

# Labor Market Trajectories in Latin America and the Caribbean: A Synthetic Panel Analysis

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## Extended Abstract

In this paper, we build a *synthetic panel* that follows the same type of individuals over time, using surveys for nine Latin American and the Caribbean (LAC) countries. Based on this data, we explore labor market trajectories over the life cycle, specifically life cycle earnings and hourly wages profiles. In addition, we examine trends in intragenerational mobility throughout the life cycle, using percentile rank-based measures. We document the large differences in earnings trajectories of men and women, in particular for those highly educated, as well as the different earnings and wages trajectories over the life cycle across types of employment. Finally, we document the low intragenerational mobility of workers, conditional on education, after age 30.

Following the seminal work of Deaton (1985), pseudo-panels (or synthetic panel) analysis has been widely used in the context of consumption and income (e.g. Deaton and Paxson, 1994; Banks, Blundell, and Brugiavini, 2001; Pencavel, 2007). As well as in different areas such as labor responses to tax reforms (Blundell et al., 1988); the returns to academic and vocational qualifications (Mcintosh, 2006); household demand for private medical insurance (Propper et al., 2001); and, poverty dynamics (e.g. Bourguignon et al., 2004; Dang and Lanjouw, 2013; Dang et al., 2014; Dang and Lanjouw, 2015).

In Latin America, the synthetic panel approach has been used primarily to examine income mobility (e.g. Calónico, 2006; Navarro, 2006; Ñopo, 2011; Ferreira et al., 2013). Recent applications in other contexts include Székely and Karver (2015) for analyzing the phenomena of youth out of school and out of work, Bentaouet-Kattan and Székely (2015) in the context of school attendance, and Levy and Székely (2016) to study the relation between schooling and formality.

We use synthetic panels, for nine LAC countries from 1992 to 2014, to explore labor market trajectories and intragenerational mobility over the life cycle. Other studies have investigated the evolution of labor earnings in the region (e.g. Duryea et al., 2002; Brambilla and Tortarolo, 2014), but as far as we know, this is the first study that uses synthetic panels to examine labor market trajectories over the life cycle and intragenerational mobility in the region.

Relying on synthetic panels is unavoidable in LAC for life cycle analysis, because there in general no long panels in the region that could be used for this purpose. There are some short

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panels associated to the rotation waves in the household surveys, and some longer panels like the Mexican Family Life Survey (that follows individuals for up to 11 years), and the Brazilian RAIS (that follows only formal workers over time). However, there is no available panel data that could be used for a large number of LAC countries, and that follows both formal, informal and self-employed workers.

Synthetic panel analyses rely on two key assumptions: i) that after controlling for differences in observable characteristics different birth-cohorts are similar at similar ages; ii) that the past labor market outcomes of different birth-cohorts are reasonable proxy for the labor market outcomes of future birth-cohorts. We show in the paper that those two assumptions, after controlling for observable characteristics and changes in macroeconomic conditions, are likely to hold.

Our analysis uses the harmonized IDB Labor Markets and Social Security Information System (SIMS) that includes household surveys from 1990 to 2014 (not necessarily every year for every country) for Argentina, Brazil, Chile, Colombia, Dominican Republic, Ecuador, Mexico, Peru and Paraguay. We conduct two types of analysis. First, giving each country equal weight (but allowing weights to differ across individuals within a country) weighted averages for cohorts of the same age across calendar years are calculated using non-parametric linear regressions, after controlling for any broad changes across the economy (i.e. the business cycle) that affect the yearly surveys, through survey-year fixed effects. Second, we replicate the results from the non-parametric regressions, estimating flexible on age panel data (weighted) regressions that allow for more complete sets of controls, for observable characteristics, as well as survey year, country and cohort fixed effects. A summary of our results is presented below. In all of our analysis we classify individuals in three education groups (less than high school, high school complete and more than high school), and present them by gender. For earnings, we differentiate between those individuals that are employed in formal jobs, in informal jobs, and self-employed. For wages, we only compare formal and informal employees. In all cases, we create an index based on real earnings (wages), setting as 100 the average earnings (wages) of 20-24 years old males with high school complete, in formal employment in 2006. The results shown below in Figures 1 to 3 are based on the non-parametric regressions, while those in Figure 4 are based on the flexible panel regressions.

***Result #1: Earnings grow faster for highly educated workers over the life cycle***

As can be seen in Figure 1, earnings grow faster over the lifecycle for those who attain higher levels of education. And even though this is true for both men and women, male workers register higher growth rates. In contrast, less educated workers present relatively flat earnings over the life cycle.

Surprisingly, female workers who are either self-employed or employed in the informal sector exhibit similar or lower average earnings than male workers with lower educational levels. However, this pattern does not hold when we use hourly wages instead of earnings for those employed in the formal or informal sectors (Figure 2).

***Result #2: The type of employment and work matters***

The evidence suggests that the type of employment or work individuals hold make an important difference (Figure 1). Those employed in the informal sector or self-employed register similar average earnings and earnings growth in their careers. Meanwhile, those who are employed in the formal sector exhibit not only higher average earnings but also higher growth rates over the life cycle. This is consistent with our analyses (not shown) indicating high substitution between employment in informal jobs and self-employment over time.

**Figure 1. LAC: Life Cycle Earnings Profile**



Note: The figure shows the life cycle profiles of a real earnings index (net of expenses for self-employed), where the index is set equal to 100 for the real average earnings in 2006 of 20 to 24-year-old men with high school complete, employed formally.

**Figure 2. LAC: Life Cycle Wages Profile**

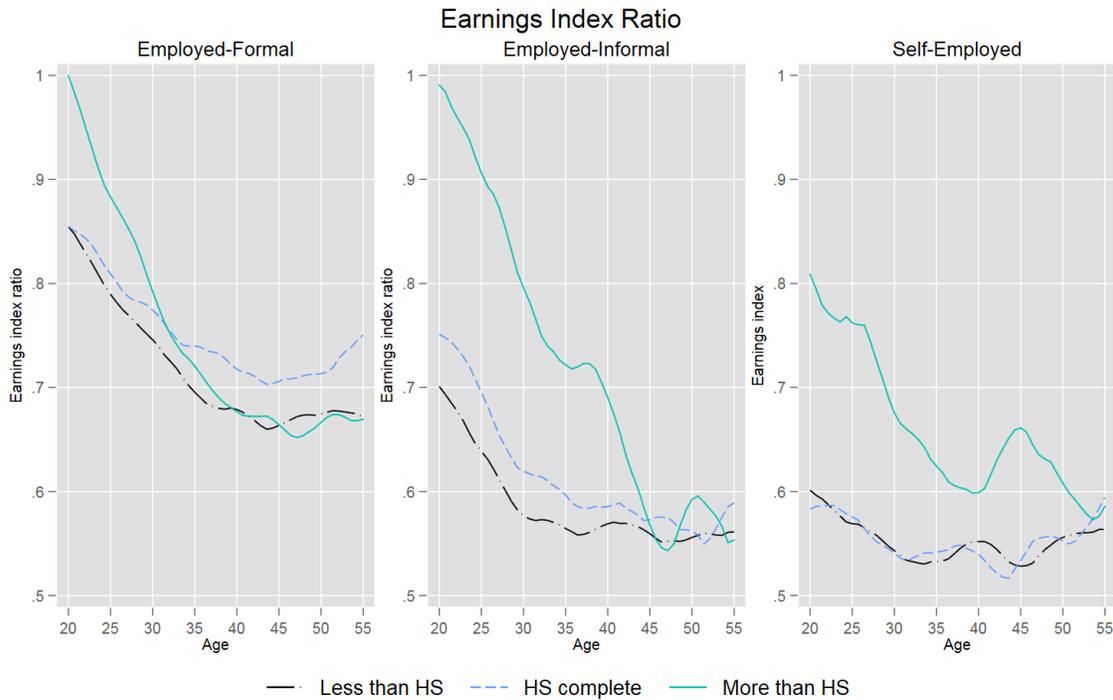


Note: The figure shows the life cycle profiles of a real hourly wages index, where the index is set equal to 100 for the real average hourly wages in 2006 of 20 to 24-year-old men with high school complete, employed formally.

**Result #3: There is a growing gender gap over the life cycle**

The wedge in earnings between males and females increases throughout their careers (Figure 3). While this is true for all education levels, for individuals with higher educational attainment, at early ages the earnings ratio of females to males starts close to one, but the gap between females and males increases substantially over the life cycle. A similar, but less pronounced pattern is seen for individuals with high school degrees or less than high school.

**Figure 3. LAC: Life Cycle Earnings Ratio (Females/Males)**

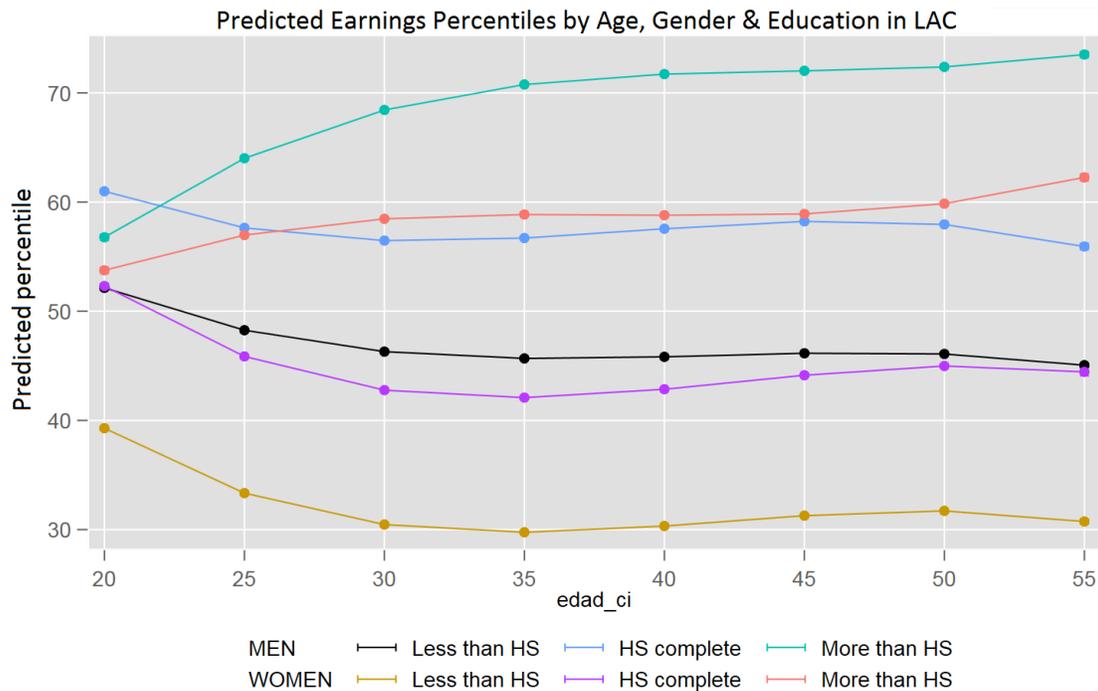


Note: The figure shows the ratio of female to male earnings index over the life cycle.

**Result #4: Intragenerational mobility in earnings is low conditional on education**

By age 30 the average position in the earnings distribution (for that age group) is extremely stable over the life cycle, conditional on education. Figure 4 shows predicted values from flexible on age (weighted) panel regressions of the percentile of the earnings distribution (percentiles calculated for each age) controlling for observable characteristics, and for survey year, country and cohort fixed effects. Except for men with more than high school, who tend to have high intragenerational mobility, the other groups stay in the same position in the earnings distribution over their life cycle. Furthermore, in analyses not shown we find that the 5-year and 10-year quartile-quartile elasticity is high, indicating that the position of the group is a very good predictor of an individual's position in the earnings distribution.

**Figure 4. LAC: Predicted Earnings Percentiles Over Life Cycle**



Notes: The figure presents predicted earnings distribution percentiles at 5-year intervals by gender and education levels. The predicted values are obtained from regressions with observable characteristics controls, country, survey year and cohort fixed effects.

**Preliminary Conclusion**

Latin America and the Caribbean present highly segmented labor markets by education and type of employment. Over the life cycle that segmentation not only does not disappear, but worsens, in particular relative to the higher educated groups. While men and women start with similar earnings, the ratio of female to male earnings decreases continuously over time, regardless of education level (actually even further for highly educated women and men). After age 30, the position in the earnings distribution is very stable, except for highly educated males. All these facts point towards the need of policies that improve the educational attainment of workers, increase the share of formal employment, and improve the earnings of women relative to men of the same characteristics.

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