0.200	0.036	-0.103	0.020	-0.014	0.017	0.006
	[0.51]	[0.71]	[0.42]	[5.66]***	[4.98]***	[3.54]***	[2.82]***	[5.41]***	[1.10]	[0.41]
Constant	0.395	1.062	0.429	-0.356	1.635	1.407	1.242	0.951	0.735	1.054
	[0.27]	[6.18]***	[2.07]**	[0.48]	[8.95]***	[5.63]***	[8.64]***	[3.41]***	[2.37]**	[6.46]***
LR chi2	23.95	80.20	46.65	51.00	110.51	60.69	124.22	58.65	54.89	82.40
Log Likelihood	109.77	72.95	152.21	86.47	150.48	64.55	129.79	88.66	81.41	133.52
Observations	70	26	56	56	70	28	56	42	28	54

Absolute value of *t*-statistics in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Results thus far do not single out compositional effects when explaining poverty changes, that is, whether, for instance, higher educational attainments are associated with a higher probability of moving out of poverty vis-à-vis a lower probability falling into poverty. In order to better understand the role of education in the dynamics of poverty, Table 8 reports the estimated impacts of education on poverty mobility disaggregated by educational level; whether or not the level was complete; and changes out of and into poverty separately. Each transition category already controls for the initial poverty position of each pseudo-observation, so the initial poverty variable is no longer included in the regression. Results from a multinomial logit (using "always poor" as baseline category) show that after controlling for country specific effects, socioeconomic and demographic characteristics, the effects of each level of education (and whether or not level was completed) have distinct and asymmetric effects on poverty mobility.

In effect, primary education attainment reduces the probability of moving out of poverty, while secondary and tertiary increases the probability of moving out of poverty. This effect is increasingly stronger as educational attainment increases: completing tertiary education doubles the effect of incomplete tertiary education on moving out of poverty, which in turn is stronger than complete secondary education. Instead, the impact of educational attainment is mostly statistical insignificant when explaining moving into poverty (all other factors controlled for) – a surprising exception being complete secondary education that increases the probability of falling into poverty. Results, therefore, suggest that there are substantive compositional effects in the relationship between education and mobility, which vary by level of education and type of (in and out) poverty transitions.

Table 8. Determinants of the Changes Out of and Into Poverty Incidence in Latin America Using $2/Day Poverty Line

	Remains Poor	From Poor to Non-Poor	From Non-Poor to Poor	Never Poor
Primary incomplete	4.130	-0.037 [3.02]***	0.007 [-0.71]	-4.100 [-2.76]***
Primary complete	4.296	-0.023 [-2.47]**	0.005 [-1.55]	-4.299 [-2.49]**
Secondary incomplete	1.283	0.014 [-0.42]	0.012 [2.76]***	-1.310 [-0.89]

Secondary complete	4.454	0.007 [-2.03]**	0.011 [-0.10]	-4.473** [-2.50]
Tertiary incomplete	5.536	0.025 [-2.48]**	0.014 [0.02]	-5.575*** [-2.96]
Tertiary complete	5.853	0.056 [-1.38]	0.014 [-0.17]	-5.924*** [-3.25]
R^2		0.7204		
Observations		672		
Log Likelihood		-260.46		

Regressions control for age, gender, number of children, dwelling characteristics and countries
Marginal effects evaluated at mean of each variable
Remains poor is the reference category
z statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys

Although the aim of the paper is not to explore country-specific explanations underlying mobility estimates, Table 9 reports some basic descriptive statistics on economic growth, labour and social spending. It also includes educational attainment and inequality of opportunities specific to education, which have been singled out as main factor explaining income mobility differentials in Latin America by Behrman et al (2001), Duryea et al (2003), IADB (2007), World Bank (2004), Paes et al (2009) and Cogneu and Gignoux (2009), Leite (2009). On the one hand, high rates of returns to schooling and/or an expansionary educational policy will increase attainment and reduce income immobility. On the other, the extent to that impact depends on how much inequality of opportunity (that is, current inequalities explained by 'circumstances' at birth) prevents an individual from grasping those inequality-reducing, mobility-enhancing prospects and how close educational attainment is to an upper-bound (see Behrman et al 2001 a lucid explanation).

Table 9 expectedly shows stark differences across countries in terms of economic growth, unemployment, informality, labour income growth and gender-based wage dispersion and rule of law all likely to affect, directly or indirectly, the generation of household incomes. These differences, although difficult to generalize, point towards a better performance among those countries with persistently high immobility after controls are introduced ("conditional immob." row: Brazil, Colombia and Costa Rica): they show typically better averages –although a mixed balance of dispersion– in all those indicators than the rest of countries. Note, however, that the

magnitudes of such differences are not substantive between the two groups, which would suggest that differences in their mobility would not lie on their economic performance during the decade.

Interestingly, educational trends purport the opposite message. Both public spending on education alone and in addition to health remain lower for the persistently immobile group of countries than for the rest in the region throughout the period considered. Both primary and secondary enrolment rates reach substantively lower levels than the group of more conditional-mobile countries. Equality of opportunities in education (that is, the proportion of educational opportunities allocated independent of exogenous circumstances to the individual, see Paes et al 2009) remains lower in more conditional-immobile countries than among the rest, despite in both cases, equalizing progress has taken place across all countries between mid-Nineties and 2005. See columns "opportunity of education index" in Table 8 as reported by Paes et al (2009). [19] Also, these countries in conjunction with Chile are those with the largest returns to tertiary education, close or exceeding 20%, well above primary returns, which may explain the reported differences in the poverty mobility results of these countries vis-à-vis the rest of the region.

Systematic and comprehensive series of rates of return to schooling are hard to come across for the period under consideration. Duryea et al (2003) constitutes an exception, reporting rates of return for secondary and tertiary education for a similar sample of countries and period to this article (see Figure 2). Interestingly, the notion than higher returns are associated with higher mobility does not necessarily hold: Brazil, Colombia and Costa Rica, the most conditional-immobile countries in the region are among the countries with largest returns both on secondary and tertiary education. However, they are the only countries in which temporal trends for rates of return for secondary and tertiary education just move in opposite directions: that is, when, for example, secondary education returns increase over time from the onset to the middle of the decade, tertiary returns decrease in that same period. That would suggest a cancellation effect crippling the ability of rates of returns to affect income mobility in those three countries – at least to population group of urban males ages 30-50.

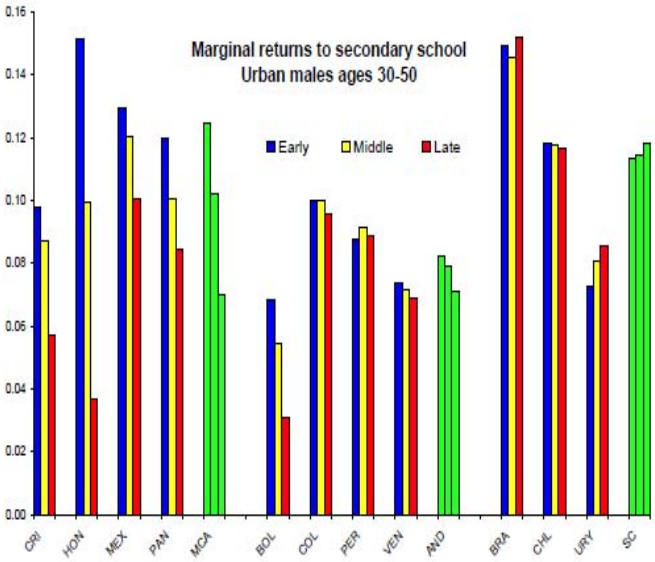
[19] The picture is inconclusive as far as dispersion trends are concerned. A coefficient of variations higher than the regional average is observed at times for the conditional-immobile group, while the opposite is also observed.

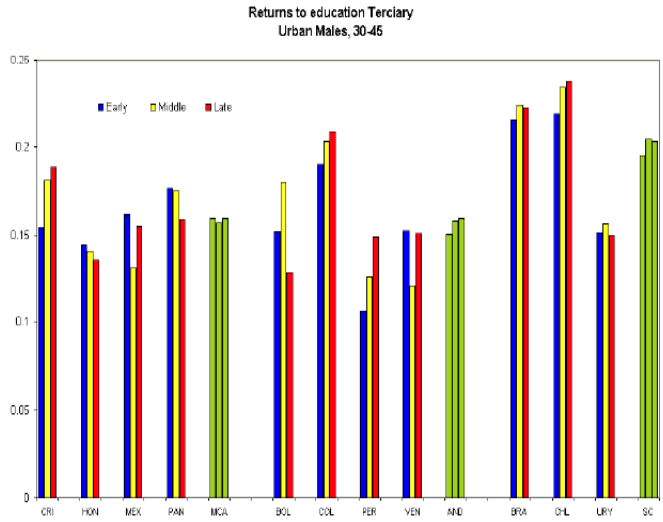
Table 9: Socioeconomic Descriptive Statistics

Country	Per Capita GDP Growth (%)		Unemploym. rate (%)		Informality (%PEA)		Real labor income growth (%)		Female to male urban wage ratio % (at average educ.)		Rule of Law (Score -2.5, +2.5)		Public spending on education and health (%GDP)		Public spending on education (%GDP)		Net primary enrolment (%)		Net secondary enrollment (%)		Opportunity Index for education (%)	
	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Circa 1995	Circa 2005
Argentina	1.1	5.9	14.5	0.3	42.3	1.7	-1.1	-4.6	86.2	5.1	-0.3	-1.6	8.8	0.0	4.2	6.2	99.4	0.6	79.1	2.3	n.a.	89.0
Bolivia	1.1	1.4	6.1	0.3	65.2	1.8	3.7	0.7	74.7	5.9	-0.4	-0.2	8.4	0.1	5.6	12.7	94.9	0.4	70.8	4.2	n.a.	83.0
Brazil	0.9	2.1	7.0	0.4	46.5	1.7	-0.1	-44.6	70.9	7.3	-0.3	-0.2	3.9	0.5	1.7	60.6	90.6	2.3	51.4	52.9	51.0	67.0
Chile	4.0	0.8	8.1	0.2	33.4	4.4	2.8	0.4	76.2	4.1	1.2	0.0	5.9	0.1	3.3	14.9	87.3	1.6	54.4	4.4	85.0	90.0
Colombia	0.9	2.8	13.7	0.3	n.a.	n.a.	2.6	0.7	85.5	2.9	-0.8	-0.1	5.1	0.2	3.4	20.9	83.9	6.9	48.1	15.3	68.0	78.0
Costa Rica	2.6	1.1	5.6	0.2	39.8	4.0	2.5	1.3	85.2	5.9	0.7	0.1	6.1	0.5	4.2	19.8	88.6	1.3	40.1	2.6	70.0	79.0
El Salvador	2.2	0.9	7.1	0.1	52.6	2.7	n.a.	n.a.	85.2	4.4	-0.6	-0.3	3.4	0.1	2.4	20.7	85.0	9.5	42.4	27.6	54.0	65.0
Honduras	1.1	2.2	5.9	0.2	55.1	6.5	n.a.	n.a.	80.5	9.4	-0.8	-0.1	6.5	0.3	4.1	31.0	89.3	0.9	n.a.	n.a.	52.0	62.0
Mexico	1.3	2.8	4.2	0.2	44.9	4.3	1.0	6.7	76.1	3.7	-0.4	-0.1	7.1	0.1	3.7	6.6	98.8	1.3	55.4	11.2	77.0	68.0
Panama	2.0	1.1	16.0	0.1	34.6	7.8	n.a.	n.a.	83.3	4.8	-0.1	-0.2	9.5	0.1	4.5	7.3	97.8	0.9	61.4	2.7	78.0	81.0
Paraguay	-0.5	-5.3	8.2	0.4	61.3	2.5	0.0	71.6	78.2	10.5	-1.0	-0.3	5.8	0.3	3.9	25.9	92.3	3.5	33.5	10.5	68.0	74.0
Peru	2.4	1.6	9.0	0.1	63.7	2.2	-0.5	-11.9	84.0	7.9	-0.6	-0.1	3.9	0.0	2.8	5.0	94.1	4.6	60.8	14.2	72.0	83.0
Uruguay	-2.1	-2.4	12.0	0.3	42.5	5.5	-1.6	-3.6	74.9	6.0	0.6	0.0	4.1	0.2	2.3	26.1	92.6	0.4	n.a.	n.a.	n.a.	85.0
Venezuela	0.8	6.8	12.0	0.3	51.0	9.8	-5.5	-2.5	89.9	6.5	-0.9	-0.3	5.2	0.2	3.9	16.8	87.7	4.2	41.2	42.5	77.0	84.0
Average (all)	1.3	1.6	9.2	0.2	48.7	4.2	0.3	1.3	80.8	6	-0.3	-0.2	6	0.2	3.6	19.6	91.6	2.7	53.2	15.9	68.4	79.1
Conditional Immob.	1.5	2	8.8	0.3	43.1	2.9	1.6	-14	80.5	5.4	-0.2	-0.1	5	0.4	3.1	33.7	87.7	3.5	46.5	23.6	63	74.7
Conditional Mob.	1.2	1.4	9.4	0.2	49.7	4.5	-0.1	7.1	80.8	6.2	-0.3	-0.3	6.3	0.2	3.7	15.7	92.6	2.5	55.5	13.3	70.4	80.4

Source: CEPAL (2009), ILO (2009), Kaufmann et al (2008), and Paes et al (2009)
Notes: Informality is defined as the percentage of workers without health and old-age insurance; The "rule of law" indicator measures "perceptions of the extent to which the agents have confidence in and abide by the rules of the society", relating to contract enforcement, property rights, the police, courts, and the likelihood of crime and violence. The index takes values from -2.5 to 2.5 (in which a higher score represents a better outcome).

Figure 2: Rates of Return to School





Source: Duryea et al (2003)

In broad terms, those results are consistent with estimates of high immobility in Latin America (vis-à-vis the US) and large discrepancies by country, with Brazil and Colombia typically reported among the highly immobile (although previous evidence has admittedly analyzed a shorter sample of countries than in this paper). Also, highly immobility is consistent with lower equality of opportunities in the sample analyzed, especially in Brazil. Nonetheless, providing more clear-cut explanations would necessarily require a more detailed look not only at outcomes but also at the policies affecting income inequality, inequality of opportunities, human capital formation and its returns. That implies an in-depth analysis of taxation regimes and reforms; specific composition of health and education overall public spending; existence and coverage of programs facilitating female participation in labor markets and future child development (such as, for example, pre-school provision, subsidized early childhood development programs); trade policies affecting relative wages; among others. They fall outside the scope of this paper but constitute an important area of mobility-related research on its own.

5. Conclusions

Difficulties in the construction of panel-data have prevented a comprehensive analysis of mobility in Latin America and elsewhere in the developing world. This paper sheds some light on the implications of mobility in the Region by constructing, alternatively, a pseudo-panel for

14 countries over 11 years and eight birth cohorts. Our analysis focuses on the standard notion of income mobility and, in addition, explores a notion of "poverty mobility" around thresholds or poverty lines. We show that the Region as a whole is highly immobile both in income and poverty terms. However, a sizeable part of this immobility results from failing to account from the effects that personal and socioeconomic controls have on mobility (over 30 percent of the unconditional time-dependence mobility). Country-specific differences are also substantive and tend to cancel out when grouped into traditional sub-regions (Andes, Southern Cone, Central America). Current levels of incomes and poverty not explained by past levels of incomes or past poverty status may vary widely across countries, in some cases exceeding well over 50 percent of estimated changes. Specific to poverty mobility, we found statistically significant roles for age, gender and, education of the household head , the latter suggesting distinctive effects from different levels of education, completion status and the nature of the poverty transition (statistically significant and positive for moving out of poverty; statistically insignificant for falling into poverty).

Notwithstanding the limitations of the modeling, we reject as simplistic and misleading the widely accepted notion of a dominating socioeconomic immobility throughout the Region. This is a first step towards uncovering the underlying dynamics of poverty mobility. Further modeling efforts and the construction of appropriate panel data will be critical in providing further steps. Also, it should contribute to clarify results difficult to explain thus far relating the role of certain levels of education in specific countries.

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Annex 1. Data Sources

Table 1. Coverage of Data Sources

Country	Survey	Number of surveys per year	Chosen survey	Coverage
Argentina	Encuesta Permanente de Hogares (EPH)	May and October	October	Urban - 15 cities (1992-1998)
Brazil	Pesquisa Nacional por Amostra de Domicilios (PNAD)	Once a year	September	Urban - 28 cities (1999-2002)
Bolivia	Encuesta de Hogares	Once a year	October-November	National
Chile	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	Once a year	November	National
Colombia	Encuesta Continua de Hogares	Once a year	Monthly	National
Costa Rica	Encuesta de Hogares de Propósitos Múltiples (EHPM)	Once a year	July	Urban (1992) National (1993-2002)
Honduras	Encuesta Permanente de Hogares de Propósitos Múltiples	May and September	September	National
Mexico	Encuesta Nacional de Ingreso y Gastos de los Hogares (ENIGH)	Once a year	August-November	National
Panama	Encuesta de Hogares	Once a year	August	National
Paraguay	Encuesta Permanente de Hogares	Once a year	August-December	National
Peru	Encuesta Nacional de Hogares sobre Medición de Niveles de Vida	Quarterly	IV quarter	National
El Salvador	Encuesta de Hogares de Propósitos Múltiples (EHPM)	Once a year	January-December	National
Uruguay	Encuesta Continua de Hogares	Once a year		National
Venezuela	Encuesta de Hogares por Muestreo	Twice a year	July-December	Urban

Source: Own calculations based on IDB Research Department Harmonized Household Surveys.

Table 2. Components to construct consistent definitions of Household Income over time and across countries

		Type of Income			
		Monetary	Monetary	Labor	Non-Monetary
Nr.	Country	Labor Income	Non-Labor Income	Non-Monetary Income	Non-Labor Income
1	Argentina	x	x		
	Belize	x			
2	Bolivia	x	x		
3	Brazil	x	x	x	
4	Chile	x	x		
5	Colombia	x	x		
6	Costa Rica	x	x		
	Dominican Republic	x	x		
	Ecuador	x	x	x	
7	El Salvador	x	x		
	Guatemala	x	x	x	
	Guyana	x	x	x	
8	Honduras	x	x		
	Jamaica	x	x		
9	Mexico	x	x	x	
	Nicaragua	x	x	x	
10	Panama	x	x		
11	Paraguay	x	x		
12	Peru	x	x	x	
13	Uruguay	x	x	x	
14	Venezuela	x	x		

Source: Own calculations based on IDB Research Department Harmonized Household Surveys.

Annex 2. Sensitivity Analysis

Table 1. Estimates of Unconditional and Conditional Time-Dependence Income Mobility in Latin America Using Four-Year Cohorts

	I	II	III	IV	V	VI	VII	VIII	IX
Estimated Income Mobility - Equation (3)	$\overline{\ln y}_{c(t),t} = \beta_c \ln \overline{y}_{c(t-1),t-1} + \delta_c \overline{X}_{c(t),t} + \mu_{c(t),t}$								
B	0.966	0.736	0.696	0.693	0.949	0.716	0.68	0.681	0.582
	(807.29)**	(81.00)**	(69.91)**	(63.45)**	(248.57)**	(78.14)**	(69.60)**	(63.31)**	(59.62)**
R^2	0.995	0.998	0.999	0.999	0.999	0.998	0.999	0.998	0.999
N. observations	1320	1320	1320	1110	1320	1320	1320	1110	1110
Estimated Income Mobility - Equation (4)	$\Delta \ln \overline{y}_{c(t),t} = \beta_c \overline{\ln y}_{c(t-1),t-1} + \delta_c \Delta \overline{X}_{c(t),t} + \mu_{c(t),t}$								
B	-0.034	-0.192	-0.183	-0.181	-0.051	-0.2	-0.193	-0.192	-0.198
	(28.16)**	(20.08)**	(20.11)**	(17.47)**	(13.40)**	(22.39)**	(22.80)**	(19.91)**	(20.57)**
R^2	0.38	0.52	0.55	0.56	0.53	0.58	0.62	0.63	0.7
N. observations	1,320	1,296	1,320	1,044	1,320	1,296	1,320	1,044	1,044
Controlling By									
Age	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Age^2	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Gender	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Years of Education	No	Yes	No	No	No	Yes	No	No	No
Number of Children	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Number of Other relatives	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Educational Dummies	No	No	Yes	Yes	No	No	Yes	Yes	Yes
Dwelling Characteristics	No	No	No	Yes	No	No	No	Yes	Yes
Regional Dummies	No	No	No	No	No	Yes	No	Yes	No
Country Dummies	No	No	No	No	Yes	No	Yes	No	Yes

Absolute value of t statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on IDB Research Department Harmonized Household Surveys.

Table 2. Estimates of Unconditional and Conditional Time-Dependence Income Mobility in Latin America Using Six-Year Cohorts

	I	II	III	IV	V	VI	VII	VIII	IX
Estimated Income Mobility - Equation (3)	$\overline{\ln y}_{c(t),t} = \beta_c \overline{\ln y}_{c(t-1),t-1} + \delta_c \overline{X}_{c(t),t} + \mu_{c(t),t}$								
B	0.967	0.745	0.703	0.699	0.95	0.722	0.685	0.687	0.582
	(685.62)**	(67.94)**	(58.67)**	(53.09)**	(210.12)**	(65.18)**	(58.45)**	(53.18)**	(49.94)**
R^2	0.995	0.998	0.999	0.999	0.999	0.998	0.999	0.998	0.999
N. observations	912	912	912	768	912	912	912	768	768
Estimated Income Mobility - Equation (4)	$\Delta \ln \overline{y}_{c(t),t} = \beta_c \overline{\ln y}_{c(t-1),t-1} + \delta_c \Delta \overline{X}_{c(t),t} + \mu_{c(t),t}$								
B	-0.033	-0.188	-0.18	-0.178	-0.05	-0.198	-0.193	-0.193	-0.198
	(23.56)**	(16.07)**	(16.23)**	(13.91)**	(11.14)**	(18.01)**	(18.72)**	(16.25)**	(16.81)**
R^2	0.38	0.51	0.55	0.56	0.54	0.58	0.62	0.63	0.7
N. observations	912	896	912	720	912	896	912	720	720
Controlling By									
Age	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Age^2	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Gender	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Years of Education	No	Yes	No	No	No	Yes	No	No	No
Number of Children	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Number of Other relatives	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Educational Dummies	No	No	Yes	Yes	No	No	Yes	Yes	Yes
Dwelling Characteristics	No	No	No	Yes	No	No	No	Yes	Yes
Regional Dummies	No	No	No	No	No	Yes	No	Yes	No
Country Dummies	No	No	No	No	Yes	No	Yes	No	Yes

Absolute value of *t*-statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.