Income Mobility in Latin America

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1. Introduction and Motivation

In the last decades Latin American countries have experienced substantial macroeconomic instability. While the region as a whole experienced economic growth during most of the 1990's and 2000's, there were also years of stagnation as well as economic decline (see Fig.1). Furthermore, most of the countries in the region experienced quite varied episodes of growth, crises, and recessions (Fig. 2).

Traditionally, economists have assessed the welfare impact of these fluctuations on the population by studying the evolution of economic inequality and poverty. Questions like "Who benefits from economic growth?" and "Who is hurt by economic decline?" have been answered by analyzing the changes in cross-sectional inequality or poverty associated with these episodes.

While it is important to know the evolution of inequality or poverty per se, this type of analysis fails to measure one important aspect of welfare, namely, the evolution of the well-being of *given* economic units through time. The goal of mobility analysis is precisely to study this dynamic evolution of well-being for units identified through time.

To better appreciate the difference between cross-sectional analyses of inequality (or poverty) and mobility analysis, consider the following example. Take an imaginary economy with two individuals whose initial incomes are $1 and $3. Suppose the economy grows and the new incomes are $1 and $5. Clearly, inequality has increased in the course of economic growth, but what has happened to the destinies of specific individuals? With anonymous data, we cannot know. With panel data, there are two underlying possibilities. Adopting the notational convention that individuals (denoted by Greek letters) are ordered from lowest initial income to highest initial income in both the initial income vector and final income vector, what happened was either

Case I: (1, 3) → (1, 5)
         α, β   α, β

or

Case II: (1, 3) → (5, 1)
          α, β   α, β

In Case I, the income of the poorest individual remained unchanged, while the income of the initially richer individual grew. In Case II, on the contrary, the initially poor individual experienced a substantial income gain, while the other individual experiences an income loss.

As can be seen from this small example, just comparing anonymous distributions of income across time cannot answer questions like "Are the (initially) poor getting poorer and the (initially) rich richer?" or "Is economic growth benefiting individuals that were initially poor?" In order to answer such questions, it is necessary to perform mobility analyses, tracking the evolution of individual incomes over time and seeing who are the winners and losers during the growth process. In other words, the crucial difference between mobility studies and dynamic comparisons of cross-sectional measures of inequality and poverty is the ability of mobility studies to unveil the intertemporal anonymity that accompanies cross-sectional studies.

The reason why economic mobility had not been widely studied in developing countries until very recently was the lack of suitable data. In order to study mobility, it is necessary to have longitudinal data tracking economic units (i.e., individuals, households, or firms) over time. Collecting this type of data is expensive, and for many years it was not generally done in most Latin American countries.

Now, however, such data sets are available for a number of Latin American and Caribbean countries; see Table A-1 in the Appendix for a list of available panel datasets that can be used for income mobility studies for these countries. In this paper, we discuss what we have learned from mobility studies that is different from what we knew from comparable cross sectional analysis.

The structure of the paper is the following. Section 2 discusses what is mobility, how it can be measured, and how it differs from inequality. Section 3 presents a review of previous mobility studies on Latin American countries. Section 4 summarizes the contribution of our own recent work. Finally, Section 5 concludes and discusses what lies ahead in mobility research for Latin American economies.

Before moving on, it is important to clarify that this paper deals only with the study of *intra*-generational mobility. *Inter*-generational mobility is an important area of research, but we avoid discussing it for sake of brevity. Readers interested in this literature applied to Latin America should refer to the authoritative paper by Behrman et al. (2001).

2. What is Mobility and How Does It Differ from Inequality?

As used in this paper, an "income distribution" is the entire vector of incomes – for example, (1, 3) and (1, 5) in the example above. "Income mobility" and "income inequality" are two different aspects of the income distribution. The raw data for a random variable that measures income or some other measure of economic well-being can be processed to obtain measures of location (e.g., the mean) and dispersion (e.g, the

variance) of the distribution of that variable. Similarly, a sample of income observations can be handled so as to measure different aspects of its distribution such as growth, poverty, inequality, polarization, or mobility.

Inequality is an aspect of the distribution that has drawn special attention in the literature, particularly because of the pathbreaking work of Kuznets (1955, 1963). Researchers have formulated a series of criteria which allow us to determine if one income distribution is more, less or equally unequal than another. Comparing Lorenz curves, first suggested by Lorenz (1905), is perhaps the most influential of these criteria. Any given Lorenz curve involves arraying a given population from lowest to highest income (or any other measure of well- being) and graphing the cumulative percentage of the population against the cumulative percentage of income. For comparing the inequality of one income distribution with the inequality of another, draw the two Lorenz curves. If one income distribution A has a Lorenz Curve that is below the Lorenz Curve of another income distribution B for all cumulative percentages of the population and never above it, distribution A is said to be more unequal than distribution B.

The problem with Lorenz curve comparisons is that they only provide ordinal rankings of income inequality for two distributions and, in some cases, not even that. When two Lorenz curves intersect, it is not possible to tell which distribution is more unequal. This incompleteness of the Lorenz ordering led to the development of a series of inequality indexes that provide cardinal measures of inequality for any given distribution and therefore complete rankings of inequality for any two distributions or more. An inequality index that possesses four properties - anonymity, income homogeneity, population homogeneity, and the transfer principle – is said to be "Lorenz-consistent." Any such index can provide a cardinal inequality ranking, even if an ordinal ranking using Lorenz curves is not possible. Different indexes provide different notions of inequality and hence, a proper knowledge of their properties is required for an adequate measure of inequality.

There is a large literature on the theory of measuring inequality and its intricacies; see, for example, Lambert (1993), Cowell (1995), and Foster and Sen (1997) for details. In parallel, there is also a venerable literature empirically measuring inequality across countries and over time. Inequality has been related to economic growth in two ways: how inequality changes when economic growth takes place, and how the level of inequality affects the rate of economic growth. Fields (2001) reviews both literatures. Theoretical justifications for an association between these two variables, with different causation directions, have also mushroomed; for a recent summary, see Bertola et al. (2006).

The case of Latin America has been of special interest in this literature because, together with Africa, it is one of the most unequal regions in the world (see WDR 2006, ch.2).[1]

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[1] The comparison of inequality indices between these two regions is problematic because in Africa inequality is usually measured using consumption data, while in Latin America it is usually measured using income data. In spite of this, these two regions are considered the most unequal in the world.

There are several recent studies that summarize the evolution of inequality in Latin America for several decades. Wodon (2000), Morley (2001), Székely (2001), and De Ferranti et al. (2004), despite their different methods and scope, agree in identifying the following general trends for inequality in the region. First, income inequality declined in the seventies, increased in the eighties, and increased again in the nineties. Second, the levels of inequality among Latin American countries in the nineties have become more homogeneous. This is due to a slight decline in inequality in one of the most unequal countries of the region, Brazil, and perhaps in Mexico too, together with a remarkable increase in inequality in countries originally characterized by low inequality such as Argentina and Venezuela. Other studies, such as Deininger and Squire (1996), Székely and Hilgert (2001), Milanovic (2002), Bourguignon and Morrison (2002), and Bourguignon, Ferreira and Leite (2003) also coincide in establishing that Latin America is the region of the world with the highest levels of inequality. These studies also remark that, as far as data are available, Latin America has always been the more unequal region of the world. Additionally, inequality in the region is different from inequality in other parts of the world mainly because of a concentration of income among the richer strata of the distribution.

All these studies analyze the evolution of income inequality over time, making use of measures of inequality for different periods and comparing them. Since these measures of inequality use anonymous individuals, no insight can be drawn on what are the changes over time in income or position for specific individuals in the income distribution. To study specific individuals rather than anonymous individuals, we turn to mobility studies.

Mobility

By definition, mobility analyses rely on "panel data", also called "longitudinal data," in which the same income recipients are followed over time. Mobility studies analyze how specific individuals move through the income distribution, be it in terms of income, position, or something else.

Mobility studies are of two basic types. *Macro-mobility studies* ask how much mobility there is in a country and compare it over time and across countries. As with inequality studies, there is a large array of mobility measures available to the researcher; but unlike inequality studies, in which nearly all the commonly-used measures are measures of the same conceptual entity (relative inequality), the mobility measures in fact measure different underlying notions of mobility. The various notions of macro-mobility and measures of those notions are described later in this section. On the other hand, *micro-mobility studies* investigate which individuals have larger changes than others. The dependent variables used in micro-mobility studies are income change, positional change, or some function of these.

Macro-mobility

Mobility Towards Equality

Since the economic well-being of income recipients evolves over time, studying the income distribution at a point of time may present a partial and perhaps mistaken picture

of long-term inequality. For instance, young individuals, due to lack of experience and accumulated human capital, often start at the lower end of the income distribution. If, after several years of study, these same individuals gain skill and experience, their position in the long-term distribution of income is higher than it was in the spot distribution of income when they were young. However, if youngsters are unable to accumulate human capital, their initial low position would be more permanent and would not differ much from their position in the longer-term distribution of income.

Hence, an early interest in mobility focused on how permanent an individual's position is in the distribution of income. With this in mind, Shorrocks (1978) proposed an operational definition of mobility: "In essence, mobility is measured by the extent to which the income distribution is equalized as the accounting period is extended." (Shorrocks, 1978, p.378). Shorrocks himself proposed an index to measure this concept of mobility:

$$1 - \frac{I\left(\sum_{t=1}^{T} y^t\right)}{\sum_{1}^{T} w^t I\left(y^t\right)},$$

where I(.) stands for an inequality measure, y^t is a measure of economicwell-being in period t, and w^t is a yearly weight. In effect, as inequality of over-time average income is smaller that the weighted average of the income inequalities in each period, there is more mobility towards equality. On the contrary, if the inequality of average income is close to the of the year-by-year inequalities, then there is little mobility towards equality.

However, the Shorrocks index does not distinguish between equalizing and disequalizing changes in income distribution, so Fields (1999) suggested another index of "mobility as equalization of longer-term incomes."

$$1 - \frac{I\left(\sum_{t=1}^{T} y^t\right)}{I\left(y^1\right)}$$

In Fields' index, mobility towards equality depends on the relation between inequality of average income to inequality of initial income: if average income is distributed more (less) equally than initial income, mobility is judged to have equalized (disequalized) longer-term income relative to initial income.

More recently, the interest in mobility attains a wider scope and is not only interested in gauging the distributional impact of income changes, but in the nature and origin of changes in economic well-being. As Fields (2001) put it: "Economic mobility studies are concerned with quantifying the movement of given recipient units through the distribution of economic well-being over time, establishing how dependent one's current

economic position is on one's past position, and relating people's mobility experiences to . . . various influences." Changes in economic well-being can be interpreted and thus measured in a wide variety of ways. Fields categorizes these different interpretations into five notions of mobility (in addition to mobility towards equality): time dependence, positional movement, share movement, symmetric income movement, and directional income movement. Some of the indices of these different mobility notions are listed in Table 1.

Time Dependence

Mobility as time dependence refers to the extent to which an individual's current economic well-being is determined by his or her economic well-being in the past. Sometimes, time dependence is studied in an intergenerational context, so the incomes (or the education or any other variable) of a generation are predicted by the incomes of a previous generation. In an intra-generational context, however, the final income of an individual is explained by his or her own base income. Early studies of this type of mobility relied on aggregate data such as transition matrices, whereas more recent studies make use of micro data. In any case, time dependence is gauged by measures of association such as Cramer's V or Pearson's correlation coefficient:

$$\frac{Cov(Y_j^f, Y_j^i)}{\sqrt{Var(Y_j^f)}\sqrt{Var(Y_j^i)}}$$

In this case, the farther from zero the correlation between initial income (Y^i) and final income (Y^f), the less mobility-as-time-dependence there is.

Positional Movement

Mobility as positional movement indicates changes in the position of the individual in the income distribution. For this purpose, position is measured by quantiles of the income distribution (quintiles, deciles, centiles, or even ranks). Other types of categorical mobility are changes among occupations, industries, social classes, and fixed real income categories, but whether such movements constitute positional movement is debatable. An example of positional movement is the average quantile change:

$$\frac{1}{n}\sum_{j=1}^{n}\left|P_j^f - P_j^i\right|,$$

where P^f, P^i stand for quantile position of individual j in final and initial periods, respectively. For this index, the larger the number of average quantile changes, the more positional movement there is.

Share Movement

Others might wish to regard mobility as relative in a different way. Mobility as share movement is concerned with changes over time in the individual's share of total income.

Usually, share movement is not explicitly measured in empirical studies. The average share movement has no descriptive content because it always equals zero. The average absolute value of share changes, or the average of squared share changes, could be an aggregate measure of this mobility notion, but neither has been used so far. However, the correlation between initial income share and final income share equals the correlation between initial income and final income, so whenever mobility as time dependence has been measured using the correlation coefficient, mobility as share movement has also been measured.

Symmetric and Directional Income Movement

When a large population is considered, individual income shares and their changes may be very small and share movement may not be too meaningful. Changes in actual incomes, however, convey a more appealing measure of income change. Two mobility notions have been used in this case. If the researcher is only interested in the size of income changes, the notion of mobility as symmetric income movement is called for. On the other hand, if the researcher is interested in the size and direction of income changes, the notion of directional income movement is needed.

Mobility as symmetric income movement gauges the absolute value of income changes while mobility as directional income movement distinguishes between upward and downward movements. Both symmetric and directional income movement can be measured in real currency terms and can also be measured in total, per capita, or even logarithmic per capita terms. Fields and Ok (1996, 1999b) provide indexes for measuring symmetric and directional income movement, some of which are:

$$\frac{1}{n}\sum_{j=1}^{n}\left|Y_j^f - Y_j^i\right| \text{ and } \frac{1}{n}\sum_{j=1}^{n}\left|\log Y_j^f - \log Y_j^i\right|$$

for symmetric income movement and

$$\frac{1}{n}\sum_{j=1}^{n}(Y_j^f - Y_j^i) \text{ and } \frac{1}{n}\sum_{j=1}^{n}(\log Y_j^f - \log Y_j^i)$$

for directional income movement.

The diversity of macro-mobility notions and measures recalls the variety of inequality indexes and, in very much the same way as was in the case for inequality, calls for an axiomatic foundation of the different measures so that mobility indexes can be adequately chosen and interpreted. Such an axiomatic foundation (e.g., properties of normalization, relativity, and translation invariance) has been formulated over the last two decades, but much remains to be done (Fields and Ok, 1999a).

Micro-Mobility

As previously mentioned micro-mobility studies analyze which individuals (or households) have larger income changes than others and what are the determinants of these changes. In particular, economists have devoted much of their attention to estimating two types of mobility, namely *unconditional* and *conditional* mobility.

Unconditional Mobility

Studies of unconditional mobility want to estimate to what extent there is convergence between the incomes of rich and poor individuals over time.

Traditionally, questions of unconditional mobility have been answered by focusing on the bivariate relationship between income changes and initial income. In particular, many studies have estimated a model in which the income change of individual i at time t, ΔY_{it}, depends linearly on lagged income $Y_{it\text{-}1}$, i.e.,

$$\Delta Y_{i,t} = \alpha + \beta Y_{i,t-1} + u_{i,t} \tag{1}$$

The β parameter in this model measures the extent to which unconditional convergence takes place. If β<0 there is such convergence, if β>0 there is divergence between rich and poor, and if β=0 earnings change is unaffected by initial earnings (i.e., rich and poor individuals gain or lose the same amount in local currency units over time).

This convergence (or the lack of it) can be influenced by many factors like human capital characteristics of the individuals, local market conditions, aggregate economic shocks, state dependence, etc. However, the main goal of unconditional mobility studies is not to explore these factors, but rather start by documenting whether this convergence process has taken place or not.

Documenting this process is relevant because if there is convergence between the incomes of initially rich and initially poor individuals, this would equalize the long term distribution of income, and it would be indicative of the possibilities for equality of opportunity in an economy.

Conditional Mobility

Studies of conditional mobility estimate a different type of convergence, namely the convergence of incomes to a *conditional* mean. In other words, the presence of conditional convergence means that individual incomes are converging to their predicted individual level. This predicted level is usually determined by a set of observable and unobservable characteristics like gender, age, education level, ability, etc.

In practice, many conditional mobility studies have estimated linear models where income mobility depends on initial income, and on a set of observable time-invariant characteristics Z_i and time-varying characteristics X_{it}, i.e.,

$$\Delta Y_{i,t} = \Delta X_{i,t}\phi + Z_i\gamma + \rho Y_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

If there are many observations for each individual over time, the estimation of equation (2) could control for unobserved fixed characteristics as in the literature on dynamic panel models.

In the case of (2), ρ is the parameter capturing the degree of conditional convergence. It is important to stress again that this parameter *does not* capture the extent to which initially poorer individuals are catching up with the initially richer ones. Instead it estimates the extent to which poorer and richer individuals who are observationally equivalent (in terms of age, education, gender, etc.) have income patterns that converge over time.

Estimating an equation like (2), or some modified version of it, is of interest mainly because it can help us elucidate the underlying determinants of income change. In particular, it can estimate the impact of socioeconomic characteristics like education, age, gender, sector of employment, etc. on mobility, conditional on the initial income level. Also, if the number of observations for each individual is moderately large it can help us determine if the impact of lagged income on mobility is due to state dependence, to unobserved ability, or some other possible factor.[2]

It is important to remark that in both equations (1) and (2), income can be measured in currency units or in logarithms. The interpretation of the parameters is different in the two cases. In particular, taking logarithms of income will give less weight to the income changes of richer individuals and a higher weight to the income changes of poorer individuals. Also, the logarithmic transformation will approximate proportionate changes instead of changes in currency units.

Other Micro-Mobility Approaches

In addition to estimating models of unconditional and conditional mobility, economists have been interested in estimating other types of micro-mobility models. Four of these models deserve mention:

- Testing for nonlinear income dynamics as evidence of poverty traps
- Estimating the determinants of transitions into and out of poverty
- Estimating the negative effect of volatility and risk on individual welfare
- Estimating reduced form determinants of income mobility

The search for nonlinearities on income dynamics can be thought as an extension of the unconditional approach outlined in eq. (1), where a poverty trap might arise due to the non-linear impact of lagged income on current income.[3]

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[2] Equations in the form of (2) could be derived from Mincerian earnings equations, depending on the assumptions made on the unobservable error terms in such equations; see for instance Duval-Hernandez 2006a).

[3] Usually these models are estimated by extending an equation like (1) with a low-order polynomial of lagged income Y_{it-1} on the right hand side of the equation and controlling for unobserved fixed effects; see for instance Jalan and Ravaillon (2004).

The models estimating the determinants of transitions into and out of poverty focus on the mobility that takes place in one particular part of the income distribution (around the poverty line), and they often look at discrete transitions (into and out of poverty) instead of changes in currency units.

Recently, some authors have recognized that a lot of income mobility can have negative effects by bringing volatility and risk to risk-averse individuals. This is particularly relevant if the economies under consideration lack functioning credit markets that could insure individuals against such shocks and help them smooth their consumption patterns. The paper by Gottschalk and Spolaore (2002) presents a theoretical framework to analyze the trade-off between the equalizing effects of mobility and the inter-temporal volatility that might be associated with it. From an empirical perspective some papers have started tackling this question for Latin American countries; see section 3 below.

Finally, some authors have estimated reduced forms of the determinants of income mobility. In particular, they estimate a model like eq. (2) without lagged income on the right hand side of the equation. This is done in some vulnerability studies in order to analyze the distribution of income shocks, conditional on a set of observable characteristics; examples are Cunningham and Maloney (2000), Maloney et al. (2004), and World Bank (2004).

Methodological Issues with Mobility Measurement

In an ideal world the type of longitudinal data used to perform mobility studies would be enough to answer static questions on inequality and poverty and also to analyze the dynamics of income by tracking the same individuals over time, hence eliminating the anonymity implicit in the comparison of cross-sectional data over time. However, reality is more problematic than this.

Longitudinal data have many problems in practice and hence their use requires caution. In general, since longitudinal studies are expensive to collect, the sample size of these surveys is considerably smaller than for cross-sectional surveys. More importantly, problems like measurement error of the income variable and attrition of individuals from the original sample can create serious biases in the estimation of the mobility parameters of interest.

Measurement error of the income variable can create serious biases in mobility studies precisely because this mismeasured variable appears *both* on the right hand side and on the left-hand side of the mobility regression models.[4] In particular, it can be shown that in the case of unconditional and conditional mobility models, measurement error of the income variable can bias the mobility parameters, giving the impression of high levels of

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[4] The extent to which measurement error of income biases macro-mobility indices will depend on the nature of this error and on the particular index under consideration.

convergence; see for instance Fields et al. (2003a), Duval Hernandez (2006a,b), Gottschalk and Huynh. (2006).

Attrition of individuals from the sample, on the other hand, may lead to serious losses of information, especially if this attrition is non-random, i.e., if it is related to the underlying income mobility process under study. For instance, positive mobility would be understated if individuals who would otherwise have experienced a large negative income shock move to another location to get another job and avoid the shock, thus disappearing from the panel..

Recently the use of pseudo-panels has been proposed as a potential solution to problems of measurement error and attrition in mobility studies; see for instance Antman and McKenzie (2005 and forthcoming). These pseudo-panels are constructed from cross-sectional surveys and, instead of tracking particular individuals or households, they track entire cohorts of individuals. These cohorts are usually created based on age, gender and sometimes education. In this case, the mobility analyzed is change in average cohort incomes, not changes in individual or household incomes.

The principal advantage of pseudo-panels is that because they are constructed from cross-sectional surveys, the time dimension of mobility studies can be extended. The disadvantages, however, are several. The pseudo-cohort method might still lead to biases if there is time-varying cohort-level measurement error. Also the pseudo-panel analysis can entail certain biases when it fails to track a consistent group of individuals over time due to events like migration, deaths, and household dissolution and creation. Finally, switching the analysis from individual or household income to the average cohort income eliminates the possibility of studying any intra-cohort income mobility.

An alternative method trying to eliminate the effects of measurement error is the one used in our joint 2006 comparative study reviewed in Section 4 below. This method relies on estimating mobility with respect to a predicted measure of permanent income. While doing this eliminates the measurement error component, it also eliminates some transitory components of earnings and the mobility associated with them. In practice, in the absence of validation data, it is virtually impossible to separate measurement error in income (or earnings) from true transitory income shocks.

While currently panels and pseudo-panels complement each other to give a better picture of the income mobility existing in an economy, in practice there is nothing better than collecting good quality panel data following individuals even when they migrate out of their households, obtaining second measurements on income variables (like administrative records), and covering over long periods of time.[5]

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[5] Efforts such as the new Mexican Family Life Survey are important steps in this direction.

3. What Does the Earlier Literature on Economic Mobility in Latin America Teach Us?

For reasons of data availability, empirical studies of income mobility began with work on developed countries; see Atkinson, Bourguignon and Morrison (1992) and Gottschalk (1997) for summaries. As panel data sets became available for developing countries, further research was carried out in those parts of the world; see the special issue of *The Journal of Development Studies* (vol.36, August 2000) and Fields (2001) for summaries of mobility research in the developing world as of the turn of the millennium.[6]

There are now a number of studies for Latin American countries. These studies are mainly country-specific and in some cases have limited coverage, but each illustrates in different ways the potential richness of economic mobility analysis. These studies are reviewed below, and they are also listed together by country in Table2-A,B.

Argentina
This section deals with the literature on economic mobility specific to Argentina. The amount of research on income mobility is starting to grow in the Argentina due to availability of new data from panel surveys. The major studies are those by Wodon (2001), Corbacho et al. (2003), Gutierrez (2004), McKenzie (2004), Albornoz and Menéndez (2004), Sánchez Puerta (2005), Sánchez Puerta and Fields (2005a and 2005b), Beccaria and Groisman (2006), Navarro (2006) and Cruces and Wodon (2003 and forthcoming).

Wodon (2001) analyzes income (wages and self-employment) macro mobility and risk throughout the business cycle in Argentina and Mexico. He uses a new measure of time-dependence, namely the Gini index of mobility, which is a function of the covariance between individuals' incomes and their income ranks. In Argentina, time-independence gauged by this index turns out to be higher during recessions and lower during growth compared to Mexico. Mexican labor markets seem to adjust to negative macroeconomic shocks through price adjustments (i.e., real wage cuts), while in Argentina labor markets adjust through quantities (in particular, a rise in unemployment). Since layoffs usually lead to more reranking of individuals in the earnings distribution, Argentina experienced less time-dependence in ranks during the downturns of its economy. Furthermore, young uneducated workers experienced less time-dependence than the rest of the population.

Corbacho et al. (2003) also use panel data from Argentina for the years 1999 to 2002 and analyze the determinants of changes in household income to draw inferences regarding socio-economic characteristics and vulnerability. They find that households whose heads were male, less educated, and employed in the construction sector were more vulnerable to the crisis, experiencing larger-than-average declines in income and higher dispersion.

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[6] Another closely related literature is the study of chronic poverty in the developing world. For a summary of recent research in this area see the special issue of *World Development* (Vol. 31, No. 3, 2003).

Gutierrez (2004) examines occupational and wage mobility in urban Argentina in the period 1998-2002. The author constructs panels for all individuals, both employed and economically inactive. He studies the determinants of wage mobility (using the concept of time dependence, as measured by the correlation coefficient between wages at two different points in time) and the determinants of finding or losing a job. He finds that low-earnings individuals have more wage volatility and more movements into and out of employment than high-earnings individuals. Also, men, the least educated, and younger individuals show more time independence than the other groups.

In a very comprehensive paper about the 2002 financial crisis in Argentina, McKenzie (2004) constructs panels and assesses the adjustments of household and individual incomes and the labor market response. McKenzie studies changes in nominal wages, entry into and exit from the workforce, hours worked, household labor supply and work program participation separately. The mobility analysis consists of an OLS regression of change in individuals' log earnings on individual characteristics and regions, with dummy variables for the period of crisis with interactions. The conclusions are that the largest earnings declines were for males, managers, and job-changers. Females in Cuyo did better than before, while females with tertiary education did worse.

Albornoz and Menéndez (2004) use panel data from Argentina during the 1990s and analyze the changes in the logarithm of household income per capita to determine what are the principal observed socioeconomic factors driving income dynamics. For this purpose, they perform multiple regression analysis to test, ceteris paribus, whether there are similar structural patterns in the variables explaining income changes over time in their five one-year panels.[7] They do not find any structural patterns for the determinants of income change and conclude that shocks affect different types of people over time.

Sanchez Puerta (2005) makes use of a series of rotating panels for 28 cities in Argentina to examine how much aggregate mobility there is in Argentina and how it has evolved under different macroeconomic scenarios from 1995 to 2003. The most important finding from the examination of indices of mobility in Argentina is that comparisons of mobility experiences through time or across groups depend on the index (and thus the notion) of mobility chosen. Comparing genders, education levels, age ranges, regions, initial quintiles, and initial sector of employment, some groups are found to have higher earnings mobility for some mobility notions and lower earnings mobility for others.

In addition, Sanchez Puerta (2005) compares determinants of changes in positions with determinants of changes in pesos and finds that, for the most part, those determinants are the same. Non parametric regressions on around eighty percent of the sample show a linear relationship between changes in positions and changes in pesos. Furthermore, the author studies four different definitions of upwardly-mobile and downwardly-mobile

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[7] A mobility pattern is said to be "structural" when the groups that gain the most when the economy is growing are also the groups that gain the most (or lose the least) when the economy is contracting.

individuals from concepts of absolute movement, relative movement, positional movement, and a hybrid notion of mobility, which combines the first three concepts. Even though the four classifications divide individuals in different ways, the unconditional and conditional determinants of upward (downward) mobility are almost the same across all classifications. Centile of initial reported earnings is the only determinant of upward (downward) mobility which has the same sign and significance in both the unconditional and the conditional analyses, both in growth and recessionary periods.

Fields and Sánchez Puerta (2005a) deepen the analysis of determinants of directional earnings changes at the microeconomic level. In both unconditional and conditional analysis, the variables that are found to be both statistically and economically significant determinants of earnings change are initial earnings and sector transition; the variables that are mostly statistically significant but economically insignificant are gender, age, and education; and the variable that is mostly statistically insignificant and always economically insignificant is geographic region.[8] Given the importance of sector transitions, both statistically and economically, the authors also looked for the determinants of sector change for initially unemployed, initially informal, and initially formal individuals. They found some statistically significant variables, but did a poor job explaining the variance of sector transitions using gender, age, education, and region. In a companion study, Fields and Sanchez Puerta (2005b) explain in detail how convergent mobility is consistent with increasing inequality in the case of Argentina. The "reconciliation" is achieved through examples, simulations, and actual data.

A recent paper by Beccaria and Groisman (2006) is also concerned with quantifying the volatility of income in the Greater Buenos Aires between the late 1987 and 2001. The authors calculate coefficients of variation for each individual using their labor incomes over time. They interpret these coefficients as a measure of income instability. The authors also propose a methodology to quantify the instability associated with transitions into and out of employment as well as the instability associated with changes in remunerations (holding constant employment transitions). While the authors find that the degree of instability in the region remained more or less constant during the period analyzed, they find that this was the product of two interacting forces, namely: the reduction in inflation in the mid-nineties (which reduced income instability), and the increase in employment volatility (which increased instability). Also, individuals with low education experience higher levels of instability than others. The authors also estimated measures of time dependence and positional movement and found that in general the region became more immobile by the end of the period under study.

Navarro (2006) estimates a dynamic pseudo-panel for Argentina for the period 1985 to 2004, to make up for the lack of long panel data in Argentina. The author finds that absolute mobility in incomes is quite high in Argentina, suggesting that the high level of inequality found in cross-sectional analyses will not persist over time. The paper also

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[8] A variable is judged to be "economically significant" if it explains at least 1% of the variance in earnings changes, "economically insignificant" otherwise.

finds evidence of reversal in recent years. Navarro compares her results with those in Albornoz and Menendez (2004) and Fields and Sánchez Puerta (2005) and finds similar results as the latter.

The relationship between poverty and income mobility in the Greater Buenos Aires area between 1995 and 2002 has been analyzed by Cruces and Wodon (2003 and forthcoming). Their 2003 paper follows Jalan and Ravaillon (2000) by estimating a decomposition of the squared poverty gap into a transient and a permanent component. The authors also estimate the determinants of such components. The results show that chronic poverty grew in the region, while transient poverty remained more or less constant during this period. Also, households with young heads, or members that are employers or self-employed are more prone to experience higher levels of transient poverty. In general the authors find that the determinants of transient and chronic poverty are different.

The paper by Cruces and Wodon (forthcoming) estimates risk-adjusted measures of household income[9] and uses these estimates to compare risk-adjusted measures of poverty with standard poverty measures. In this paper the authors also estimate the difference in the determinants of income and its risk-adjusted version. The authors find that in general the risk-adjusted measures of poverty are higher than the standard ones. Also, they find that households with elderly members and members having more education are prone to less risky income trajectories, while having a recent migrant, or member who experienced episodes of unemployment or inactivity bring more risky trajectories.

In summary, many papers have exploited the panel features of the Argentine Permanent Household Survey from 1995 until now. Some authors have constructed repeated short term panels and some have relied on pseudo-panel techniques. Most studies about (household or individual) income or earnings mobility in Argentina over time, have found substantial mobility, especially in periods of recession.

Chile

The first income mobility studies for Chile were conducted by Scott and Litchfield (1994) and Scott (2000). Both papers are based on a small longitudinal study of rural households between 1968 and 1986. The authors analyze mobility of household per capita income, with and without government transfers. The panel consists of only two observations in time, but those capture the impact of Chile's liberalization reforms after 1974.

Scott and Litchfield (1994) study income mobility and the evolution of inequality over time. The authors start by presenting a transition matrix between absolute income classes. This matrix shows that, during the years considered, half of the households in the survey moved to a higher income class, while only 26% experienced movements towards lower

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[9] The risk-adjustment uses the certainty equivalent of income, and hence penalizes income trajectories that are very volatile.

income classes. Furthermore, households that experienced greater upward mobility were the initially poor, and 92% of these households moved to higher income classes.[10] Their analysis shows that, while many households changed income classes, they did not move very far. In fact, income mobility was only one-fourth of the maximum possible mobility. Also, the study shows that not only there were more upward than downward movers, but the extent of upward mobility (in terms of number of classes transited) was greater than the extent of downward mobility.[11] Finally, the authors model the determinants of directional income movement by using a linear regression and an ordered logit model (in which the dependent variable is whether the household moved to a higher income class, stayed in the same income class, or moved to a lower income class). The variables found to be significant determinants of upward income movement are age and education of the household head, amount of land owned, and per capita household income in the base year (the richer the household in 1968, the smaller the growth of income from 1968 to 1986).

Scott (2000) complements the previous findings by analyzing the extent of movements out of poverty for the households in the sample. The results show that, while there was upward mobility during those years, around 70% of the initially poor households were below the poverty line in 1986. Similarly, 64% of the non-poor households stayed above this line eighteen years later.

More recently, poverty dynamics and relative income mobility were studied by Contreras et al. (2005, 2006). Data from 1996 and 2001 were drawn from the CASEN panel, which covers 60% of the country. In Contreras et al. (2005), the authors study poverty dynamics using a two-by-two transition matrix and logistic regressions. They study relative income mobility primarily by using a ten-by-ten transition matrix. The authors report "significant short term positional mobility across the first seven deciles of the income distribution," from which they conclude that "a large percentage of non-poor households are at risk of falling into poverty." They show too that statistically significant determinants of entering and exiting poverty are number of children under the age of fifteen, the educational level of the household head, the amount of technical education received, rural residence, residence in the capital region, health problems of household members, and other variables.

Contreras et al. (2006) uses both cross-sectional and panel data methods to determine the distributional effects of Chilean growth. This review is limited to the panel data analysis in their paper. Three estimations are performed across the income distribution. All involve percentage income change from 1996 to 2001 as the dependent variable. The first is a linear regression of percentage change in income on initial reported income, the second is a non-parametric regression of percentage change in income on initial reported

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[10] These households could not move further down, since they are located in the lowest income class. At worst, they could remain in the same class.

[11] While the evidence of upward mobility of the poor seems solid, its magnitude needs to be taken with caution. According to the authors, the 1986 survey did a better job in measuring transfers like pensions and child allowances. Since these transfers are likely to go to poorer households, this could lead to an overestimation of the income gains of the poor.

income, and the third is a non-parametric regression of percentage change in *predicted* income on initial predicted income.[12] The linear regression shows convergent mobility in logs. However, both non-parametric regressions show convergent mobility in logs only in the lower deciles. It should be noted that the finding of log-convergence is consistent with either convergence or divergence *in pesos*, and thus it cannot be ascertained from the results presented whether Chile is similar to Argentina, Mexico, and Venezuela or not.

Finally, Paredes and Zubizarreta (2005) also used the CASEN data to study transitions between extreme poverty, poverty, and non-poverty. After calculating Shorrocks' rigidity index, the authors estimated a transition matrix among the three income groups. Fully 80% of those who started in extreme poverty were found to be out of extreme poverty five years later, half by escaping into (non-extreme) poverty and half into non-poverty. Next, the authors examined mobility among the ten income deciles. The same patterns were found in Chile as in other countries: the highest frequencies appear in the 1/1 and 10/10 cells, and movement among the deciles is substantial. Last, the determinants of movement among the three categories were examined. The determinants of movement out of poverty were found to be different from the determinants of movement into poverty. Particularly important for movements out of poverty were the role of women and the quality of housing.[13]

In summary, the Chile studies demonstrate substantial movement between deciles of the income distribution as well as into and out of poverty.

El Salvador

For El Salvador there is a panel dataset that spans from 1995 to 2001, where a representative sample of rural households have been interviewed every second year. Three papers make use of these panel data. All of them are concerned with income mobility as an explanation of poverty persistence, but they all use different methods for exploring this relation.

The paper by Beneke de Sanfeliu and Shi (2003) is a general description of the characteristics of the rural poor in El Salvador. It provides some measures of movement among deciles and finds that there is a lot of mobility: less than 21% of the households remain in the same decile after two years. The authors characterize the households by the number of poverty spells and find that 25% of the households are poor in the four waves of the panel, and 13% are never poor. They then construct poverty profiles and estimate logit models in order to identify the household characteristics that are associated with these poverty spells. They conclude that those with larger dependency ratios, lower schooling, and fewer assets and remittances are more likely to be poor in the four waves of the panel.

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[12] Income is predicted using household composition variables, regional variables, human capital variables, and physical capital variables.

[13] Similar work is in progress by Castro (2006), but so far only preliminary results are available.

Rodríguez-Meza and González-Vega (2004) investigate the presence of poverty traps by testing non-linearities in an income generating function. They find econometric evidence in favor of non linearities and conclude that idiosyncratic shocks may leave poor families in a position from which they cannot recover. Sosa-Escudero, Marchioni and Arias (2006) study the persistence of poverty by testing a variance-covariance model. They find that the persistence of low income is for the most part explained by low productive endowments but also by unfavorable shocks that linger over time.

In general, all three papers agree that amid serious shocks like hurricanes, earthquakes and falling export prices, El Salvador has enjoyed important reductions in poverty due to economic growth and structural reforms. However, those households that show persistent poverty are those that have been hurt by shocks and, due to low initial conditions in terms of endowments, are unable to recover from it.

Mexico
Wodon (2001) and Yitzhaki and Wodon (2002) studied aggregate income mobility in Mexico by analyzing time-dependence in individual ranks; the first compares urban Mexico with Argentina, while the second focuses on rural Mexico. Wodon (2001) has already been discussed under the literature review for Argentina. Yitzhaki and Wodon (2002) use a dataset related to the rural subsidies program PROCAMPO. The study was conducted in rural areas in Mexico in 1994 and 1997. Time-dependence in ranks is captured by the Gini index of mobility for four welfare measures: per capita income, per capita land owned, per capita land cultivated, and PROCAMPO transfers. In general, time-dependence in ranks is quite high in these rural samples, meaning that individuals preserve their ranks over time. Also, time-dependence is smaller using land measures than using per capita income. Finally, PROCAMPO caused limited re-ranking in the distribution.

Cunningham and Maloney (2000), Maloney et al. (2004), World Bank (2004), and Antman and Mckenzie (2005 and forthcoming) analyze micro-mobility in urban Mexico. Antman and Mckenzie (2005) create pseudo-panels in which the incomes of specific age-education cohort groups are tracked from 1987 to 2001. They report little convergence between the earnings of rich and poor households (what the authors call "absolute mobility") and rapid and increasing conditional convergence of the household's earnings to its own average level (what the authors call "conditional mobility"). Antman and McKenzie (forthcoming) exploit those pseudo-panels to test the existence of poverty traps in Mexico and to study the possibility of nonlinearities in household labor income dynamics. The authors conclude there are no poverty traps for Mexican urban households. Unfortunately, rural areas, where the incidence of poverty is greater, are not analyzed.

Cunningham and Maloney (2000), Maloney et al. (2004), and World Bank (2004) focus on vulnerability and the distribution of income shocks in Mexico. In particular, they study the conditional earnings mobility distribution, where the conditioning factors are a

set of socioeconomic variables. The periods covered by these studies include before, during and after the 1994 Peso crisis, as well as 1998-2002. The authors find a substantial amount of heterogeneity in the distribution of shocks across population groups. They also find that, holding everything else constant, the least educated and poor suffered slightly less in terms of earnings changes during the 1994 Peso crisis, but probably at the cost of having to add other members of the household to the labor force. Finally, the authors show that the structure of the determinants of earnings changes is quite stable regardless of whether the economy is in recession or not. One difference was that during recessions, more educated households experience larger earnings losses than less educated groups in the population, holding everything else constant. However, World Bank (2004) reaches somewhat different conclusions when analyzing consumption shocks, using the PROGRESA dataset to evaluate poverty alleviation between 1998 and 2000. Less educated households in rural areas seem to suffer greater shocks than the more educated ones.

Duval Hernandez (2006a) uses the ENEU surveys[14] between 1987 and 2002 to analyze issues of macro-mobility. In particular, he studies the evolution of directional mobility and mobility as an equalizer of longer-term incomes for the whole economy as well as for several groups of the population.[15] In general, average earnings change (a measure of directional mobility) fluctuated around zero, with the exception of the late 1980s and early 2000s, when individuals experienced gains, and the years following the 1994 peso crisis, when individuals experienced large losses. These patterns are shared by the majority of the groups in the population, with the exception of initial earnings quintile and sector groups. For these groups, the most advantaged individuals experienced the largest losses, while the most disadvantaged ones experienced the largest gains. Furthermore, mobility equalized longer-term earnings for the entire population during most of the periods studied, and it helped reduce longer-term earnings inequality within-groups. However, mobility only sometimes equalized longer-term earnings between groups.

In addition to this, Duval Hernandez (2006a) contains an analysis of the segmentation of Mexican labor markets between formal and informal sectors, and it shows that individuals predicted to be rationed out of formal sector jobs experienced important positive earnings mobility once they managed to enter this sector in future periods.

Duval Hernandez (2006b) presents a much more detailed analysis of the relationship between earnings mobility and initial advantage. It presents results similar to the ones included in this paper (see Section 4 below), and in addition tests the robustness of these findings under a wide variety of specifications. Among other things, it tests their robustness to different types of measurement error in earnings and to the presence of attrition in the data. Simulations on the impact of measurement error show that this error needs to be quite large in order to be the *sole* reason underlying the convergence findings

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[14] See the description below in Section 4.

[15] The groups considered are age, education, gender, quintile of initial earnings, sector, and region groups.

in the study. Also, the amounts of attrition in the panel and of non-reporting of the earnings variable are large, which calls for caution before generalizing the results found in the sample to the overall population.

In summary, the papers studying income mobility in Mexico provide a picture of the economy where much earnings mobility takes place. However, the majority of these changes seem to be transitory and to a great extent they have failed to alter the long-term position of individuals in the income distribution.

Peru

Studies on income mobility in Peru have been carried out by Glewwe and Hall (1998), Herrera (1999, 2001, and 2005) and Grimm (2005).[16] Glewwe and Hall (1998) used panel data from the World Bank's Living Standards Measurement Survey for Lima to study income mobility of urban households during the recessionary period 1985-1990. The authors used multiple regression to analyze the determinants of vulnerability to macroeconomic shocks and estimated the determinants of the change in the logarithm of the per capita household consumption. The more negative/less positive are the changes, the more "vulnerable" the household is said to be. Their main results were that households headed by relatively well-educated persons, female-headed households, and households with fewer children are less vulnerable.

Herrera (1999) exploits a panel of 421 households in Lima in 1990, 1994, and 1996 matched with an earlier panel of 721 households in 1985/1986-1990. He analyzed the evolution of various concepts of macro mobility and estimated microeconometric models of poverty persistence. The variables found to be significant determinants of chronic poverty were the household's demographic composition, the education of the head of the household, and initial wealth. Those that were insignificant were ethnic origin, sex of the head of the household, and place of residence. This exercise is extended for the period going from 1997 to 1999 in Herrera (2001), and put in a comparative perspective in Herrera and Roubaud (2005).

Grimm (2005) makes use of panel data for urban and rural Peru collected between 1997 and 1999. The study compares measures of pro-poor growth proposed by Ravallion and Chen (2003) and the author´s own measures of mobility and pro-poor growth. The idea is to measure whether the income changes are favorable to the poor. Grimm finds that the annual growth rate of household consumption is higher for those in the bottom percentiles than those in the higher percentiles of the distribution both for urban and rural areas of Peru. However, the poverty headcount in this country increased by 1.4 percentage points for the period because although a sizable share of the population escaped poverty (10.6%) an even larger group entered poverty (12.0%).

Venezuela

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[16] There have been some studies on mobility and subjective welfare in Peru (e.g., happiness) by Graham and Pettinato (1999 and 2001). However, the relationship between this literature and the mobility literature is still in its infancy and for the Latin American case only the Peruvian case has been studied.

Studies of income mobility in Venezuela have been conducted by Freije individually and jointly with collaborators (Freije, 2001; Fields, Cichello, Freije Rodriguez, Menéndez, and Newhouse, 2003a and 2003b; Fields, Duval Hernández, Freije Rodríguez, and Sánchez Puerta, 2006). These contributions are reviewed below.[17]

Freije (2001) makes use of a long series (from 1979 to 1998) of year-to-year panel data to compute several macro mobility indexes for household labor earnings per capita for Venezuela. The study draws a picture of rising economic insecurity, since indexes for positional mobility and time independence rise over the years. It also shows declining standards of living, because earnings flux decreased and directional mobility remained negative for most years. In another part of the study, Freije (2001) studies the determinants of income, positional and poverty dynamics in Venezuela from 1994 to 1998. Using decomposition of indexes and multivariate analysis, the author finds that labor earnings of the head and other members of the family are the principal variables explaining household income dynamics. A number of Freije's other micro mobility findings were elaborated upon in follow-up work, described below.

The study by Fields et al. (2003b) documents the relative importance of several variables in explaining the dynamics of household per capita income using longitudinal data for Venezuela and other countries (Indonesia, South Africa, and Spain). Using univariate as well as multivariate regression methods for a single panel for Venezuela, they find that changes in employment status of the head of the household, changes in family type, and changes in number of children are significant determinants of household income changes. Initial reported income is found to be significantly and negative related to income change but this significance vanishes after using household durables as instrumental variables to deal with a concern on measurement error in this variable. Further, the authors make use of the Fei, Ranis and Kuo (1978) and Shorrocks (1982) decompositions to gauge the relative importance of different variables in explaining the dispersion of income changes. They find that for the majority of the Venezuelan households, more than 50% of the change in family per capita income is explained by changes in incomes rather than changes in household size. They also find the around 90% of the changes in income can be ascribed to changes in labor earnings and only around 10% to changes in other income sources. The results for Venezuela are similar to the results for the other countries studied in terms of the relative importance of labor earnings for explaining household income dynamics but differ in that it is not possible to establish a relationship between initial income and income change in Venezuela.

The companion study by Fields et al. (2003a) searches further for a relationship between income changes and initial household per capita income. To test whether the poor have larger or smaller income changes than the non-poor, they run univariate regressions with household income per capita regressed on initial income (with and without instrumental variables). Linear regression and non-parametric regression models are used. For the case of Venezuela they find a significant negative relationship when using reported initial

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[17] Márquez and Ruiz-Tagle (2004) have studied employment mobility in Venezuela as an input for contrasting job search models in Latin America.

income, but no significant relationship when using predicted (instrumented) initial income. The authors model the possible structure of the measurement error and conclude that, despite its presence, it is not likely that measurement error overturns the results for Venezuela. They conclude that the poor do at least as well as the non-poor in Venezuela.[18]

These studies draw a picture of household income mobility in Venezuela being fundamentally driven by changes in household head labor earnings and family demographics but, at the same, no clear relationship between income changes and initial income can be ascertained.

4. Comparative Studies of Three Latin American Countries

There are two comparative studies on mobility for Latin America as a region. Our 2006 paper is one of them, and it is reviewed in detail here. Another comparative mobility study is Calonico (2006).

The paper by Fields, Duval Hernández, Freije Rodríguez, and Sánchez Puerta (2006) relates income mobility to economic growth and decline and to income inequality in Argentina, Mexico, and Venezuela. In essence, we find that the mobility results paint a very different picture of distributional change in the course of economic growth and decline from those obtained using comparable cross sections.

These three countries were selected for study both for reasons of data availability and for inherent interest. On the data side, for each of the three countries, we have repeated panels enabling one-year mobility to be studied during periods of macroeconomic growth and decline. The data sets available – the Encuesta Permanente de Hogares (Permanent Household Survey) for Argentina, the Encuesta Nacional de Empleo Urbano (National Urban Employment Survey) for Mexico, and the Encuesta de Hogares por Muestreo (Household Sample Survey) for Venezuela – are so similar to one another that virtually identical methods could be used for each of the three countries. Unlike nearly all of the preceding literature, multiple panels are utilized for each country: seven in the case of urban Argentina, fifty-six in the case of urban Mexico, and six in the case of Venezuela.

These three countries are of inherent interest for an unfortunate reason: as shown in Figure 2, each of them experienced both positive growth and negative growth episodes. Given these macroeconomic ups and downs, the questions investigated in this study are: Who gains the most income when economies grow? Are those groups that gain the most income in good times the ones that lose the most income in bad times? Are these patterns of mobility related to changes in inequality over time?

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[18] The same conclusion is reached for South Africa but not for Indonesia or Spain.

Looking first at inequality, Figures 3a-3c depict the Gini coefficients for the three countries for the years covered by the panel. Earnings inequality trended upward in Argentina and Mexico and followed an inverted-V pattern in Venezuela.

More often than not, in Latin American countries, economic growth has been positive and income inequality has been rising. In such times, the anonymous individuals at the top end of the income distribution benefited as much or more in proportionate terms, and therefore much more in terms of pesos or bolivares, than lower income groups. But in addition, in times of macroeconomic decline, approximately constant relative inequality would imply that those anonymous individuals at the top end of the income distribution would have lost more in pesos or bolivares than others.

Given this, it is only a small step to formulate two hypotheses for panel people. The first finding suggests that when the same people are followed over time, in times of economic growth, those at the top end of the income distribution will be observed to have gained more in pesos or bolivares than those lower in the income distribution. We term this the "divergent mobility hypothesis" and test it in our panels both for income itself and for the income of groups that differ in terms of economic position (those with more education versus those with less, men versus women, etc.). The divergent mobility hypothesis is reinforced by three economic factors: cumulative advantage, poverty traps, and labor market twist. These three factors exemplify positive feedback, defined by Nobel laureate James Meade (1976, p. 155) as "self-reinforcing influences which help to sustain the good fortune of the fortunate and the bad fortune of the unfortunate." It should be noted that one other factor − regression to the grand mean (Galton, 1889) − works in the opposite direction.

Moreover, the two findings taken together led us to hypothesize that symmetry would hold for particular individuals: specifically, when following the same people over time, those groups for whom earnings changes are the most positive when the economy is growing are those for whom earnings changes are the most negative when the economy is contracting. We term this the "symmetry hypothesis" and test it in our panels both unconditionally and conditionally.[19] Denoting by $\Delta \bar{Y}_t^g$ the average earnings change of group g, the (unconditional) "symmetry hypothesis" states that if $\Delta \bar{Y}_{t-1}^j \geq \Delta \bar{Y}_{t-1}^k$ during periods of growth, we should expect to see $\Delta \bar{Y}_{t-1}^j \leq \Delta \bar{Y}_{t-1}^k$ during periods of recession.[20]

To test the (unconditional) divergence hypothesis we estimated a regression like (1), and in addition to that, we estimated the same regression but now using a measure of predicted earnings $\hat{Y}_{i,t-1}$ as a regressor, i.e.

$$\Delta Y_{i,t} = \alpha + \beta \hat{Y}_{i,t-1} + u_{i,t} \tag{3}$$

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[19] This hypothesis would be expected to hold if the forces that lead an economy into a recession are similar to the ones that take it out the slump, by acting in the opposite direction.

[20] To test this hypothesis *conditionally* the parameters of conditional mobility regressions like (2) are compared over periods of growth and recession.

The reasons for using a measure of (initial) predicted earnings in addition to the earnings reported by the individuals in the survey are twofold. First, by predicting initial earnings with a set of characteristics that are permanently attached to the individual (age, gender, education, etc.), one obtains an estimate of a more permanent aspect of well-being, one that is less affected by transitory fluctuations in income. Second, using this proxy of well-being as an independent variable in the mobility regressions gives us results that are robust to the presence of several types of measurement error in the earnings variable.

An alternative method that could be used is to approximate the individual longer-term earnings by averaging individual earnings over all the periods observed in the panel. The advantage of this method is that it would capture the advantage brought about both by observable factors (like age, education, gender, etc.) and by unobservable time-invariant characteristics (e.g. ability, social capital, etc.). This method will work best if the panel has many observations per individual (i.e. if T is large) and if these observations are spaced widely over time. Under these conditions the effects of transitory income fluctuations and measurement error would be averaged out and their impact would be minimal. We chose not to follow this route because in our case T is not very large and the time observations are close to one another.[21]

The actual results surprised us. We found that the divergent mobility hypothesis and the symmetry hypothesis were borne out in only a very small percentage of the cases. Figure 4 displays the coefficients of regressions based on (1), i.e. of earnings change on initial reported earnings (left half of the figure) and the ones based on (3) (right half of the figure).[22] Each graph displays the point estimate for a given panel along with the corresponding 95% confidence interval. A negative parameter indicates convergence between the earnings of rich and poor, a positive parameter indicates divergence (and would support the "divergent mobility hypothesis"), and a parameter statistically insignificant indicates that the earnings changes (in pesos or bolivares) were on average the same for individuals with different initial earnings.

As can be seen from Figure 4, the divergent mobility hypothesis receives no support at all when reported earnings are used and very scant support for only a small number of years when predicted earnings are used. In general, the results that use predicted earnings as a measure of initial advantage show much less convergence than the ones that use reported

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[21] For Mexico there are 5 quarterly observations per individual (leaving aside attritors in the intermediate quarters) and for Argentina there are 4 semi-annual observations. In both countries, the aforementioned exercise gives virtually the same results as the ones observed with the regression based approach. For details see Duval-Hernandez (2006) and Sánchez Puerta (2005) respectively. For Venezuela, an experiment using the average income over the two-semester panel ended with qualitatively the same results as when using predicted income.

[22] Six methods for predicted earnings were used, and all showed similar results. The figure displays the results for one of the methods. For a full list of regressors used to predict earnings on the first stage please refer to our joint 2006 paper.

earnings.[23] As previously mentioned, this is because predicted earnings are less sensitive to transitory fluctuations in earnings and more robust to the presence of measurement error than initial reported earnings are. One example of convergence with predicted earnings occurred during the 1994-96 "Tequila Crisis" in Mexico, during which time almost everybody lost, but the individuals with high permanent advantage lost the most in pesos.

Moving to a comparison of earnings changes for different groups in the population, the divergence hypothesis would be said to hold if the earnings changes for more-advantaged groups (men, for example) are significantly greater than the earnings changes for less-advantaged groups (such as women).Empirically, though, we find that the divergence hypothesis is rejected in all cases in Argentina and Mexico, while in Venezuela, divergent mobility is found for two indicators only (education and economic sector). As for the symmetry hypothesis, which would hold if the group that gains the most when the economy is growing loses the most when the economy is contracting, only one instance is found: in Venezuela, men gained more than women when growth was positive and lost more than women when growth was negative. Symmetry was rejected for all other variables in Venezuela and for all variables in Argentina and Mexico – for the particular case of initial income, Figure 1 shows that the coefficients do not change sign according to growth performance.

When divergent mobility was rejected, the pattern was either convergent or statistically insignificant. Convergent mobility means that low earners gained more in pesos or bolivares than middle earners and high earners. Statistical insignificance means that low earners, middle earners, and high earners experienced about the same changes in pesos or bolivares as each other. Thus, our panel data analysis presents a picture of economic growth and decline in which high-earners do not gain more compared to middle earners and low earners.

The panel data results and the cross section results demonstrate quite different things. The panel data results show that in general mobility is neither divergent nor symmetric. On the other hand, cross section analysis shows that inequality is trending upward in Argentina and Mexico and is inverted-V shaped in Venezuela. How can these two sets of results be reconciled?

The answer is that many individuals experienced large changes within the distribution of earnings, while the anonymous distribution of earnings was changing less.[24] For each

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[23] The result for 1996 in Venezuela is the only exception. Venezuelan household surveys have two different rotation patterns. Out of eight regions, six of them are rotated every six semesters and the other two every four semesters. In the panel for the period 1996-1997, observations from only two regions could be matched. Consequently, the panel for such period does not have observations from every region of the country, as the other panels do. Therefore, the panel for this period is systematically different from others and this result ought to be interpreted as an artifact of the data.

[24] In the example in Case II in the introduction, individual α experienced an income change from \$1 to \$5, individual β experienced an income change from \$3 to \$1, but the whole anonymous distribution changed only from (1, 3) to (1, 5).

panel in each of the three countries, we calculated how much of the percentage change in the variance could be accounted for by the convergent central tendency and how much by the inequality of earnings changes. In the great majority of panels, the central tendency accounted for no more than 15% of the change in variance and often considerably less, meaning that 85% or more of the change in the variance was accounted for by the inequality of earnings changes. It is this large variance in individual changes from one year to the next – some low-income individuals moving way up in an earnings distribution that is often becoming more unequal and some high-income individuals moving way down in the distribution – that reconciles the mobility and inequality results.

Before concluding this section, mention should be made of the study by Calonico (2006). This study uses pseudo-panels to analyze micro-mobility in Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Uruguay and Venezuela from 1992 to 2003. Unconditional and conditional mobility equations are estimated. Some countries like Uruguay, Argentina, and Brazil are found to be very immobile, while Chile, Mexico, and Venezuela are found to be the most mobile countries of those considered. Conditional mobility is usually higher than unconditional mobility, and the patterns across countries are similar to those of unconditional mobility.

5. Conclusions and Suggestions for Further Work

Much literature has been reviewed in this paper. There is a large array of results on mobility for Latin America due to the use of different mobility concepts, data bases, and methodologies. We would sum up the results with six major findings:

First, income mobility is not the same as inequality changes. Mobility studies have taught us quite different things from what we learn from changes in inequality in comparable cross sections. As detailed below, rising inequality is compatible with mobility that is neither divergent nor symmetric.

Second, Latin American income distributions are not rigid from one year to the next. All studies show that individuals and families move from one income class to another and into and out of poverty. Is there a lot of income mobility or a little? We would sum up the findings by saying that in each of the countries where income mobility has been studied there is both a lot of mobility and a lot of immobility.

Third, and not surprisingly, some income groups exhibit more positive earnings changes than others. What is surprising, though, is that in all of the Latin American countries where the issue has been studied, it is the *lowest* earners who, with a small number of exceptions, have been found to gain at least as much as middle earners and high earners do, and sometimes more. The fact that a high convergence between high and low earners is found when initial reported earnings are used and low convergence occurs when predicted earnings are used (with the exception of Argentina in its crisis years), might

reflect that, while there is a lot of transitory mobility in the short run, this mobility is doing little to alter the long term positions of individuals in the income distribution.

Fourth, over the business cycles in Argentina, Mexico, and Venezuela, income mobility appears to be structural, not symmetric. Put differently, the same factors that are important determinants of income changes when the economy is growing are also important and act in the *same* direction, not the opposite direction, when the economy is contracting. Thus, for these three countries, we find scant evidence for divergence or symmetry.

Finally, the mobility patterns confirm the idea that countries differ in the mechanisms by which they adjust to macroeconomic shocks. Mexico appears to have relied more on price adjustments than Argentina, which relied more on quantity adjustments. Venezuela registers wide oscillations of the unemployment rate as well as the highest inflation rate on the continent during the nineties; at the same time, the labor code is quite restrictive with respect to firing employees.

These results offer insight to policy-makers. It is a cliché but still true that time exposure results could lead to different policy interventions from snapshot results. In this context, it might have been that little mobility was found in Latin America and that the low earners in one year are the same people as the low earners in another. Had this been found, interventions targeted at a fixed group of people would have been in order. But in fact the target populations are *not* comprised of the same people over time. Much more movement within the earnings distribution is reported than had been thought.[25] Programs such as Oportunidades in Mexico, Bolsa Familia in Brazil, and Puentes in Chile need to be designed to take account of both the substantial fixity of the low-earning population and the substantial movement into and out of low earnings, for example, by including mechanisms to mitigate risk. Growth is necessary but it is not enough.

The authors feel that too many "policy implications" in the earnings mobility field, and in the analysis of Latin American labor markets more generally, are not implications at all. This is because the "implications" are based on empirical evidence that is too limited, they are not supported by well-formulated theoretical models, and they lack an explicit criterion for making social welfare judgments. Careful social cost-benefit analysis is needed. These concerns and recommendations are elaborated at length in a paper now being prepared by one of us (Fields, forthcoming).

Despite all that has been learned, much more remains to be done:

First, many of the panels used to gauge mobility in Latin America are urban panels, or panels that are not necessarily representative of the whole economy. Panels with national coverage are essential for learning what is going on in a country as a whole.

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[25] "Reported" because some of the apparent mobility is due to measurement error.

Second, the research community would benefit from panels for more countries. These would enable us to learn the extent to which the findings reported here can be generalized across Latin America.

Third, longer panels for existing countries would be helpful, allowing us to measure longer-term economic position better and also compare changes for the same people from one year to the next. This is particularly relevant if analysts are to find the socioeconomic determinants of long-run mobility.

Fourth, more needs to be learned about the effect of measurement error on the mobility estimates. In particular, validation studies that quantify and specify the nature of measurement error on earnings are much needed for Latin American countries and for developing countries in general. Without such studies, it is virtually impossible to separate true transitory adjustments in earnings from spurious correlations between mismeasured earnings.

These data deficiencies are likely to be overcome in the new Mexican Family Life Survey, which shows substantial promise in providing a panel with national coverage, low levels of attrition, broader measures of income besides labor market earnings, and administrative records of earnings that can help distinguish true mobility from measurement error. More data sets like this would be welcome for other Latin American countries

Fifth, we believe that the most has been learned about mobility when the same methodology has been used in a number of countries. More such comparative studies would be particularly valuable. While there is a vast array of results on mobility for Latin American economies, it is hard to come up with a general picture of what has happened in the region since there are a lot of methodological disparities across studies.

Sixth, more questions could be asked than have been. One example can be found in the Inter-American Development Bank's *Good Jobs Wanted* study (IADB, 2003), which estimated that 16% of formal sector workers in Argentina and 10% in Mexico transited to an informal sector job after six months.[26] Another example is a joint Inter-American Development Bank – World Bank study now under way which is looking at the skills, gender, and age dimensions of mobility in three Latin American countries and six transition economies.

Finally, the field would benefit from an open discussion among researchers and policy makers alike about what are the fundamental questions that need to be answered. How important is mobility vis-à-vis inequality and poverty? Which aspects of mobility – time-independence, positional movement, share movement, symmetric income movement, directional income movement, and mobility as an equalizer of longer-term income - are most important from the point of view of economic well-being? What is the trade-off

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[26] "Formal sector" here is defined as a job with social security benefits, "informal sector" as a job without them.

between the equalizing effects of mobility versus the volatility and uncertainty brought by it?[27] These and other such fundamental questions merit a more thorough discussion in the region than they have been given thus far.

In conclusion, we have learned a great deal from mobility studies, knowledge that would not have been gotten from inequality and poverty studies using cross sectional data. What we have learned is that in Latin America, as elsewhere in the world, the knowledge obtained from mobility studies adds a different and valuable dimension to income distribution analysis. All types of income distribution studies are worth doing, but because mobility studies are the fewest in number, they rate the highest priority for future research.

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[27] While the theoretical literature has started addressing this particular issue (see the paper by Gottschalk and Spolaore 2002), there is still a vacuum in the empirical literature trying to link income mobility with the credit markets conditions, that would allow individuals to smooth income fluctuations.

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Table 1: A Summary of Mobility Indexes

Mobility Notion	Index	Formula
Mobility Towards Equality	Shorrocks' equalization index	$1 - \dfrac{I\left(\sum_{t=1}^{T} y^t\right)}{\sum_{1}^{T} w^t I\left(y^t\right)}$
	Fields' equalization index	$1 - \dfrac{I\left(\sum_{t=1}^{T} y^t\right)}{I\left(y^1\right)}$
Mobility as Time Dependence	Pearson's correlation coefficient	$\dfrac{Cov(Y_j^f, Y_j^i)}{\sqrt{Var(Y_j^f)}\sqrt{Var(Y_j^i)}}$
	Pearson's chi-squared	$\sum_c \sum_r \dfrac{\left(n_{c,r} - m_{c,r}\right)^2}{m_{c,r}}$
Mobility as Positional Movement	Mean absolute quantile change	$\dfrac{1}{n}\sum_{j=1}^{n}\left|P_j^f - P_j^i\right|$
	Mobility ratio	1-trace(M)
Mobility as Symmetric Income Movement	Average absolute income change	$\dfrac{1}{n}\sum_{j=1}^{n}\left|Y_j^f - Y_j^i\right|$
	Relative absolute income change	$\dfrac{\sum_{j=1}^{n}\left|Y_j^f - Y_j^i\right|}{\sum_{j=1}^{n} Y_j^i}$
Mobility as Directional Income Movement	Average income change	$\dfrac{1}{n}\sum_{j=1}^{n}(Y_j^f - Y_j^i)$
	Average logarithmic income change	$\dfrac{1}{n}\sum_{j=1}^{n}\left[\ln\left(Y_j^f\right) - \ln\left(Y_j^i\right)\right]$

Notes:

$Y_j^{f,i}$: income of individual j in period f (final) or period i (initial)

$P_j^{f,i}$: income position (e.g. quantile) of individual j in period f (final) or period i (initial)

M : transition matrix

$n_{c,r}$: number of observations in column c, row r, of a quantile mobility matrix

$m_{c,r}$: number of expected observations in any cell of a quantile mobility matrix under the hypothesis on time independence (i.e. the inverse of the squared number of quantiles times the total number of observations).

y^t : population vector of individual incomes for period t

n : number of individuals in the population

w^t: factor weights (ratio of average income in period t to the sum of average incomes over time)

**Table 2-A Mobility Studies on Latin American Countries**

Country/ Author	Years Studied	Type of Study
Argentina		
Wodon (2001)	1993-1996	Time Dependence
Corbacho et al. (2003)	1999-2002	Conditional Mobility, Vulnerability
Albornoz and Menéndez (2004)	1991-2000	Conditional Mobility
Gutierrez (2004)	1998-2002	Time Dependence Conditional and Unconditional Mobility
McKenzie (2004)	2000-2002	Conditional Mobility
Cruces and Wodon (2003 and forthcoming)	1995-2002	Poverty Dynamics and Income Instability
Sanchez Puerta (2005)	1995-2003	Macro Mobility
Fields and Sanchez Puerta (2005 a,b)		Conditional and Unconditional Mobility
Beccaria and Groisman (2006)	1987-2001	Income Instability and Macro Mobility
Navarro (2006)	1985-2004	Conditional and Unconditional Mobility
Chile		
Scott and Litchfield (1994)	1968 and 1986	Positional, Symmetric and Directional Mobility Conditional Mobility
Scott (2000)	1968 and 1986	Movements out of poverty
Paredes and Zubizarreta (2005)	1996-2001	Determinants of extreme poverty and Mobility
Huneeus and Repetto (2004)	1990-2000	Determinants of Mobility
Contreras et al. (2006)	1996-2001	Pro-poor growth and Unconditional Mobility
Contreras et al. (2006)	1996-2001	Poverty Dynamics and Positional Mobility
El Salvador		
Beneke de Sanfeliu and Gonzalez-Vega (2000)	1995 and 1997	Conditional Mobility
Beneke de Sanfeliu and Shi (2003)	1995-2001	Conditional Mobility, Vulnerability
Rodríguez-Meza and González-Vega (2004)	1995-2001	Poverty Traps
Sosa-Escudero et al. (2006)	1995-2001	Determinants of poverty persistance
Mexico		
Wodon (2001)	1987-1996	Time Dependence
Yitzhaki and Wodon (2002)	1994 and 1997	
Cunningham and Maloney (2000)	1994-1997	Vulnerability
Maloney et al. (2004)	1994-1996	
World Bank (2004)	1992-1995 1998-2003	
Antman & McKenzie (2005)	1987-2001	Conditional and Unconditional Mobility
Antman & McKenzie (forthcoming)		Poverty Traps
Duval Hernandez (2006 a,b)	1987-2002	Macro Mobility Conditional and Unconditional Mobility
Peru		
Glewwe and Hall (1998)	1985-1990	Conditional Mobility, Vulnerability
Herrera (1999)	1985-1996	Macro Mobility
Herrera (2001)	1997-1999	Determinants of poverty persistance
Herrera and Roubaud (2005)		
Grimm (2005)	1997-1999	Pro-poor mobility
Venezuela		
Freije (2001)	1979-1998	Macro Mobility and Conditional Micro Mobility
Freije (2003 a,b)	1997-1998	Conditional and Unconditional Mobility

Table 2-B Mobility Studies on Latin American Countries

| Comparative Studies			
Author	Countries	Years Studied	Type of Study
Fields et al. (2006)	Argentina	1996-2003	Unconditional Mobility
	Mexico	1987-2002	Conditional Mobility
	Venezuela	1994-2000	Symmetry Hypothesis
Calonico (2006)	Argentina	1992-2002	Unconditional Mobility
	Brasil	1995-99, 2001-03	Conditional Mobility
	Chile	1992-2003	
	Colombia	1992-2003	
	Costa Rica	1992-2003	
	Mexico	1992-2001	
	Uruguay	1995-2003	
	Venezuela	1994-2003	

Figure 1

GDP Per Capita
Latin America Region
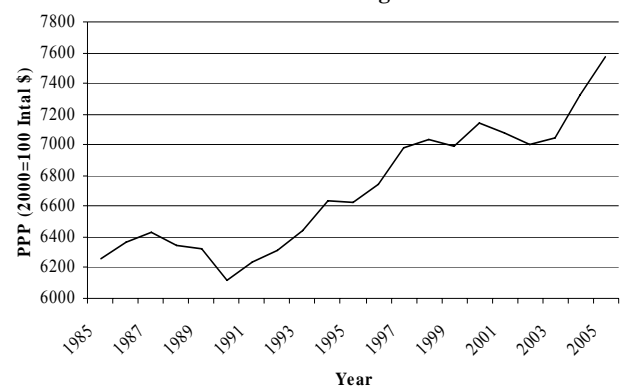
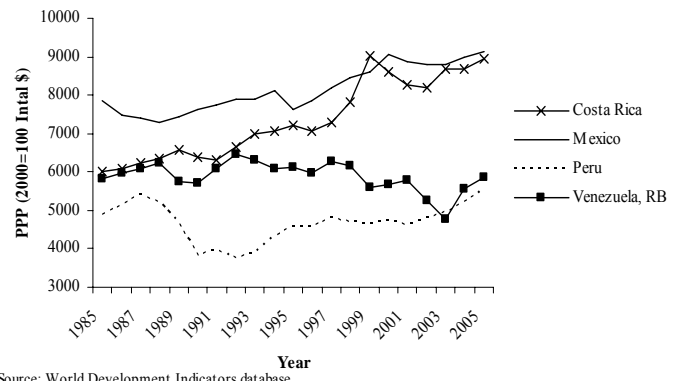Source: World Development Indicators database

Figure 2

GDP Per Capita
Selected LATAM Countries I
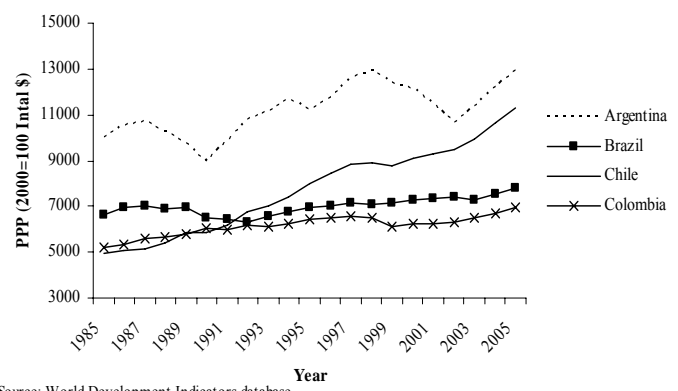
Source: World Development Indicators database

GDP Per Capita
Selected LATAM Countries II

Source: World Development Indicators database

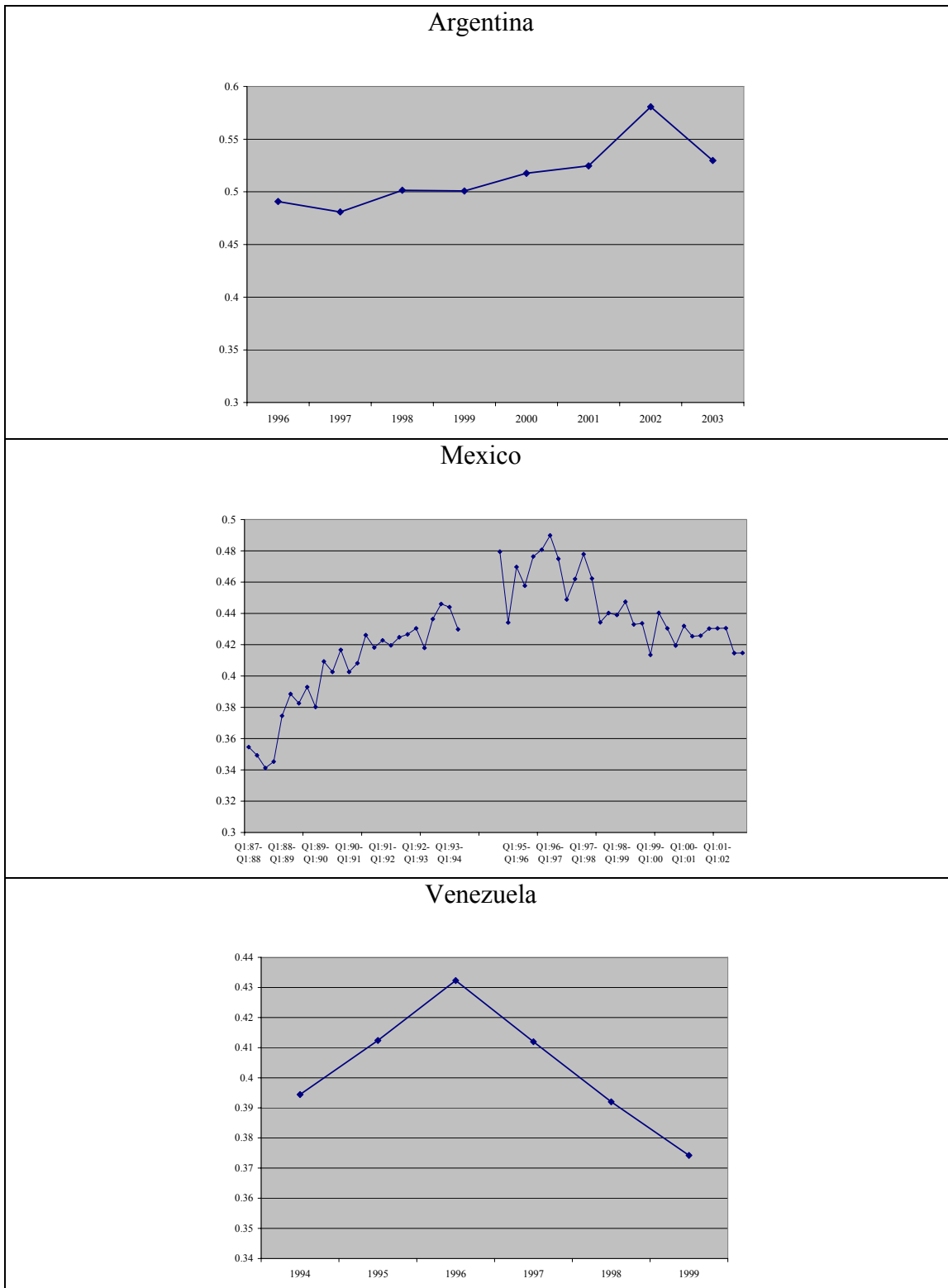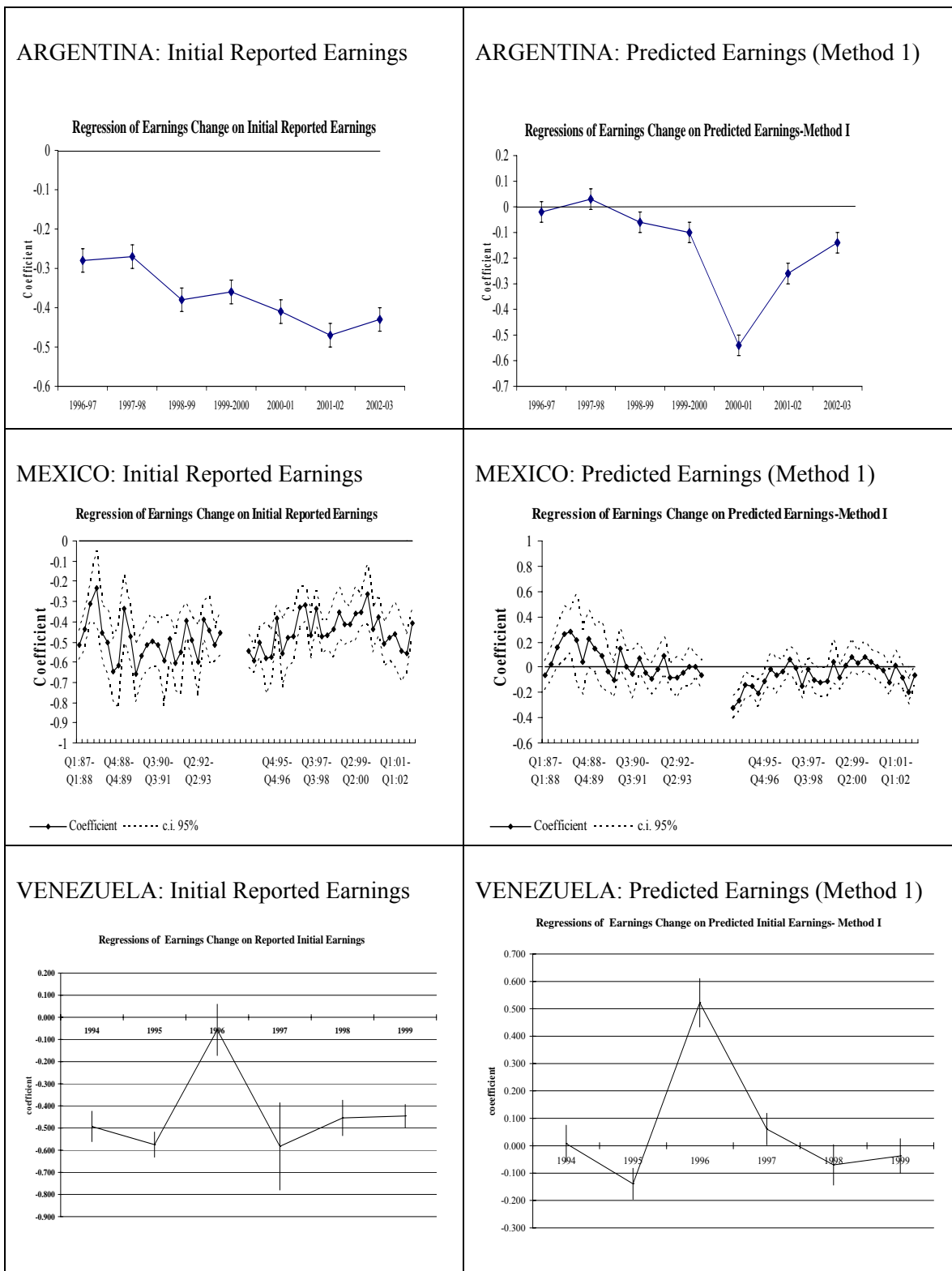**Figure 3: Evolution of the Gini Coefficient**

Figure 4.

Regression Coefficients of Income Change on Initial Earnings.

Appendix

Table A-1 Panel Data for Latin American Countries

	Years	Coverage
Argentina		
Encuesta Permanente de Hogares	1988-to date	Urban Areas, mainly Buenos Aires
Brazil		
Pesquisa Mensal de Emprego	monthly from 1980 to date	Selected urban areas
Relação Anual das Informações Sociais	annual from 1976 to date	Formal sector workers
Chile		
Survey of Scott and Litchfield (1994) and Scott (2000)	1968 and 1986	Selected rural areas
Encuesta de Caracterización Socioeconomica Nacional	1996-2001	National coverage
El Salvador		
BASIS Survey	1995-2001	Rural Areas
Mexico		
ENEU-ENET-ENOE	1987-to date	Urban Areas until 2001, National afterwards
Encuesta de Evaluacion de los Hogares, ENCEL	1998-1999	Households in treatment and control groups of PROGRESA program
IMSS employer-employee data	1993-2004	Formal sector workers
Mexican Family Life Survey	2002 and 2005	National coverage
World Bank-SRA Survey	1994 and 1997	Rural Areas
Jamaica		
Jamaica Survey of Living Conditions	1995-2002	National coverage
Nicaragua		
Encuesta Nacional de Hogares sobre Medicion de Nivel de Vida	1998 and 2001	National Coverage
Peru		
Encuesta Nacional de Hogares Sobre Medición de Niveles de Vida	1985 and 1990; 1991-97	(85-90) Urban Lima; (91-97) National coverage
Encuesta Nacional de Hogares	1997-1999	National coverage
Venezuela		
Encuesta de Hogares por Muestreo	1994-1999	National coverage