

# A Brief Review of the Literature on Earnings Mobility in Developing Countries

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February 20, 2008

## Introduction

Some developing countries have experienced rapid economic growth, some slow economic growth, some no growth at all, and some economic decline.<sup>1</sup> The traditional way of gauging the distributional consequences of economic growth, if in fact there was economic growth, is to use data from comparable cross sections to calculate various measures of (relative) inequality and (absolute) poverty. The very large literature on inequality and poverty will not be reviewed here.<sup>2</sup>

A newer approach in the development literature is to study the distributional consequences of economic growth by using data for the same recipient units for two or more points in time to analyze changes in total income (“income mobility”) and in labor income (“earnings mobility”). One kind of panel data (also called “longitudinal data”) involves baseline interviews and one or more subsequent reinterviews. Another kind of panel data involves a single interview with retrospective questions about previous income or earnings. Examples of panels with reinterviews are South Africa’s KwaZulu-Natal Income Dynamics Study, the Indonesia Family Life Study, and Chile’s CASEN panel. A prominent panel based on retrospective data is the China Household Income Project. The literature reviewed in this paper draws on both kinds of panel data.

The literature on income and earnings mobility falls into three categories:

1. *Macro mobility studies* address the entire economy. They ask the question, how much income mobility and/or earnings mobility is there in the economy?
2. A second group of studies, *micro mobility studies*, examines patterns of income and earnings change over time for different individuals or groups. They ask the questions, which individuals or households experience movements of what magnitudes, and what are the correlates and determinants of these movements?
3. Within the micro mobility studies are a number of studies that look specifically at *poverty dynamics*. These studies ask the question, how many households move into and out of poverty within a certain time frame and what are the correlates and determinants of these movements?

The current project asks the following questions about earnings mobility:

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<sup>1</sup> Growth rates are available, for example, in Table 1 of every World Bank *World Development Report*.

<sup>2</sup> Two excellent resources on poverty and inequality are <http://www.worldbank.org/poverty> and <http://www.wider.unu.edu/wiid/wiid.htm>.

- Who benefits the most from the growth process, and how much do they benefit?
- Who is left behind or made more vulnerable?
- Who is hurt when economic decline takes place and by how much (and who can withstand or even see income gains in such environments)?
- What are the forces behind these changes and behind the experiences of different groups of individuals?

Given these questions, this literature review focuses on studies of micro earnings mobility. This review excludes a number of other literatures: studies that present transition matrices across income classes;<sup>3</sup> studies of macro mobility;<sup>4</sup> studies of poverty dynamics, which necessarily are based on data on household incomes from all sources and/or household consumption;<sup>5</sup> studies that use pseudo-panels rather than true panels or retrospective data;<sup>6</sup> and studies using data from one or a very small number of villages, cities, or occupational groups.<sup>7</sup>

One lesson coming out of the empirical literature bears mention at the outset: not everybody gains when economic growth takes place and not everybody loses when economic decline takes place. Figure 1 on the next page displays the distribution of earnings changes during Argentina's 2001-2002 economic crisis. We see that the majority of earnings changes were to the left of the zero point, but a sizeable number were positive.

Similarly, in a study of income changes during a time of sharp economic decline in Côte d'Ivoire, it was found that about 30% of households moved up from "extreme poor" to "mid-poor" or from "mid-poor" to "non-poor." In the words of the study's authors (Grootaert and Kanbur, 1996), "the general message is loud and clear: the lucky 'few' were not so few!" (Exclamation point in the original.)

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<sup>3</sup> Transition matrices have been calculated for most of the countries for which evidence is cited in this paper. Such matrices tell us how many of the people who started in each income class remained in that class and how many moved up or down into other income classes. What they do not tell us is who moved up or down and why, which are the questions to which this project is addressed.

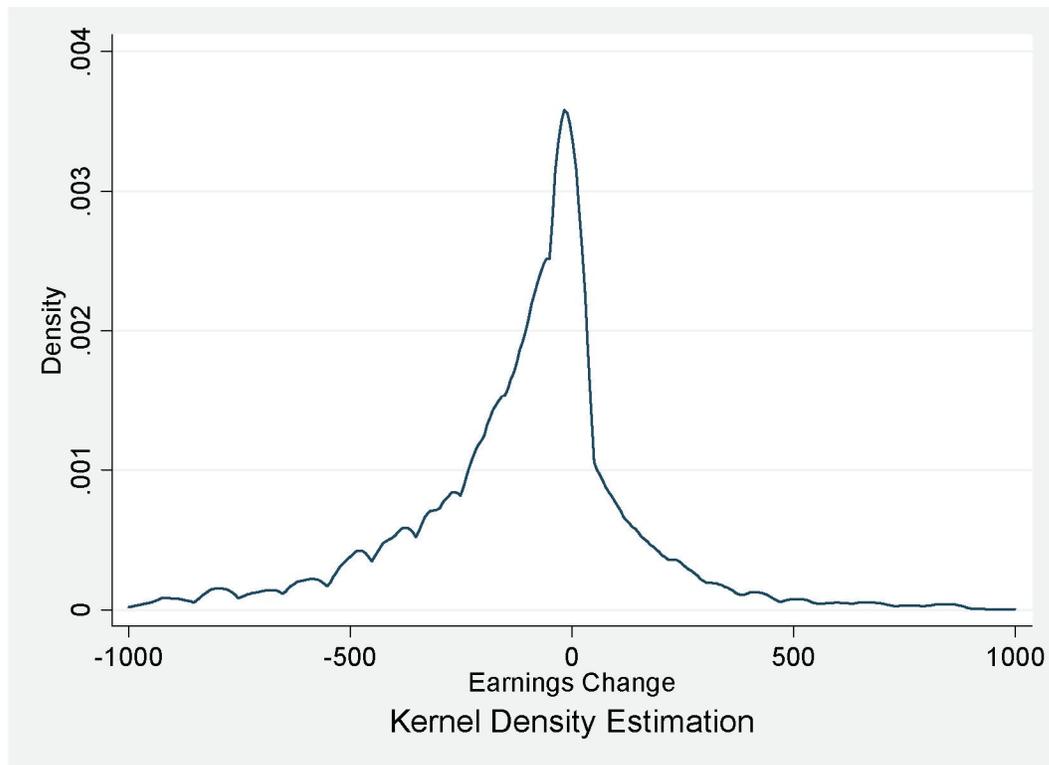
<sup>4</sup> Many mobility studies present macro mobility results only. Examples are the studies by Wodon (2001) for Argentina and Mexico and by Nee (1994) and Wang (2005) for China.

<sup>5</sup> The poverty dynamics literature is reviewed in Baulch and Hoddinott (2000), Hulme (2003), Chronic Poverty Research Centre (2004), and Dercon and Shapiro (2007).

<sup>6</sup> Examples are the studies by Antman and McKenzie (2005) for Mexico, Navarro (2006) for Argentina, and Calónico (2006) for Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Uruguay, and Venezuela.

<sup>7</sup> Examples are the studies of single villages such as Palanpur, India (Drèze, Lanjouw, and Stern, 1992) and single cities such as Lima, Peru (Glewwe and Hall, 1998).

**Figure 1.**  
**Argentina:**  
**Distribution of Earnings Changes Between -1000 and +1000 Pesos, 2001-2002**



Source: Fields and Sánchez Puerta (2007).

### **Different Types of Micro Mobility Analysis**

As noted above, micro mobility studies start by asking who has more economic mobility and who has less. Let  $Y_1$  denote the reported value of the economic variable of interest in the initial year and let  $Y_2$  denote the reported value of the economic variable of interest in the final year. Define “economic mobility” as  $\Delta Y_{i,t} \equiv Y_2 - Y_1$ . Throughout the micro mobility literature, the dependent variable is invariably the change in the reported value of  $Y$ .

The economic variable of interest can be change in total income (“income mobility”), change in income from the labor market (“earnings mobility”), or change in some other economic variable such as wealth. The recipient units can be individuals or households. In studies of household income mobility, household income is typically adjusted for household size, either on a per capita basis or using equivalence scales. The recipient units’ changes can be measured as change in income in real currency units, change in log-income (real), or change in position (in quintiles, deciles, or centiles) within the income, earnings, or wealth distribution. The focus here will be on earnings change in real currency units, but studies of income change will also be cited where relevant.

It is useful to separate out two types of micro mobility studies. Both examine such correlates of earnings change as initial earnings, gender, education, and geographic location. *Unconditional micro mobility studies* examine these correlates one variable at a time – for example, to determine who has more economic mobility, men or women or better-educated vs. less-educated workers. The purpose of these studies is explicitly *not* to hold other things equal; their purpose is to see who is doing better, period. On the other hand, *conditional micro mobility studies* gauge the effect of one correlate controlling for the role of others – for example, to determine whether men have more economic mobility than women after controlling for gender differences in education, geographic location, etc. Both sets of issues – identifying which are the important unconditional correlates of economic mobility and which are the important conditional correlates – are of interest and are taken up in turn in the following sections.

### **Unconditional Micro Mobility**

The first issue is, why study earnings mobility at all? This focus is justified by the results of empirical studies looking into the sources of changes in household income adjusted for household size.

The first question to be asked is, which is more important in explaining changes in adjusted household income, change in income or change in household size? Studies conducted for Indonesia, South Africa, and Venezuela (and also Spain) found that income change was far more important than change in household size (Fields et al., 2003b). This finding justifies concentrating research efforts more on economic events than on demographic ones.<sup>8</sup>

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<sup>8</sup> It is possible that economic changes induce demographic changes (for example, in South Africa, where the receipt of pension income has been shown to influence the makeup of households) and that demographic changes may induce economic changes (for example, the birth of a child may lead the mother to withdraw from the labor force, causing the

Given the importance of change in income rather than change in household size, the next question is, which type of income change is most important in explaining the change in total income? Fields et al. (2003b) also showed that for these same countries, change in labor income (which includes income from salaried employment, wage employment, and self-employment) was more important in accounting for the change in total income than the change in all other income sources combined. This finding on the importance of changing labor income for total income mobility justifies focusing research efforts on the labor market more than on capital markets, land markets, income transfers, or other income sources.

In studies of unconditional earnings mobility (and other types of economic mobility as well), considerable attention has been paid to the question of how earnings changes relate to initial earnings. As above, letting  $Y_1$  and  $Y_2$  denote initial reported earnings and final reported earnings respectively and  $\Delta Y_{i,t} \equiv Y_2 - Y_1$  denote the change in reported earnings from initial to final year, unconditional mobility studies typically run linear regressions of the form

$$\Delta Y_{i,t} \equiv Y_2 - Y_1 = \alpha + \beta Y_{i,t-1} + \varepsilon_{i,t}, \quad (1)$$

although non-parametric regressions have occasionally been estimated as well. The error term in (1) is usually assumed to be independent and identically distributed. This assumption is far from innocuous.

Various theories have been brought to bear on the expected sign of  $\beta$  in these models.<sup>9</sup> The theory of *cumulative advantage* maintains that for a variety of economic and political reasons, those who have the most to begin with are the ones likely to continue to gain advantage. Then there is the notion of *poverty traps*, according to which those who start out in poverty are likely to face serious disadvantages that make it hard for them to move up and out of poverty. A third factor is the phenomenon of *labor market twist*. This is the idea that due to skill-biased technological change in today's globalized world, the relative demand for skilled labor has outpaced the relative demand for unskilled labor, resulting in larger earnings gains for the skilled (who on average are high earners) than for the unskilled (who on average earn less). These three factors – cumulative advantage, poverty traps, and labor market twist – create an expectation that those households and individuals who experience the earnings gains over time will be the highest initial earners. On the other hand, the theory of *regression to the grand mean* leads one to expect that those with initially high earnings will do less well than those with initially low earnings.<sup>10</sup>

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household to lose her labor earnings). Such interactions have not been taken into account in the basic decomposition reported in the text.

<sup>9</sup> Citations to these theories appear in Fields et al. (2007).

<sup>10</sup> The theory of regression to the grand mean goes back more than a century to Galton, who formulated the theory in the context of body heights. Why this theory should carry over to incomes, earnings, or other economic outcomes is by no means evident. An important task yet to be carried out in the income and earnings mobility literature is to work out the full implications of a non-iid structure for  $\varepsilon_{it}$  in (1).

Empirically, the studies of developing countries to date (reviewed below) produce a virtual consensus: unconditionally, with one major exception, those who gained the most over time have generally been those who reported the *lowest* incomes or earnings to begin with. This result is termed “unconditional convergence.”

Unconditional convergence comes in two flavors. The weaker form of unconditional convergence is that the largest *percentage* changes in income or earnings are experienced by those who have the lowest reported incomes or earnings to begin with. Such “weak unconditional convergence” has been reported in studies of income mobility in Indonesia, South Africa, and Venezuela (Fields et al., 2003a) and in China for the period 1991-1995 (Ying, Li, and Deng, 2006; Khor and Pencavel, 2006), of consumption mobility in Peru (Grimm, 2005), and of earnings mobility in South Africa (Cichello, et al., 2005). In China, though, a reversal is reported: whereas weak unconditional convergence appeared in the data for 1991-1995, weak unconditional *divergence* appeared for the period 1998-2002 (Ying, Li, and Deng, 2006). Why this reversal took place is clearly an important question for future work.

In addition to this finding about weak unconditional convergence, the literature offers an even stronger and perhaps surprising finding: that those with the lowest reported incomes or earnings to begin with have experienced the most positive or least negative changes *in dollars*. “Strong unconditional convergence” has appeared in studies of income mobility in Indonesia, South Africa, and Venezuela (Fields et al., 2003a) and of earnings mobility in Argentina, Mexico, and Venezuela (Fields et al., 2007) and South Africa (Cichello et al., 2005).

The results of the unconditional convergence studies just cited have not been accepted unquestioningly for good reason: the possible mismeasurement of income or earnings. In regressions of the type

$$\Delta Y_{i,t} \equiv Y_2 - Y_1 = \alpha + \beta Y_{i,t-1} + \varepsilon_{i,t}, \quad (1)$$

if  $Y_1$  is measured with error, the mismeasured variable appears both on the left hand side and on the right hand side of the regression, producing an attenuation bias which in this context means that apparent convergent mobility can be spurious rather than real.<sup>11</sup> A direct way of remedying the measurement error in survey data is to instead use administrative data such as employers’ reports to the tax authorities. Such a study is under way in the United States; initial results reported in Dragoset and Fields (2007) find unconditional convergence using survey data and administrative data for the exact same respondents.

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<sup>11</sup> Whenever the right-hand-side variable is measured with error in a regression, an attenuation bias results (Deaton, 1997). However, the presence of the same mismeasured  $Y_1$  variable as a regressor on the right-hand-side and in  $Y_2 - Y_1$  on the left-hand-side produces a further attenuation bias. See Bound, Brown, and Mathiowetz (2001) for details.

In developing countries, where administrative data are lacking, analysts have tried to address the measurement error issue by replacing  $Y_1$  on the right hand side of (1) by a measure of predicted or longer term income or earnings,  $\hat{Y}_1$ . When regressions of the type

$$\Delta Y_{i,t} \equiv Y_2 - Y_1 = \alpha + \beta \hat{Y}_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

have been run, the results prove to be quite mixed. In the study of income mobility in Indonesia, South Africa, and Venezuela (Fields et al., 2003a), unconditional convergence was still found in South Africa, but unconditional divergence was found in Indonesia and no statistically significant pattern appeared in Venezuela. Each of these regressions was run for a single year only. Later, in a study of earnings mobility in Argentina, Mexico, and Venezuela (Fields et al., 2007), such regressions were run for many years in each country. In Argentina, the estimates of (2) produced convergent results in most years and insignificant results in others. In Mexico, the results were overwhelmingly insignificant. In Venezuela, the results were convergent in two years, insignificant in two years, and divergent in two years.

Note well what statistical insignificance means in the context of equation (2): the income or earnings changes in currency units were not significantly different for those in different parts of the income or earnings distribution. This may come as a surprise to those who infer from slowly-changing Lorenz curves and other measures of relative inequality that those who gain the most dollars when economic growth takes place are those at the top of the income or earnings distribution.

Convergent mobility ties in with one aspect of macro mobility, namely, whether the mobility that takes place equalizes longer-term earnings relative to initial earnings (Fields, 2007). The idea that longer-term earnings are more equally distributed than earnings in any given year is an old one. For example, Milton Friedman (1962) wrote:

Consider two societies that have the same distribution of annual income. In one there is great mobility and change so that the position of particular families in the income hierarchy varies widely from year to year. In the other, there is great rigidity so that each family stays in the same position year after year. Clearly, in any meaningful sense, the second would be the more unequal society.

In a similar vein, Paul Krugman (1992) stated: "If income mobility were very high, the degree of inequality in any given year would be unimportant, because the distribution of lifetime income would be very even . . . An increase in income mobility tends to make the distribution of lifetime income more equal." The empirical studies that have investigated this issue for developing countries all confirm that mobility does in fact equalize longer-term incomes; see Wang (2005) on China and Duval Hernández, Fields, and Sánchez Puerta (2008) on Argentina and Mexico.<sup>12</sup>

Some micro mobility studies have investigated the relationship between income or earnings change on the one hand and variables other than initial income or earnings on

<sup>12</sup> It is worth noting that in the United States, earnings mobility equalized longer-term earnings relative to initial in the 1970s but disequalized longer-term earnings relative to initial in the 1980s (Fields, 2007), while in France earnings mobility always equalized longer-term earnings relative to initial (Buchinsky et al., 2003).

the other. Of particular interest to this project is change in labor market status (whether employed or unemployed) and change in type of work performed (for example, formal or informal).

Numerous changes between labor market states are reported in various countries - among them, Ethiopia, Ghana, and Tanzania (Sandefur, Serneels, and Teal, 2006; Bigsten, Mengistae, and Shimeles, 2007) and Argentina, Mexico, and Venezuela (Inter-American Development Bank, 2004; Maloney, 2004; Duryea et al., 2006; Beccaria and Groisman, 2007; Pagés and Stampini, 2007). It would be expected that changes in whether a person is employed and in the type of employment would be linked to changing income and earnings. Indeed, research findings bear this out. Households whose heads gained employment or (where available) gained formal sector employment were the ones that exhibited the largest per capita income gains in Indonesia, South Africa, and Venezuela (Fields et al., 2003b). In Korea, the loss of employment was a major factor producing downward income mobility during that country's financial crisis of the late 1990s (Yoo, 2004). In Argentina, Mexico, and Venezuela, workers who moved from formal wage employment to informal wage employment on average experienced a decline in monthly earnings, while the reverse move produced the reverse earnings change on average (Duryea et al, 2006). In South Africa, although earnings mobility is strongly influenced by sector change, research has shown that it is not necessary to acquire a formal sector job in order to achieve earnings gains; indeed, the majority of those who achieved earnings gains in South Africa did so *within* the sector where they were employed (Cichello et al., 2005). Despite what is known, it remains to examine most systematically the changes in earnings for those who make various labor market transitions (for example, between wage employment, household enterprises, and self employment; between formal and informal employment; between major economic sectors such as agriculture, industry, and services) as well as the changes in earnings for those who do *not* make such transitions.<sup>13</sup>

Another variable that has been explored is non-economic shocks. For example, it was found in Pakistan that low-income rural households suffered more from natural disasters than more privileged households did (Villanger, 2003). On the other hand, in Indonesia, neither positive shocks nor negative shocks disproportionately affected poor households (Newhouse, 2005). As for man-made disasters, a study in Rwanda showed that households experiencing the murder or imprisonment of one of their members moved considerably downward in the income distribution (Verpoorten and Berlage, 2007).

What is striking is that many of the variables which have been shown to be important in determining earnings *levels* turn out to be remarkably unimportant in explaining earnings

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<sup>13</sup> It is obvious that those who started unemployed and became employed necessarily experienced earnings gains, and likewise those who became unemployed necessarily experienced earnings losses. What is not obvious is that the people who transitioned into or out of unemployment are a small minority. For example, in Argentina, which suffered a real GDP decline of 13.5% between 2001 and 2002 and a large increase in unemployment, 89% of the individuals who were employed in 2001 were also employed in 2002. When the analysis is limited only to the individuals who were employed in both years, it remains the case that sector of employment is the second most important factor (after initial reported earnings) in explaining earnings changes. See Fields and Sánchez Puerta (2005) for details.

*changes*. A variable is judged to be unimportant if it is either statistically insignificant or economically insignificant. (A variable is termed “economically insignificant” in the unconditional context if a simple regression of income or earnings change on that variable produces an  $R^2$  less than 1%.) In the study of Indonesia, South Africa, and Venezuela, variables that were shown to be unimportant included gender of the head of the household (insignificant in all 3), education of the head of the household (insignificant in 2), age of the head of the household (insignificant in all 3), and geographic region (insignificant in 2).

Another question examined in the literature is the symmetry of mobility hypothesis. This is the idea that those groups that experience the largest earnings gain in dollars when the economy is growing are those that experience the largest earnings losses in dollars when the economy is contracting. Using the multiple panels available in Argentina, Mexico, and Venezuela, Fields et al. (2007) tested this hypothesis comparing positive growth and negative growth years for six variables: initial reported earnings quintile, gender, age, education, sector transition, and geographic region. Only for gender in Venezuela was it the case that the group that gained the most in times of growth (men) did worst in times of economic decline. For the other variables in Venezuela and for all the variables in Argentina and Mexico, when statistically significant differences between groups were found, the same groups that experienced the most positive earnings changes when the economy was growing also did best when the economy was contracting.

Finally, some unconditional micro mobility studies have used positional change rather than earnings change as the dependent variable. Examples are studies of Malaysia (Trczinski and Randolph, 1991) and China (Zhang, Huang, and Mi, 2006). The Malaysia study reached an interesting conclusion: “Only one action enhanced an individual’s prospect for relative mobility. By actively searching out new jobs in response to changing economic circumstances, an individual could increase the prospects for upward mobility.”

### **Conditional Micro Mobility**

Turning now to studies of conditional micro mobility, these studies run descriptive multiple regressions of the form

$$\Delta Y_{i,t} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 Z_i + \beta_3 X_{i,t-1} + \beta_4 X_{i,t} + \varepsilon_{i,t} \quad (3)$$

or

$$\Delta \log Y_{i,t} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 Z_i + \beta_3 X_{i,t-1} + \beta_4 X_{i,t} + \varepsilon_{i,t}.^{14} \quad (3')$$

In (3), the dependent variable  $\Delta Y_{i,t}$  is the same as it was in (1) and (2): the change in income or earnings in dollars between the initial year  $t-1$  and final year  $t$ . On the right hand side,  $Y_{i,t-1}$  denotes the income or earnings reported in the initial year,  $Z_i$  denotes time-invariant individual characteristics like age, gender, race, and education,  $X_{i,t-1}$  and  $X_{i,t}$  denote time-varying individual characteristics like occupation and sector of employment in years  $t-1$  and  $t$  respectively. The coefficient  $\beta_1$  estimates whether mobility

<sup>14</sup> “Descriptive regression” means that the regression coefficients do not necessarily have a causal interpretation.

is strongly conditionally convergent. If  $\beta_1 < 0$ , there is strong conditional convergence; if  $\beta_1 > 0$ , there is strong conditional divergence; and if  $\beta_1 = 0$  or is not significantly different from zero, the pattern of earnings change is neutral with respect to initial earnings, i.e., recipients in different parts of the initial earnings distribution gain the same amount in dollars (and hence those who report low initial earnings gain more in percentage terms than those with higher reported initial earnings). Researchers have also used change in  $\log Y$  as the dependent variable as in (3'), in which case the regression coefficients measure changes in percentages rather than in dollars and the resultant  $\beta_1$  provides a test of weak conditional convergence.

Looking first at the  $\beta_1$  coefficient in (3) and (3'), the overwhelming pattern in the literature is that  $\beta_1 < 0$  - that is, incomes and earnings converge to their conditional mean. When reported initial incomes and earnings have been used, strong conditional convergence has been found for income mobility in India (Coondoo and Dutta, 1990), Côte d'Ivoire (Grootaert, Kanbur, and Oh, 1997), Indonesia, South Africa, and Venezuela (Fields et al., 2003b) and for earnings mobility in South Africa (Cichello et al., 2005), Argentina, Mexico, and Venezuela (Fields et al., 2007). Some studies tested only for weak conditional convergence, which was found for income mobility in Chile (Scott and Litchfield, 1994) and South Africa (Woolard and Klasen, 2005). Finally, when predicted incomes were used instead of reported incomes, weak conditional convergence was found in Indonesia and South Africa but not Venezuela, but strong conditional convergence was not found in any of the three.

Switching our attention from initial reported income or earnings to the time-invariant variables ( $Z$ ) and the time-varying variables ( $X$ ) in (3) and (3'), the literature reveals that other variables also play a role in explaining changes in income or earnings:

- The conditional effect of education was found to be statistically significant and positive in Peru (Herrera, 1999), South Africa (Cichello et al., 2005), Argentina, Mexico, and Venezuela (Fields et al., 2007).
- The conditional effect of gender (being male) was found to be statistically significantly positive in South Africa (Cichello et al., 2005), Argentina, Mexico, and Venezuela (Fields et al., 2007). On the other hand, another study of Argentina found a statistically significant negative effect of being male (McKenzie, 2004).
- The conditional effects of sector transitions were statistically significant in South Africa (Cichello et al., 2005; Woolard and Klasen, 2005) and Argentina, Mexico, and Venezuela (Fields et al., 2007).
- The conditional effect of geographic region was found to be statistically significant in Côte d'Ivoire (Grootaert, Kanbur, and Oh, 1997) but insignificant in Argentina, Mexico, and Venezuela (Fields et al., 2007).

Among the statistically significant variables, not all are economically significant. In the conditional mobility context, a variable may be judged to be conditionally unimportant if either a) it is statistically insignificant or b) the decomposition weight on that variable is

less than 1%.<sup>15</sup> In Indonesia, South Africa, and Venezuela, variables that were shown to be conditionally unimportant in explaining income mobility were the same ones that were unimportant unconditionally: gender of the head of the household, education of the head of the household, age of the head of the household, and geographic region (Fields et al, 2003b).

### **A Final Word**

This literature review has presented results on the major micro mobility questions for developing countries. It was beyond the scope of this assignment to try to find and report on *all* of the studies of developing countries' income and earnings mobility. Probably there is other work on the countries that have been cited in this report (Argentina, Chile, China, Côte d'Ivoire, India, Indonesia, Korea, Malaysia, Mexico, Peru, South Africa, and Venezuela). In addition, other countries have panel data sets with reasonable geographic coverage that could potentially be used to study income and earnings mobility (and perhaps already have been). These countries include Bangladesh, Nepal, Nicaragua, Pakistan, Tanzania, Uganda, Vietnam, and probably others. Finally, transition economies have not been considered in this review.

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<sup>15</sup> The decomposition weights come from a method devised by Fields (2003).

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