The Geography of Intergenerational Mobility in Latin America and the Caribbean

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Abstract

In this paper, I estimate intergenerational mobility (IGM) in education using cross-sectional data from 88 censuses that span 23 countries in Latin America and the Caribbean (LAC) over half a century. I measure upward mobility as the likelihood of obtaining at least a primary education for individuals whose parents did not finish primary school, whereas downward mobility as the likelihood of failing to complete primary education for individuals whose parents completed at least primary school. In addition, I explore the geography of educational IGM using nearly 400 “provinces” (coarse administrative units similar to states in the U.S.) and more than 6,000 “districts” (fine administrative units similar to counties in the U.S.). I document wide cross-country and within-country heterogeneity. In LAC, the distance between the most and least upwardly mobile country is similar to what has been recently documented in Africa, although the least mobile countries in Africa are less mobile than the least mobile in LAC. I document a declining trend in the mobility gap between urban and rural populations, but I do not find important differences by gender. The level of mobility is highly correlated to the share of primary completion of the previous generation, which suggests a high level of inertia. In contrast, geographical variables do not appear to be highly correlated to mobility, and some proxies of economic development at the beginning of the sample period are only correlated to downward mobility.

JEL-Codes: D63, I24, J62.

Keywords: Educational intergenerational mobility, Geography, Latin America.

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I Introduction

Intergenerational mobility (IGM) has gained interest in the economic literature among other things thanks to its importance for equity, social cohesion, and economic growth. Its observed correlation with income inequality, commonly named “the Great Gatsby Curve”, has contributed to the desire for understanding IGM given the documented rise of inequality over the last decades in rich countries (see Corak (2013)).

In the case of the developing economies, the Latin America and the Caribbean (LAC) is of particular interest because of its historically documented high levels of income inequality relative to other regions of the world. However, the scarcity of high-quality data (e.g. long panel data sets or tax records with linked generations) has limited the study of IGM in income. These constraints are also common in other regions, so the efforts to document IGM on a global scale has taken an alternative path given by the measurement of mobility in education. These measures are of interest in and of themselves, but they are also a proxy for economic status given the close relationship between education and income or wealth.

Recent studies have used household and public opinion surveys with retrospective information about parents’ education to document the levels of intergenerational mobility in education in LAC countries. They have found that the intergenerational persistence of education is high (in other words, IGM is low) relative to other regions of the world (for an example, see Hertz et al. (2007), Neidhöfer, Serrano, and Gasparini (2018), and Narayan et al. (2018)).

Previous literature has focused on country-level analysis, however, analyzing IGM at a more geographically disaggregated level, as argued in Narayan et al. (2018), is valuable because it can help researchers understand the importance of localized patterns and drivers of IGM, as shown for the case of developed countries. Along these lines, Chetty, Hendren, Kline, and Saez (2014) state that the United States can be better described as a collection of societies, some of which are “lands of opportunity” with high rates of mobility across

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1See for example Messina and Silva (2019) for an analysis of wage inequality over the last two decades.
generations, and others in which only a few children escape poverty. Thus far, this type of analysis has not been conducted in LAC countries as a whole due to the inadequacy of most survey data for this purpose. This paper fills that gap in the literature by generating estimates of IGM in education at smaller geographical levels.

In this paper, I estimate intergenerational mobility in education for LAC countries at a disaggregated regional level using data from 88 censuses. The analysis covers 23 countries spanning more than half a century (approximately between 1960 and 2011). I rely on samples of co-residents (i.e., children living with their parents or older relatives), which can generate biased estimates given that co-residence is not random (see for example Emran, Greene, and Shilpi (2018)). To minimize the impact of co-residence, I investigate mobility in education at the bottom of the educational attainment distribution by focusing on primary education, which can be measured with a high degree of confidence between ages 14 and 18. Furthermore, an important share of the population does not attain more than primary education in the period analyzed.

The estimates of upward (and downward) mobility measured as the likelihood of finishing (or failing to finish) primary education, conditional on having parents who failed to finish (or who were able to finish) primary school, show wide cross-country and within-country heterogeneity. In LAC, the distance between the most and least upwardly mobile country is similar to what has been recently documented in Africa, although the least mobile countries in Africa are less mobile than the least mobile country in LAC. I do not find significant differences by gender, but I do document a declining trend in the mobility gap between urban and rural populations. At the sub-national level, there is heterogeneity in mobility across districts/provinces, and some countries show lower levels of mobility in the northern regions (e.g., Brazil), whereas the opposite is true for Mexico. However, the variability is much lower in countries with lower number of regions and less population. The level of mobility at the sub-national level is highly positively correlated to the share of primary completion of the previous generation, which suggests a high level of inertia. In contrast,
geographical correlates do not appear to be highly correlated to mobility, and some proxies of economic development like the share of employment in manufacture and agriculture at the beginning of the sample period are only correlated to downward mobility.

This paper is related to two strands of the economic literature. First, it adds to the literature about intergenerational mobility in general (see Black and Devereux (2011) for a survey) but specifically to the literature focusing on the geography of socioeconomic mobility that recently received more attention in part because of the work of Chetty et al. (2014), which shows important variation across commuting zones in the US. Furthermore, it adds to the recent wave of research that looks at intergenerational mobility in education. This set of papers include on one hand those that use household survey data. For example, Hertz et al. (2007) and Narayan et al. (2018) that document IGM for a very large set of countries, and Neidhöfer et al. (2018) that focus only on Latin America. On the other hand and more closely related to this paper, there are recent studies that use administrative data or census data. For instance, Asher, Novosad, and Rafkin (2018) study mobility among different marginalized groups and analyzes geographic differences in India; Card, Domnisoru, and Taylor (2018) use 1940 census data to study the role of school quality in mediating upward mobility in the US; and most closely related to this paper, Alesina, Hohmann, Michalopoulou, and Papaioannou (2020) document patterns of IGM in Africa using Census data and estimate whether regions have a causal effect on mobility.

Second, this paper is also related at the conceptual level to the theoretical literature about the intergenerational transmission of socioeconomic status. Seminal papers in this area of focus include Becker and Tomes (1979), Becker and Tomes (1986), Loury (1981); and, more recently, they also include contributions from Solon (2004), Solon (2014), and Becker (2018).

The paper is organized as follows. In Section II describes data and methodology. Section III reports the main descriptive results at country level and the geography of mobility. Section IV looks at correlates of intergenerational mobility. Finally, section V concludes
II Data and Methodology

Three sources of data have been typically used to estimate intergenerational mobility. 1) cross-sectional samples of adult populations with retrospective questions about parental education. For example, Narayan et al. (2018) use household survey data that covers the 96% of the world population; 2) panel data long enough in its time dimension to include the socioeconomic or educational attainment of two generations. For example, Celhay, Sanhueza, and Zubizarreta (2010) use the Chilean CASEN to estimate mobility in schooling and income; and 3) administrative/registry data with linked information for parents and adult children. For example, Chetty et al. (2014) use tax records in the U.S. to estimate income mobility.

In the case of Latin America, most of the literature has used household survey data or public opinion surveys (see for example, Hertz et al. (2007), Narayan et al. (2018), and Neidhöfer et al. (2018)). Long panel data as well as administrative/registry data that allow the researcher to link generations are rare.

In this paper, I use Census data obtained from IPUMS International. In particular, I use 88 samples of population and housing Censuses, which are run to compute the total population and contain an educational attainment question in their questionnaire. The key advantage of this data set is that it contains the entire population (or at least a large share of it publicly available) at a point in time, allowing me to analyze mobility at a very dis-aggregated geographical level. However, the main disadvantage of this data is that does not link all the individuals with their parents, so I need to rely on samples of coresidents as it is explained below.

Figure 1: Coverage over time

![Figure 1](image)

(a) Number of samples by decade

(b) Samples by country

I Countries and smaller administrative units

I use individual records, retrieved from 88 national censuses from 23 countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Trinidad and Tobago, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Saint Lucia, and Venezuela. I obtain the data from IPUMS (2019) (Integrated Public Use Microdata Series) International, hosted at the University of Minnesota Population Centre, that reports harmonized representative samples, typically 10% of the full micro data set (see Table ?? in the Appendix for the details about the fraction available by census).

These 88 samples span approximately half a century going from 1960 to 2011 in an unbalanced fashion. Figure 1a shows the number of samples by decade, highlighting that they are concentrated between the 1970s and 2000s. Figure 1b shows the coverage by country and year highlighting some heterogeneity in coverage. In terms of frequency and time span, there are countries such as Brazil, Panama, and Uruguay with the highest availability of data (i.e. roughly one census per decade between 1960 and 2010). On the other extreme, Cuba has only one Census in 2002 while El Salvador, Peru, and Saint Lucia have only two
censuses in different decades.

In terms of geography, IPUMS reports residence at the time of the interview for at most two levels of administrative units in which the households were enumerated. These variables contain the geographies for every country harmonized spatio-temporally to provide spatially consistent boundaries across samples in each country. This allows me to assign individuals to “coarse” (similar to states in the U.S.) and “fine” administrative units (similar to counties in the U.S.). The sample spans 394 provinces (admin-1 units) and 6,689 districts (admin-2 units). The baseline estimates will make use of the former to avoid issues derived from having a reduced number of observations per administrative unit but estimates using the latter will be available in the Appendix.

II Linking generations and coresidence

The data collection is organized at the household level, so it is possible to link only individuals who live in the same household at the time of the interview. The data set includes a variable that by means of 62 different values details the relationship between the individual and the head of the household. Based on this variable, I classify individuals into five different generations where the head corresponds to generation zero (see Table 1), and based on the generation number I use individuals who live with at least one member of the immediately previous generation, where these old generation members are considered as “pseudo-parents”. Table 1 provides the details of the assignment.

Figure 2 shows the unweighted average rate of co-residence by age in the sample pooling all the countries and years. There are rates above 95% for individuals before reaching 18 years old that then start decreasing more rapidly getting close to 60% for people who are 25 years old. When the coresidence rate is computed with samples that distinguish urban/rural or gender, I find negligible differences in the former and a steeper fall in the rate of coresidence.
### Table 1: Relationship to household head and identification of different generations

<table>
<thead>
<tr>
<th>Relationship to the head</th>
<th>Generation</th>
<th>Relationship to the head</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grandparent</td>
<td>-2</td>
<td>Sibling of sibling-in-law</td>
<td>0</td>
</tr>
<tr>
<td>Great grandparent</td>
<td>-2</td>
<td>Ex-spouse</td>
<td>0</td>
</tr>
<tr>
<td>Parent/parent-in-law</td>
<td>-1</td>
<td>Child</td>
<td>1</td>
</tr>
<tr>
<td>Parent</td>
<td>-1</td>
<td>Biological child</td>
<td>1</td>
</tr>
<tr>
<td>Stepparent</td>
<td>-1</td>
<td>Adopted child</td>
<td>1</td>
</tr>
<tr>
<td>Parent-in-law</td>
<td>-1</td>
<td>Stepchild</td>
<td>1</td>
</tr>
<tr>
<td>Aunt/uncle</td>
<td>-1</td>
<td>Child-in-law</td>
<td>1</td>
</tr>
<tr>
<td>Head</td>
<td>0</td>
<td>Spouse/partner of child</td>
<td>1</td>
</tr>
<tr>
<td>Spouse/partner</td>
<td>0</td>
<td>Unmarried partner of child</td>
<td>1</td>
</tr>
<tr>
<td>Spouse</td>
<td>0</td>
<td>Nephew/niece</td>
<td>1</td>
</tr>
<tr>
<td>Unmarried partner</td>
<td>0</td>
<td>Foster child</td>
<td>1</td>
</tr>
<tr>
<td>Same-sex spouse/partner</td>
<td>0</td>
<td>Tutored/foster child</td>
<td>1</td>
</tr>
<tr>
<td>Sibling/sibling-in-law</td>
<td>0</td>
<td>Tutored child</td>
<td>1</td>
</tr>
<tr>
<td>Sibling</td>
<td>0</td>
<td>Grandchild</td>
<td>2</td>
</tr>
<tr>
<td>Stepsibling</td>
<td>0</td>
<td>Grandchild or great grandchild</td>
<td>2</td>
</tr>
<tr>
<td>Sibling-in-law</td>
<td>0</td>
<td>Great grandchild</td>
<td>2</td>
</tr>
<tr>
<td>Cousin</td>
<td>0</td>
<td>Great-great grandchild</td>
<td>2</td>
</tr>
</tbody>
</table>

Categories not classified are: Other relative, not elsewhere classified; other relative with different family name; non-relative; friend; housemate/roommate; visitor; godparent; godchild; domestic employee; relative of employee; spouse of servant; child of servant; other relative of servant; roomer/boarder/lodger/foster child; boarder; boarder or guest; lodger; employee, boarder or guest; other specified non-relative; agregado; temporary resident, guest; group quarters; group quarters, non-inmates; institutional inmates; non-relative, n.e.c.; other relative or non-relative; unknown.

by age for women relative to men (see Figure ?? in the Appendix).

Figure 3 disaggregates the coresidence rate by country displaying some variability in the magnitude of the fall of it with age. This figure also suggest that the fall in coresidence around age 25 is likely driven by Brazil and Mexico, which are the most populated countries in Latin America.

### III Education

Why is education a suitable variable by which to measure IGM? Education as a measure of socioeconomic status relative to income in the context of developing countries has three key advantages: 1) it contain less measurement error, which can lead to attenuation bias (see

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*Alesina et al. (2020)* uses a similar method to assign individuals with Census data for Africa.
Figure 2: Coresidence rate by age

Notes: Coresidence is defined as living with at least one relative one generation older. The data is unweighted.

Solon (1992)); 2) it is fixed early in the life cycle, which avoids the life-cycle bias found in studies that use income (see Haider and Solon (2006)). In addition, it education is closely linked to income and it is important by itself in terms of human development; 3) it can be completely attributed to a specific individual, while income sometimes is hard to assign within a household (e.g. a household with multiple persons and home production, which may be specially relevant in the case of rural populations in poor countries).

There are two questions about educational attainment in the data set. The first one reports the total years of schooling completed by each individual (formal schooling regardless of the track or kind of study), and the second one is re-coded by IPUMS to capture educational attainment in terms of the level of schooling completed and contains four categories: 1) Less than primary completed, 2) primary completed, 3) secondary completed, 4) 

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4It does not necessarily reflect any particular country’s definition of the various levels of schooling in terms of terminology or number of years of schooling.
Figure 3: Coresidence rate by age and country

Notes: Coresidence is defined as living with at least one relative one generation older. The data is unweighted.

university completed. In this paper I use the latter variable, which has a lower number of missing values and it is available for more countries than the former.\textsuperscript{5} This variable applies, to the extent possible, the United Nations standard of six years of primary schooling, three years of lower secondary schooling, and three years of higher secondary schooling.

In the sample, a majority of individuals show levels of education that correspond to less than completed secondary (see Figure 4a), which supports the focus on primary completion that I will detail later as most of the action happens at lower levels of completion. In addition, although the level of education in Latin America and the Caribbean has been increasing across cohorts (see Figure 4b), the continent still shows a share of around sixty percent with at most nine years of schooling in the most recent cohort (those born in the 1980s), which roughly corresponds to the completion of lower secondary education.

\textsuperscript{5}Years of schooling is not available for Brazil 2010, Cuba 2002, Saint Lucia 1991, Trinidad and Tobago
Figure 4: Educational Attainment

(a) Histogram of attainment

(b) CDF of years of schooling

Notes: The graphs use different samples as years of schooling is not available in five country-year samples. The sample includes only individuals older 25 from decade cohorts 1900 to 1980. The data is unweighted.

Figure 5 shows the transition matrix for individuals older than 25 to get a rough idea of the patterns of intergenerational education mobility present in the data set. This plot highlights that the action is terms of mobility happens in the lower two levels of educational attainment, qualitatively similar to what can be seen in Alesina et al. (2020) for the African continent. The same mosaic plot can be found by country in the Appendix. Two countries that stand out in terms of low and high levels of parental attainment of primary education are Jamaica and Guatemala\(^6\) (see Figure 6).

IV Methodology

For each individual in the sample, I analyze the relationship between its own educational attainment against the average attainment of individuals one generation older living in the same household, rounded to the nearest integer. For this I consider a measure of absolute intergenerational mobility that reflects the likelihood that a children complete a strictly higher or lower education level than the members of the immediately previous generation in 1970, and Uruguay 2011.

\(^6\)Saint Lucia shows similar patterns but contains a much smaller population.
Figure 5: Educational Attainment Transition Matrix

Notes: The sample is constructed with individuals older than 25 and it is unweighted.

the household (parents and/or extended family members, such as aunts and uncles).

**Upward mobility at the country level.** To estimate upward IGM, I estimate the following econometric specification, pooling observations from all the censuses and countries:

\[
y_{icoyt}^{up} = \alpha^{up} + \gamma^b_o + \gamma^b_y + \theta_t + \epsilon_{icoyt}
\]  

(1)

where \(y_{icoyt}^{up}\) is a dummy variable that takes a value equal to one when individual \(i\) completes at least primary education and zero otherwise. The parameters \(\gamma^b_o, \gamma^b_y, \theta_t\) refer respectively to fixed effects by decade-cohort of the individual \(i\), decade-cohort of the generation above that co-resides with individual \(i\), and census year. This regression uses a sample of individuals with ages between 14 and 18 (or 14 to 25), for whom the generation above (parents or older relatives) have on average less than primary education. Hence, \(\alpha^{up}\) is the parameter of interest and measures the likelihood of completing primary for children whose “parents”
Figure 6: Transition matrix for selected countries

(a) Jamaica

(b) Guatemala

Notes: The sample is constructed with individuals older than 25 and it is unweighted.

did not complete primary net of cohort and census year effects.

This empirical approach is used in Alesina et al. (2020) with data from Africa and delivers a measure of mobility comparable between countries that captures some long-term patterns over half a decade by netting out common (across countries) birth cohorts and Census year effects.

**Downward mobility at the country level.** To estimate downward IGM, I use a similar econometric specification, pooling observations from all the censuses and countries:

\[
y_{i_coyt}^{down} = \alpha_c^{down} + \gamma_o^b + \gamma_y^b + \theta_t + \epsilon_{i_coyt} 
\]

(2)

where \(y_{i_coyt}^{down}\) is a dummy variable that takes a value equal to one when individual \(i\) do not complete primary education and zero otherwise. The parameters \(\gamma_o^b, \gamma_y^b, \theta_t\) again refer respectively to fixed effects by decade-cohort of the individual \(i\), decade-cohort of the generation above that co-resides with individual \(i\), and census year. This regression uses a sample of individuals with ages between 14 and 18 (or 14 to 25), for whom the generation above (parents or older relatives) have on average completed at least primary education. Hence, \(\alpha_c^{down}\) is the parameter of interest and measures the likelihood of failing to complete primary for
children whose “parents” completed at least primary school net of cohort and census year effects.

**Upward and downward mobility at finer geographical level.** To estimate IGM at a more disaggregated level (i.e., provinces or districts), I use the following econometric specifications run country by country:

\[
y_{icrypto}^{up} = \alpha_{cr}^{up} + \gamma_{o}^{b} + \gamma_{y}^{b} + \theta_{t} + \epsilon_{icrypto}
\]

\[
y_{icrypto}^{down} = \alpha_{cr}^{down} + \gamma_{o}^{b} + \gamma_{y}^{b} + \theta_{t} + \epsilon_{icrypto}
\]

where the variables and subscripts in common have similar interpretation as in Equation 1 and 2, and the additional subscript \(r\) refers to the district or province according to the level of geographical dis-aggregation used in the analysis (provinces as the baseline estimates and districts as a robustness exercise reported in the Appendix).

**Why is primary education a suitable variable by which to measure IGM?** The focus on primary education is based on the fact that a non-negligible share of the population in Latin America and the Caribbean has an educational attainment of less than primary as shown in the previous subsection. Furthermore, this focus makes the analysis directly comparable to the recent work of Alesina et al. (2020) in Africa and allows me to minimize the potential bias that comes from using samples of co-residents. Nonetheless, the focus on the lowest level of education can also be justified from a conceptual point of view. Development policy discussions often claim that the poorest should not be left behind and this focus is related to the school of moral philosophy exemplified by the principle of justice proposed by Rawls (1971).\(^7\)

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\(^7\)See Ravallion (2016) as an example of the focus on the poorest in the context of poverty measurement.
III Intergenerational Mobility in Latin America

I Country-level estimates

Table 2 summarizes the estimates of mobility at the country-level. On average, close to fifty percent of children with parents that did not finish primary education (from now on, illiterate parents) are able to complete primary. On the other hand, downward mobility is close to ten percent, as one out of ten children with parents that finished primary education (from now on, literate parents) do not complete primary.

There is substantial heterogeneity within LAC countries. The probability of completing primary for children of illiterate parents ranges from 18% in Guatemala to 87% in Jamaica. In the case of downward mobility, the estimated probability of not completing primary for children of literate parents ranges from being null in Jamaica to 23% in Haiti. The heterogeneity found in upward mobility in Latin America is as large as the one documented for African countries by Alesina et al. (2020), although with higher minimum and maximum values. However, the level of upward mobility in countries such as Haiti, Guatemala, and Nicaragua is comparable to the level of mobility seen in Mali, Guinea, and Burkina Faso, although highest than the countries ranked at the bottom in Africa such as Malawi, Ethiopia, Sudan, Mozambique, and South Sudan.

Figure 7 maps the country-level estimates of upward and downward mobility in education. They highlight the heterogeneity found across the continent, show that the patterns of upward mobility are inversely related to downward mobility and that there are combinations of low and high mobility countries in South America, as well as in Central America and the Caribbean. The estimates of upward and downward mobility at the level of country are significantly negatively correlated (see Figure ?? in the Appendix).
### Table 2: Country-Level Estimates of Educational Intergenerational Mobility

<table>
<thead>
<tr>
<th>Mobility / N</th>
<th>Census Years</th>
<th>(1) 14-18</th>
<th>(2) 14-25</th>
<th>(3) 14-18</th>
<th>(4) 14-25</th>
<th>(5) N</th>
<th>(6) N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinidad and Tobago</td>
<td>1970, 1980, 1990, 2000, 2011</td>
<td>.838</td>
<td>.832</td>
<td>.023</td>
<td>.023</td>
<td>41,253</td>
<td>81,100</td>
</tr>
<tr>
<td>Cuba</td>
<td>2002</td>
<td>.715</td>
<td>.731</td>
<td>.008</td>
<td>.011</td>
<td>54,746</td>
<td>107,031</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>1980, 1991</td>
<td>.517</td>
<td>.487</td>
<td>.121</td>
<td>.135</td>
<td>2,059</td>
<td>3,635</td>
</tr>
<tr>
<td>Peru</td>
<td>1993, 2007</td>
<td>.48</td>
<td>.525</td>
<td>.115</td>
<td>.088</td>
<td>357,472</td>
<td>668,806</td>
</tr>
<tr>
<td>Mean / Total</td>
<td>.522</td>
<td>.55</td>
<td>.102</td>
<td>.086</td>
<td>18,603,243</td>
<td>32,860,207</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Columns (1) and (2) give upward-IGM estimates. They reflect the likelihood that children, aged 14-18 and 14-25, whose parents have not completed primary schooling will manage to complete at least primary education. Columns (3) and (4) give downward-IGM estimates. They reflect the likelihood that children, aged 14-18 and 14-25, whose parents have completed primary schooling or higher will not manage to complete primary education. Columns (5) and (6) give the number of observations used to estimate the country-specific IGM statistics (children whose parental education is reported in the censuses). Countries are sorted from the highest to the lowest level of upward IGM in the 14-18 sample (column (1)). “mean” gives the unweighted average of the 23 country-estimates.
I.1 Urban-rural

Within countries there may be some level of heterogeneity between the mobility of populations living in urban areas versus rural areas. To explore this, I estimate mobility by birth-decade cohort of the children and country. Figure 8 reports the gap between the upward/downward mobility in urban-rural areas over birth cohort. I find a positive gap that has been declining as one moves towards older birth cohorts.

I.2 Gender

Similar to the gaps between urban and rural populations, there may exist heterogeneous levels of mobility by gender. To explore this possibility I estimate mobility by gender and birth-decade cohort. I do not find systematic differences by gender although it appears that

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8This analysis is done by estimating a modified version of equations 1 and 2 that measure mobility at the country-cohort, i.e. $y_{i|co}^{up} = \alpha_{cy}^{up} + \epsilon_{icoyt}$ and $y_{i|co}^{down} = \alpha_{cy}^{down} + \epsilon_{icoyt}$ using samples restricted to urban or rural population.

9This analysis is done by estimating a modified version of equations 1 and 2 that measure mobility at the country-cohort, i.e. $y_{i|co}^{up} = \alpha_{cy}^{up} + \epsilon_{icoyt}$ and $y_{i|co}^{down} = \alpha_{cy}^{down} + \epsilon_{icoyt}$ using samples restricted to male or female population.
Figure 8: Intergenerational Mobility in LAC - Urban/rural

Notes: The estimates are done by birth decade cohort of the children.

there is a trend towards higher upward mobility for women (see Figure 9) while downward mobility appears flat.

I.3 Evolution over time

As Figure 1b made clear, the coverage over time is unbalanced with some countries spanning more years than others. This limits the analysis of trends over time and the conclusions that can be derived from comparisons between them at given points in time or for a given cohort. Nevertheless, I document estimates of mobility by country for the different birth cohorts available. Figure 10 reports these estimates. It is clear how the level of upward mobility has been increasing at the same time that downward mobility has been falling. This is not surprising given the fact that educational attainment has increased in the region over the last decades.
Notes: These estimates are computed by birth decade cohort of the children.
II Spatial variation of intergenerational mobility in LAC

Table ?? summarizes the estimates of mobility at the province-level. These results show that there are countries with substantial variance in mobility levels across provinces. This is for example the case of Paraguay, Mexico, Guatemala, Bolivia, and Peru, where the difference in upward mobility between the most upwardly mobile to the least upwardly mobile is more than half the range found in the case of countries in Latin America. However, there are also particular cases with either high or low upward mobility at the country level and a very small variation within country, such as Jamaica and Haiti, although somewhat expected as they correspond to countries with small number of administrative units and population.

In the case of downward mobility, the variability is much smaller in level with Paraguay that stands out in terms of the range between the province with the minimum and the maximum level of downward mobility.

Figure 11 and 12 maps the same estimates that are summarized in Table 3. We can see some interesting patterns in some countries. For example, Mexico shows a somewhat lower level of upward mobility in the south and you can identify a lighter spot in the middle of the country that corresponds to the region of the capital. In contrast, Brazil shows much lower level of mobility in the northern regions and higher mobility in the East coast near the states of Sao Paulo and Rio de Janeiro. Overall, the continent shows higher levels in the south, especially in the Pacific coast and some heterogeneous level in the case of Islands of the Caribbean region with important contrasts between Cuba and Haiti.

In the Appendix, I report similar estimates (see Table ??) and maps (see Figure ?? and ??) at the district-level, which corresponds to the finest administrative unit available in the data set. The patterns are qualitatively similar, however, given the level of dis-aggregation there are some districts with just few observations used for the estimation that produces estimates that end up outside the unitary range.
Table 3: Summary Statistics: Province-Level Estimates of IM

<table>
<thead>
<tr>
<th>Country</th>
<th>Provinces</th>
<th>Upward</th>
<th>Downward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuba</td>
<td>15</td>
<td>.93</td>
<td>.927</td>
</tr>
<tr>
<td>Jamaica</td>
<td>14</td>
<td>.891</td>
<td>.894</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>4</td>
<td>.872</td>
<td>.871</td>
</tr>
<tr>
<td>Chile</td>
<td>44</td>
<td>.773</td>
<td>.767</td>
</tr>
<tr>
<td>Peru</td>
<td>25</td>
<td>.749</td>
<td>.702</td>
</tr>
<tr>
<td>Argentina</td>
<td>24</td>
<td>.702</td>
<td>.691</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>7</td>
<td>.693</td>
<td>.693</td>
</tr>
<tr>
<td>Uruguay</td>
<td>19</td>
<td>.679</td>
<td>.677</td>
</tr>
<tr>
<td>Mexico</td>
<td>32</td>
<td>.676</td>
<td>.672</td>
</tr>
<tr>
<td>Ecuador</td>
<td>14</td>
<td>.622</td>
<td>.602</td>
</tr>
<tr>
<td>Panama</td>
<td>7</td>
<td>.596</td>
<td>.629</td>
</tr>
<tr>
<td>Bolivia</td>
<td>9</td>
<td>.576</td>
<td>.546</td>
</tr>
<tr>
<td>Venezuela</td>
<td>22</td>
<td>.545</td>
<td>.526</td>
</tr>
<tr>
<td>El Salvador</td>
<td>14</td>
<td>.538</td>
<td>.541</td>
</tr>
<tr>
<td>Colombia</td>
<td>22</td>
<td>.519</td>
<td>.526</td>
</tr>
<tr>
<td>Saint Lucia</td>
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<td>.471</td>
<td>.472</td>
</tr>
<tr>
<td>Paraguay</td>
<td>14</td>
<td>.458</td>
<td>.412</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>23</td>
<td>.451</td>
<td>.469</td>
</tr>
<tr>
<td>Honduras</td>
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<td>.381</td>
<td>.377</td>
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<tr>
<td>Nicaragua</td>
<td>12</td>
<td>.349</td>
<td>.366</td>
</tr>
<tr>
<td>Brazil</td>
<td>25</td>
<td>.285</td>
<td>.249</td>
</tr>
<tr>
<td>Guatemala</td>
<td>22</td>
<td>.256</td>
<td>.256</td>
</tr>
<tr>
<td>Haiti</td>
<td>4</td>
<td>.223</td>
<td>.218</td>
</tr>
</tbody>
</table>

Notes: This table shows summary statistics for province-level estimates of IGM. “Total” shows the unweighted summary statistics across all provinces. The columns “Nmin” and “Nmean” report respectively the smallest and largest sample size across provinces. Provinces with less than 50 observations are omitted.

IV Correlates of Intergenerational Mobility

In this section, I explore a set of correlates of regional IGM with the aim of uncovering a set of stylized facts that help characterize its geography. A necessary caveat is that the set is relative small given the difficulty of collecting data that is comparable for all the administrative units. An additional and perhaps more important caveat is that the analysis does not provide any causal interpretation and it is solely descriptive.

I run univariate regressions pooling all the countries linking IGM to geographical and initial conditions that has been discussed in previous studies on mobility outside the continent (for example, see Alesina et al., 2020). This is done estimating the following econometric specification:

\[ \alpha_{cr}^{up/down} = \eta_c + \beta Z_{cr} + \epsilon_{cr} \]  

(4)

where the dependent variable corresponds to the measure of upward or downward inter-generational mobility previously estimated for province/district \( r \) in country \( c \), \( \eta_c \) denote
Figure 11: Upward Mobility in LAC
Figure 12: Downward Mobility in LAC
country fixed effects, $Z_{cr}$ and $\beta$ are respectively the covariate and the coefficient of interest. The latter summarizing the linear association between intergenerational mobility and the covariate.

I Education of the old generation

First I analyze the share of the old generation that was able to complete primary education. Alesina et al. (2020) finds this measure to be strongly associated with mobility in Africa. This correlate in part reflects the initial outcomes at the province/district-level for parents. I compute this variable using an econometric specification similar to the one used to compute mobility at regional level (see Equation 3) run country by country:

$$e_{icrty} = \delta_{cr} + \gamma_{o} + \gamma_{y} + \theta_{t} + \epsilon_{icrty}$$  \hspace{1cm} (5)

where $e_{icrty}$ is a dummy variable equal to 1 if the completed educational level of the old generation observed for individual $i$ from country $c$ region $r$ is at least primary. Similar to before, $\gamma_{o}$ and $\gamma_{y}$ are birth-decade fixed effects for parents and children, and $\theta_{t}$ a census year fixed effect. In other words, $\delta_{cr}$ estimates the share of “parents” who complete primary by region netting out cohort and census year effects.

Figure 13 shows the associated scatter plots, which evidence a strong positive correlation with upward mobility and the opposite in the case of downward mobility. These findings suggest the existence of a high level of inertia confirming the findings of Alesina et al. (2020).

II Other covariates

Given the high level of inertia, the correlation analysis of the remaining correlates is performed one by one and also partialling out the effect of the educational attainment of the old generation. The idea is to test whether any potential relationship with the covariate of interest remains after removing the effect of the covariate on “initial conditions”. This is
Although upward mobility seems to be correlated with the proxies of development, the correlation becomes insignificant when controlling by education of the old generation in all provinces that are proxies of the level of development at the beginning of the period of study. These are the urban share of the population, the share of agricultural employment, the share of manufacturing employment, and the share of service employment. These last four covariates are computed restricting the sample to only individuals born before 1960.

The results are reported in Figure 14 for upward and downward mobility respectively. Previous literature has shown that some geographical characteristics are also correlated to the level of intergenerational mobility. In this paper I consider distance to the capital, distance to the border, and distance to the coast. I also consider other characteristics of the provinces that are proxies of the level of development at the beginning of the period of study. These are the urban share of the population, the share of agricultural employment, the share of manufacturing employment, and the share of service employment. These last four covariates are computed restricting the sample to only individuals born before 1960.

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Figure 14: IGM and Correlates

Notes: The graph plots the estimated coefficients and 95% confidence intervals computed clustering standard errors by country. The analysis is done at district-level running regressions by covariate as in equation 4 and 6. The coefficients are standarized.

(a) Upward mobility
(b) Downward mobility

the cases. However, in the case of downward mobility, I find a significant correlation even after controlling for education of the old with the share of employment in manufacture and agriculture, although with opposite signs.

In the case of the geographical correlates, they are not significantly correlated to either measure of mobility. This contrasts to the results that have been documented for Africa, where distance to the coast and to the capital are significantly correlated to the measures of mobility.

Qualitatively similar results are found when the analysis of correlations is done using estimates at the district level (see Figures ?? and ?? in the Appendix).

V Final Remarks

This paper examines intergenerational educational mobility for Latin American and the Caribbean countries at a disaggregated regional level using census data spanning more than half a century. I investigate mobility in education at the bottom of the educational attain-
ment distribution by focusing on the likelihood of completion of primary education for those whose parents did not complete the level, which can be measured with a high degree of confidence between ages 14 and 18. Similarly, I measure downward mobility as the likelihood of not completing primary for those whose parents were able to complete at least primary school.

I find wide cross-country and within-country heterogeneity. In LAC, the distance between the most and least upwardly mobile country is similar to what has been recently documented in Africa, although the least mobile countries in Africa are less mobile than any country in LAC. I do not find significant differences by gender but I do document a declining trend in the mobility gap between urban and rural populations.

Within country mobility shows a variety of patterns, with countries having higher mobility in the northern regions (e.g., Mexico), whereas others show higher mobility in the southern regions (e.g., Brazil). The level of heterogeneity within country also varies country by country with the lowest levels found in the smallest and less populated ones.

In terms of correlates within countries, the level of mobility is highly correlated to the share of primary completion of the previous generation, which suggests a high level of inertia. However, upward mobility does not appear to be highly correlated with geographical variables and proxies of economic development as previously documented for Africa, whereas downward mobility appears correlated to the shares of employment in manufacturing and agriculture.

Given the unbalanced nature of the data set in terms of coverage over time and across countries, further research could shed more light on potential determinants of mobility in Latin America by focusing on the analysis of particular countries with a relatively high coverage such as Chile, Mexico, or Brazil, which makes the collection of correlates by administrative unit easier. This paper contributes to this goal by creating the estimates of mobility at a disaggregated level.
References


