

The distributional implications of income mobility: evidence for Latin America

Abstract

In recent years, a branch of the economic literature has analyzed household income movements in longitudinal datasets. Previous research has shown that household income is considerably more volatile in Latin America than in developed economies, though little is known so far about the distributional implications of such income changes. This paper exploits the unique database built in Beccaria et al. (2021) from Latin American household surveys for seven countries in 2002-2015 to analyze the impact of household income movements on income distribution. We combine the analysis from traditional indicators in the literature with a novel methodology that quantifies this precise phenomenon and allows for comparisons and rankings across time and countries. Our results show considerable differences in the equalizing effect of income mobility across countries and population groups.

JEL Classification: D31, O15, J60

1. Introduction

In recent years, a branch of the economic literature has analyzed household income movements. The well-known study of static income distributions can be greatly enriched when the analysis shifts to the issue of how household incomes change over time and the way this phenomenon affects the shape of the distribution in a given period. Though much of previous work has focused on income mobility understood as volatility (therefore, a negative feature of the household's income flow), some of the literature has emphasized the positive role of income mobility as an intertemporal income equalizer.

The question of the distributional implications of income mobility is of particular importance for Latin America for two reasons. On one hand, because it is the most unequal region in the world in terms of income distribution. On the other hand, because as shown in Beccaria et al. (2021), Latin American economies feature a degree of short-term income mobility that is quite larger from that observed in developed countries. Therefore, quantifying the effects of income mobility on the shape of the distribution would help clarify to which extent such movements can be considered a determinant of the distributional results we observe.

This paper exploits the unique database built in Beccaria et al. from Latin American household surveys for seven countries in 2002-2015 to analyze the impact of household income movements on income distribution. We combine the analysis from traditional indicators in the literature with a novel methodology that quantifies this precise phenomenon and allows for comparisons and rankings across time and countries.

2. Literature review

The study of intergenerational income mobility (that is, the analysis of the link between the income levels of parents and children) has a long tradition in the economic literature. By contrast, the last few decades have seen growing interest in a related but different phenomenon, the observed changes in household incomes over shorter periods of time, usually referred to as intragenerational income mobility or, more generally, short-term

income mobility. A wide range of research has shown this attribute of intertemporal income distributions also has interesting implications in the domain of observed cross-sectional inequality.

Friedman (1962) is usually credited with the first insight on what would later be considered the income mobility research field: “Consider two societies that have the same distribution of annual income. In one there is great mobility and change so that the position of particular families in the income hierarchy varies widely from year to year. In the other, there is great rigidity so that each family stays in the same position year after year. Clearly, in any meaningful sense, the second would be the more unequal society”. A similar intuition is developed in Krugman (1992) and in Gardiner and Hills (1999), while the formal building blocks for further research were laid in the seminal papers of Atkinson, Bourguignon and Morrison (1988) and Shorrocks (1978).

Fields (2006) distinguishes six concepts of income mobility, one of which is labeled “mobility as an equalizer of longer-term incomes”. This is the precise interpretation mobility is given in this paper, as well as in much other empirical work. Several papers have measured this type of mobility using data from developed countries (Aaberge et al., 2002; Auten, Gee and Turner, 2013; Bayaz-Ozturk, Burkhauser and Couch, 2014; Bjorklund, 1993; Buchinsky and Hunt, 1999; Burkhauser and Poupore, 1997; Canto, 2000; Gustaffson, 1994; Jarvis and Jenkins, 1998; Maasoumi and Trede, 2001), though some evidence on the subject in developing countries also exists (Castro, 2011; Fields et al., 2015; Wodon, 2001; Woolard and Klasen, 2007).

3. Data

The database used in this paper was built in Beccaria et al. (2021) from regular household surveys carried out by the national statistical institutes of the selected countries. Most Latin American countries do not feature longitudinal household surveys, however, most household surveys do use a rotational sampling scheme, which can be exploited to build short panels.

This kind of scheme implies that the total sample is divided into r household groups, with each group remaining in the sample in r observation periods or waves. Therefore, for each wave of the survey, one of these groups enters the sample while another one leaves. Consequently, it is possible to trace changes of a given proportion of the sample along the r waves. The only case with a longitudinal survey is Peru, although the panel covers a few years only. However, the rotating schemes differ among countries and the only common window of observation among them is the year. Hence, it is only possible to analyze changes in income resulting from comparing two successive observations of each household with a 1-year interval between them.

The Argentinean data was taken from the Encuesta Permanente de Hogares (EPH), which is conducted by the Instituto Nacional de Estadística y Censos (INDEC). For Brazil, micro-data from the Pesquisa Mensal de Emprego (PME), which is conducted by the Instituto Brasileiro de Geografia e Estatística (IBGE), will be employed. This survey, however, only gathers information on labor incomes. For Costa Rica, the Encuesta de Hogares de Propósitos Múltiples (EHPM) and the Encuesta Nacional de Hogares (that replaced the former in 2010), conducted by the Instituto Nacional de Estadística y Censos (INEC), were used. For Ecuador, we resort to the Encuesta Nacional de Empleo, Desempleo

y Subempleo (ENEMDU), conducted by the Instituto Nacional de Estadística y Censos (INEC). The Encuesta Nacional de Ocupación y Empleo (ENOE) is the source of data for Mexico. Like Brazil, this survey measures labor income only. In the case of Peru, data from longitudinal panels built from sub-samples of the Encuesta Nacional de Hogares (ENAHOG), the regular household survey conducted by the Instituto Nacional de Estadística e Informática (INEI), were used. Finally, the Paraguayan Encuesta Continua de Empleo (ECE) is carried out by the Dirección General de Estadística, Encuestas y Censos. The periods covered in each country are the following: 2003-2015 for Argentina and Brazil, 2006-2013 for Costa Rica, 2004-2015 for Ecuador, 2005-2015 for Mexico, 2010-2015 for Paraguay and 2002-2010 for Peru. The analysis is restricted to urban areas since not all surveys are nationally representative. Moreover, the comparison of income mobility in rural areas among countries with different types of agricultural production (and, hence, different production cycles) is difficult to assess with data coming from the type of surveys employed in this study.

We exclude from our calculations households with zero reported total income, or with zero reported labor income when Brazil and Mexico are included. We also drop households that include workers who report zero wage or individuals whose age or gender show inconsistencies.

4. Methodology

Most descriptive analysis of equalizing income mobility is carried out using Shorrocks' mobility index (Shorrocks, 1978). Let (y^1, y^2, \dots, y^T) be a sequence of N -dimensional vectors, each describing the income distribution at time t in an economy populated by N agents and let $I(y)$ be a measure of the inequality of the distribution of income vector y . Then, Shorrocks' Mobility index (SM) is given by:

$$SM = 1 - \frac{I(\bar{y})}{\sum_{t=1}^T w_t I(y^t)}$$

Where $w_t = \sum_{i=1}^N y_i^t / \sum_{i=1}^N \bar{y}_i$ and \bar{y} is the vector that contains the mean of each individual's income over time. If $I(y)$ is convex (as is the case for most inequality measures used in the literature), then inequality evaluated at the time mean vector \bar{y} must be smaller than the weighted average of the values of $I(y^t)$ over time, thus making M bounded between 0 and 1. For the inequality measure we will use the Gini index.

Although this measure provides information on how much equalizing income mobility there is in a certain economy, it does not offer a way to characterize such mobility. To that end, we will complement this analysis with the estimation of mobility curves as defined in Aaberge and Mogstad (2014). This methodology builds from an analogy with the more familiar Lorenz curves: a mobility curve shows, for each income percentile, how much its intertemporal income differs from the one it would receive if the income process were completely immobile—if each individual's relative position in the cross-sectional distribution of income were constant over time.

Formally, let $L(\bar{y}; u)$ be the Lorenz curve associated to the income distribution given by \bar{y} and $u \in [0; 1]$. Then, the mobility curve is given by:

$$M(u) = L(\bar{y}^R; u) - L(\bar{y}; u)$$

Where \bar{y}^R is the counterfactual intertemporal income distribution, where each individual's initial position in the income distribution is preserved in the second period. This implies that an individual's income may grow as a consequence of a general rise in incomes (economic growth) but no redistribution takes place—this is the interpretation that must be given to the immobile concept. A subsequent relevant concept is the derivative of the mobility curve, given by:

$$M'(u) = \frac{F^{-1}(\bar{y}; u)}{\frac{1}{N} \sum_{i=1}^N \bar{y}_i} - \frac{F^{-1}(\bar{y}^R; u)}{\frac{1}{N} \sum_{i=1}^N \bar{y}_i^R}$$

Where $F(\bar{y}; z)$ is the empirical distribution function of \bar{y} evaluated at income value z , so that $F^{-1}(\bar{y}; u)$ is the inverse of such distribution function evaluated at percentile u . This measure has a straightforward interpretation: it is positive (negative) for those percentiles that are better (worse) off because of income mobility.

5. Results

It is not straightforward to find comparable values of SM across published work. Reported figures for different countries and time periods differ strongly in three important methodological choices: the time window over which the measure is calculated, the income concept defined and the inequality measure used. Table XX summarizes the results found in the literature so far.

Table 1. Estimates of SM in previous literature.

Source	Country	Time period	Window (years)	Income concept	Inequality measure	SM
Aaberge et al. 2002	Denmark	1980-1990	11	Total household income	Gini	0.0780
	Sweden	1980-1990	11	Total household income	Gini	0.1540
	USA	1980-1990	11	Total household income	Gini	0.0920
	Denmark	1986-1990	5	Total household income	Gini	0.0540
	Norway	1986-1990	5	Total household income	Gini	0.0750
	Sweden	1986-1990	5	Total household income	Gini	0.0970
	USA	1986-1990	5	Total household income	Gini	0.0600
Bayaz-Ozturk Burkhauser Couch 2014	Germany	1984-1988	5	Household per capita income	Theil	0.2120
		2002-2006	5	Household per capita income	Theil	0.1520
	USA	1984-1988	5	Household per capita income	Theil	0.1310
		2002-2006	5	Household per capita income	Theil	0.1520
Bjorklund 1993	Sweden	1951-1958	8	Total individual income	Gini	0.2625
		1960-1967	8	Total individual income	Gini	0.2483
		1966-1973	8	Total individual income	Gini	0.2767

		1974-1981	8	Total individual income	Gini	0.3183
		1982-1989	8	Total individual income	Gini	0.3433
Buchinsky Hunt 1999	USA	1981-1982	2	Individual labor income	Generalized entropy	0.1480
		1990-1991	2	Individual labor income	Generalized entropy	0.0720
		1981-1984	3	Individual labor income	Generalized entropy	0.2350
		1988-1991	3	Individual labor income	Generalized entropy	0.1350
		1981-1986	6	Individual labor income	Generalized entropy	0.2530
		1986-1991	6	Individual labor income	Generalized entropy	0.1800
		1981-1988	8	Individual labor income	Generalized entropy	0.2650
		1984-1991	8	Individual labor income	Generalized entropy	0.2210
		1982-1991	10	Individual labor income	Generalized entropy	0.2660
Burkhauser Pourpore 1997	USA	1983-1988	6	Individual labor income	Theil	0.1200
	Germany	1983-1988	6	Individual labor income	Theil	0.2130
Canto 2000	Spain	1985-1992	1	Household per capita income	Gini	0.0800
			1.5	Household per capita income	Gini	0.0900
			2	Household per capita income	Gini	0.1100
			1	Total individual income	Gini	0.0700
			1.5	Total individual income	Gini	0.0900
			2	Total individual income	Gini	0.1000
Castro 2011	Chile	1996-2001	5	Household per capita income	Gini	0.0800
Gustaffson 1994	Sweden	1971-1980	2	Total individual income	Gini	0.0580
			10	Total individual income	Gini	0.3070
Jarvis Jenkins 1998	UK	1991-1994	2	Total household income	Gini	0.0500
			3	Total household income	Gini	0.0800
			4	Total household income	Gini	0.0900
Maasoumi Trede 2001	Germany	1984-1989	2	Household per capita income	Generalized entropy	0.1126
	Germany		3	Household per capita income	Generalized entropy	0.1052
	Germany		4	Household per capita income	Generalized entropy	0.0983
	Germany		5	Household per capita income	Generalized entropy	0.0941
	USA		2	Household per capita income	Generalized entropy	0.2079
	USA		3	Household per capita income	Generalized entropy	0.2061
	USA		4	Household per capita income	Generalized entropy	0.2040
	USA		5	Household per capita income	Generalized entropy	0.2106

Woolard Klasen 2007	South Africa	1993-1998	6	Household per capita income	Gini	0.1050
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The time window length and the value obtained for SM are positively correlated, as the reduction in inequality associated to mobility is naturally higher if the time period over which incomes are allowed to move is longer. Since the database used in this paper features panels that cover one-year time windows, the results in Canto (2000) for Spain in the 80s are comparable to ours (the income concept and the inequality measure used also coincide).

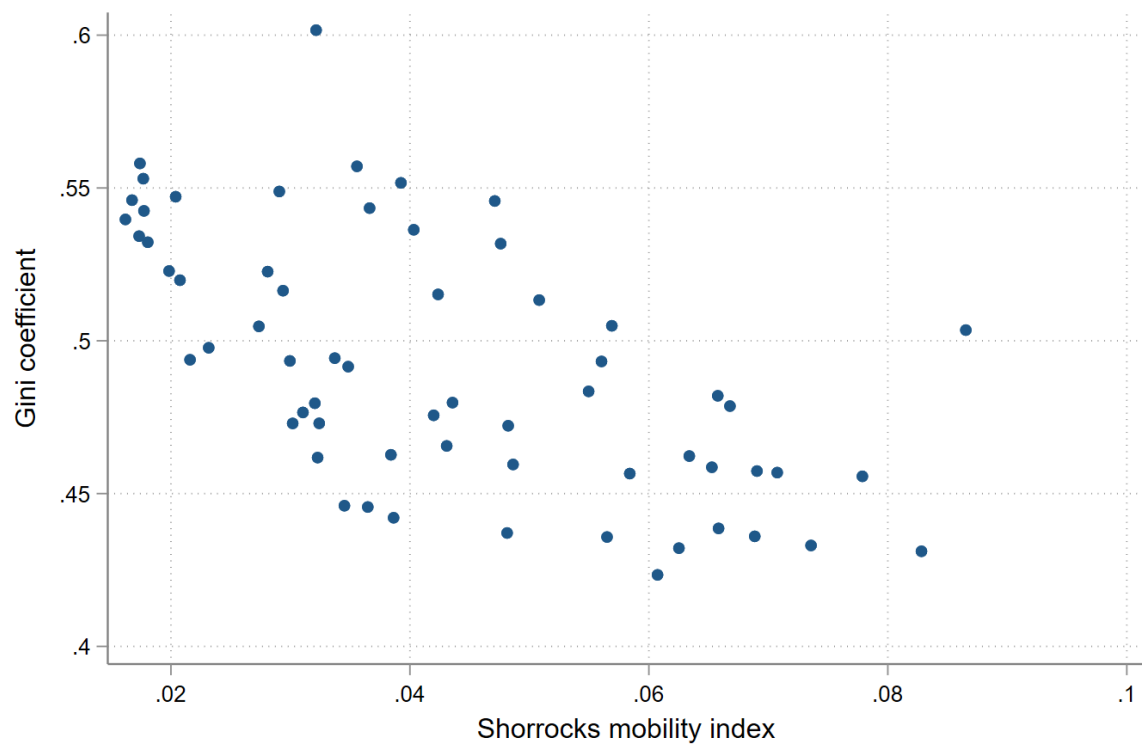
Table 2. Estimates of SM in Latin America 2002-2015

Country	Time period	All income sources		Labor income only	
		Total income	Per capita income	Total income	Per capita income
Argentina	2003-2015	0.047	0.0356	0.0236	0.0187
Brazil	2003-2015			0.0238	0.0191
Costa Rica	2006-2013	0.0418	0.0348	0.045	0.0394
Ecuador	2004-2015	0.0556	0.0511	0.0602	0.0532
Mexico	2005-2015			0.0682	0.0586
Paraguay	2010-2015	0.056	0.052	0.0515	0.0448
Peru	2002-2010	0.0489	0.0432	0.0438	0.0378

Our results show values for smaller values for SM than reported by Canto for Spain. In Latin American countries, the Gini coefficient of household per capita income is reduced yearly in a magnitude that ranges from 3.5% (Costa Rica) to 5.2% (Paraguay), in contrast to the 8% found by Canto. Results are slightly larger when the Gini coefficient is calculated from total household income. Alternatively, when only labor income is considered (which allows for the inclusion of Brazil and Mexico in the estimation sample), results for per capita income range from 1.9% (Argentina) to 5.9% (Mexico).

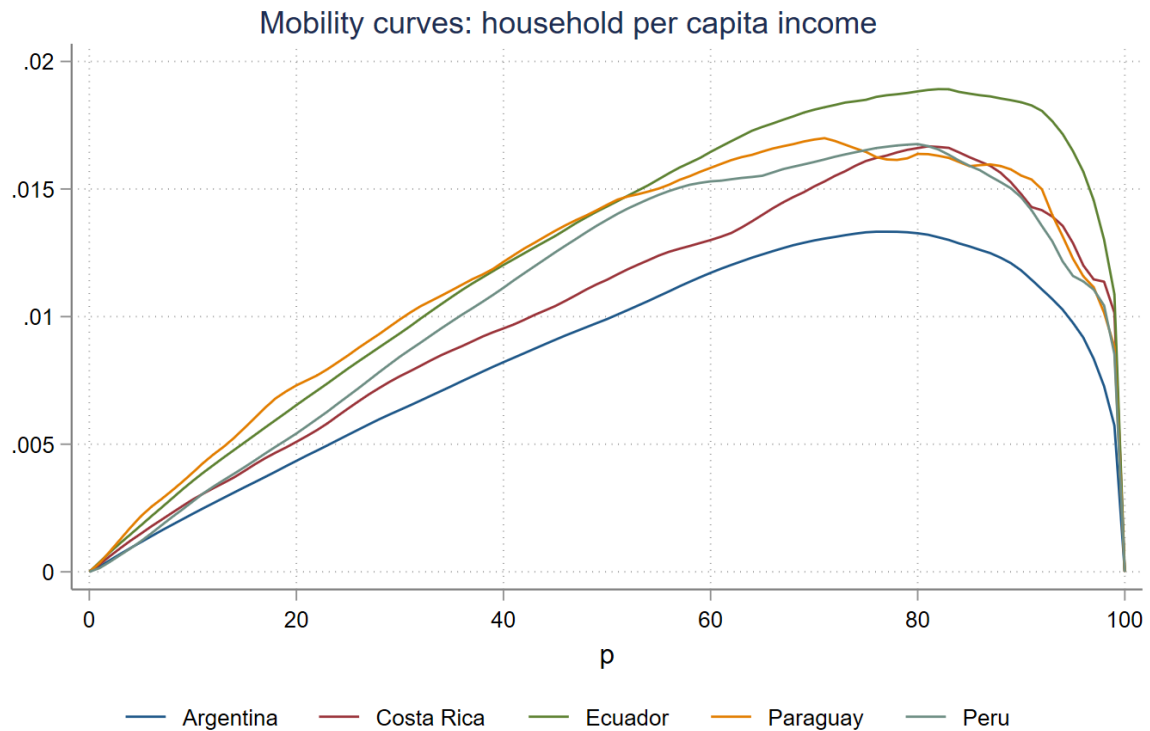
Some recent literature has explored the correlation between intergenerational income mobility and cross-sectional income inequality. This relation has been named “the Great Gatsby curve” and has been shown to be downward sloping in the United States (Krueger, 2012; Corak, 2013). Figure XX shows the scatterplot for SM and the Gini coefficient in our data, where we also find negative correlation. This “short-term Great Gatsby curve” has strong implications as it means that income changes over short periods of time are also associated to a more equitable income distribution in a given period, as long as such changes imply lower inequality in the distribution of intertemporal income.

Figure 1. The Great Gatsby curve for Latin America 2002-2015



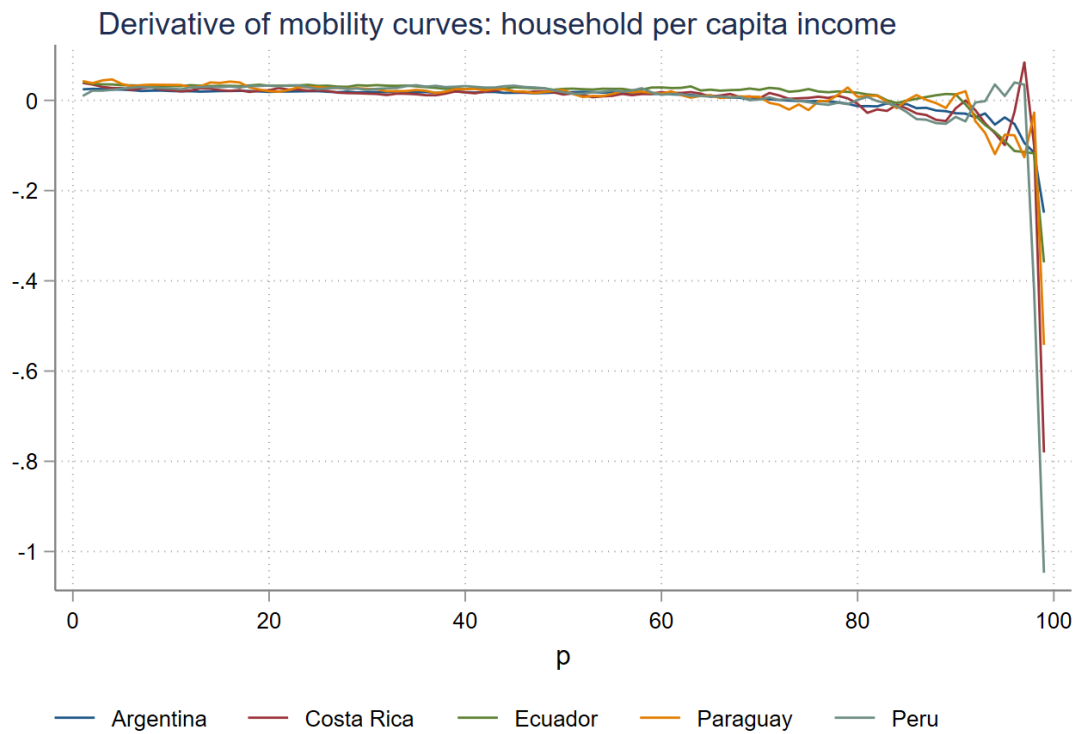
We now move on the analysis of mobility curves. Aaberge and Mogstad (2014) show that the higher of two non-intersecting mobility curves unambiguously features more income mobility than the lower—in our data, this indicates that Argentina has the lowest level of equalizing income mobility in the sample. Not much can be said for the remaining four countries, as their mobility curves do intersect, though the one for Ecuador remains on top from the median to the right tail. Curves for Costa Rica, Paraguay and Peru are fairly similar and cross one another several times.

Figure 2. Mobility curves for Latin America 2002-2015, household per capita income



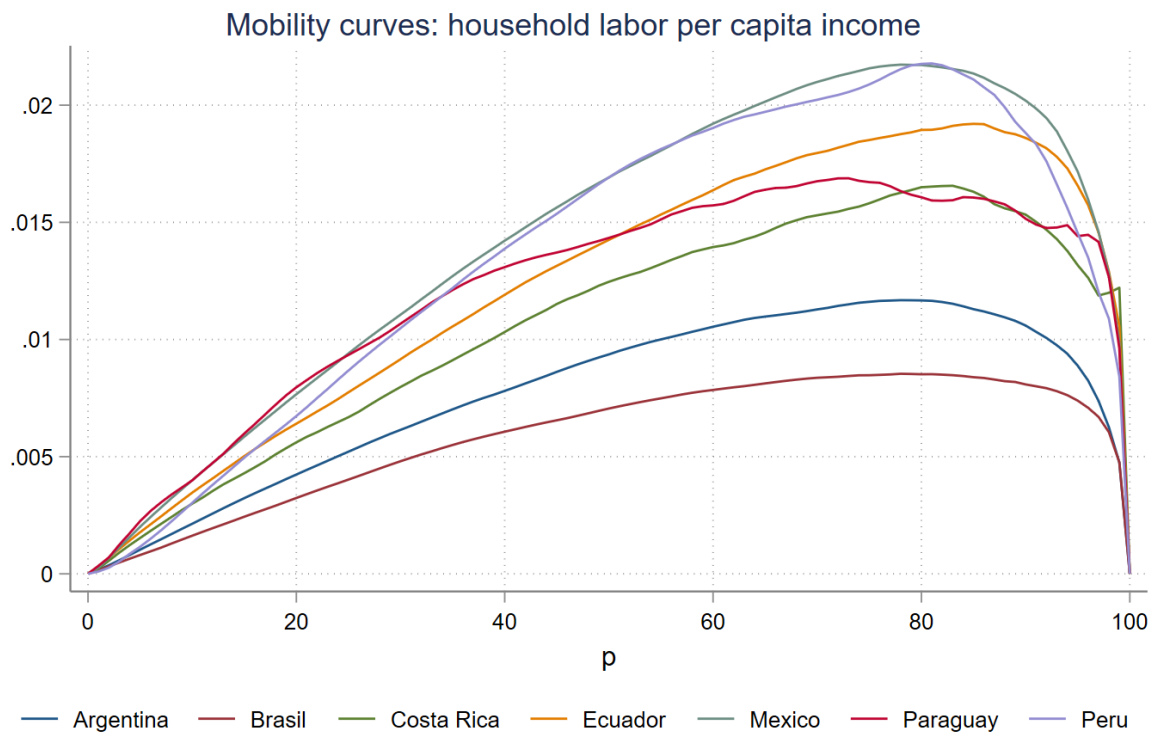
The derivatives of these mobility curves show a remarkable pattern—all of them are positive up to percentile 70, when some cross the horizontal axis, and almost all values become negative after percentile 90. This finding has powerful implications as it shows income mobility was beneficial, not only for households in the left tail of the income distribution, but for essentially all that cannot be deemed rich. Only households in the highest income decile have seen a decline in their relative position as a consequence of income movements. Income mobility in the region has certainly had equalizing effects.

Figure 3. Derivative of mobility curves for Latin America 2002-2015, household per capita income



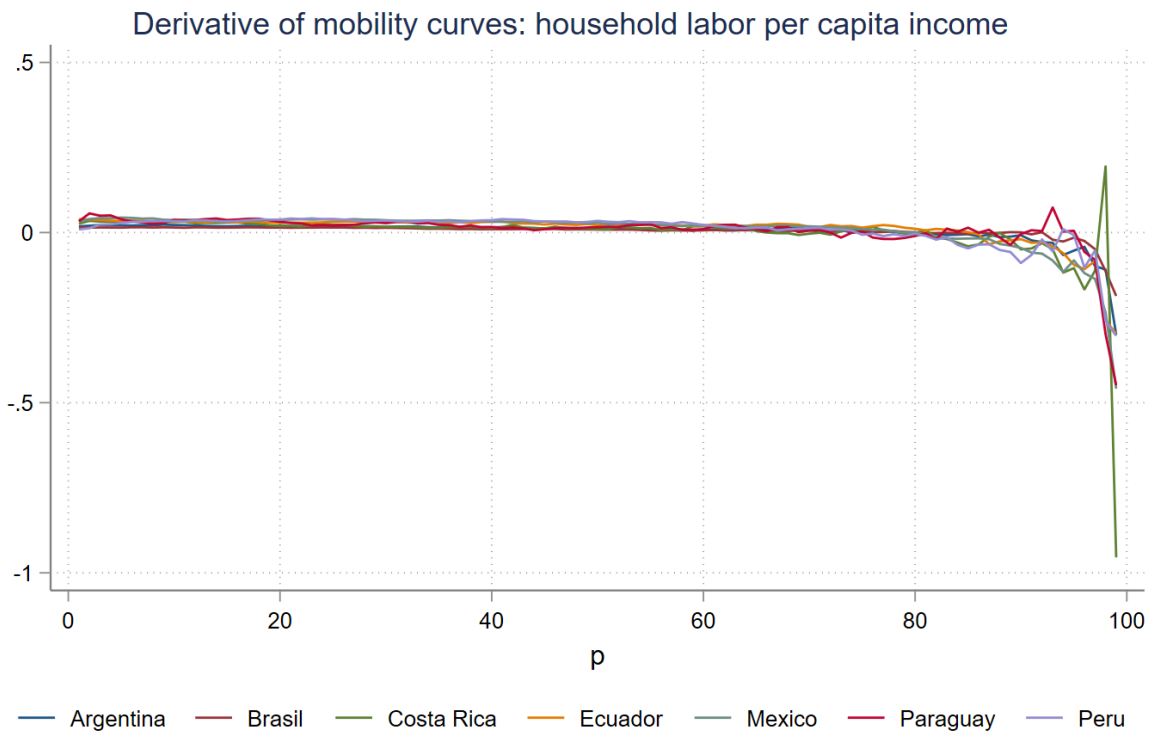
Changing the income definition from total per capita income to labor per capita income allows us to include Brazil and Mexico in the comparison. These countries are interesting since, as shown in figure XX, they lie at opposite ends of the ranking—while Brazil is unambiguously the country with the lowest level of equalizing mobility in the sample, Mexico's curve is found at the top, although crossing those of Peru and Paraguay a few times.

Figure 4. Mobility curves for Latin America 2002-2015, household labor per capita income



Finally, the derivatives of these mobility curves are essentially equal to those analyzed before, with approximately constant positive values up to percentile 80, when the sign is reversed. These results indicate that the income equalization process observed in the region was led mostly by labor income, the main source of revenue for Latin American households.

Figure 5. Derivative of mobility curves for Latin America 2002-2015, household labor per capita income



6. Conclusions

Previous research has shown that household income is more unstable in Latin American countries than in developed economies, mostly due to high labor informality, weak labor market institutions and low non-labor income. This is a strong concern from a policy perspective as most households in these economies do not have access to financial markets that enable them to insure against income risk—and probably those who do are the ones who need it the least.

This paper extends this literature in a new dimension, the analysis of the equalizing potential of such income variability. We have shown that such equalizing effects are somewhat lower in Latin American economies than reported for one European country (Spain). However, we have also found evidence of considerable variability across Latin American countries, with Mexico, Ecuador and Paraguay showing the greatest reductions in income inequality as a consequence of income mobility in short time windows.

One salient feature of the mobility process observed in Latin America in 2002-2015 is that essentially all but households in the highest income decile benefited from it in terms of their relative position in the aggregate income distribution. In fact, mobility curves show an approximately constant slope for households below the 80th percentile of per capita income, which means mobility was about as beneficial for the poor as for families with income levels close to the median.

Establishing the determinants of the shape of the mobility curve is an exciting challenge for future research. We propose two hypotheses, a macroeconomic one and a social policy one. The macroeconomic channel mainly involves economic growth and price stability. Household income is likely to grow in a proportion that matches that of gross domestic product in the long run and the macroeconomic regime is probably a strong determinant of how that income growth rate is distributed across households. At the same time, inflation might affect workers' ability to negotiate stable real wages, particularly in labor markets marked by high informality and weak institutions. This hypothesis rationalizes the finding that Argentina and Brazil have the lowest levels of equalizing mobility in the region, probably as a consequence of the two country's relatively poor macroeconomic performance in the 2011-2015 period, when inflation rose and product stagnated.

A second hypothesis concerns the role of social transfers, particularly pensions and poverty alleviation programs. Although these income sources account for a relatively small proportion of household income in Latin American countries, both grew considerably along the period under analysis, with generally good focalization in the poorest households. Extensive research has shown such expansions in social policy have had a strong positive effect on income inequality, which implies it is likely to have a significant role in shaping the mobility curve.

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