Educational transition and literacy gaps in Latin America during the twentieth century

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The middle decades between the 1940s and the 1970s saw significantly higher and less volatile rates of per capita income growth in Latin America than in preceding and succeeding decades (Astorga, Bergés and FitzGerald 2005). This growth was also 'high quality', having been accompanied by rapid social progress, as proxied by literacy and life expectancy. However, these aggregate indicators are not particularly informative about their distribution across different income and social groups. This paper seeks to complement pioneering research on historical income inequality in Latin America by focusing on the distribution of non-monetary improvements in welfare during the twentieth century, namely education. Towards this end two new data sets on school enrolment at primary, secondary, and tertiary levels, and on literacy rates, with special reference to rural-urban and gender inequalities in literacy, are introduced and analyzed to comment on the quality of social and economic progress in twentieth century Latin America.

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1 *Introduction: Living standards in Latin America during the twentieth century*[1]

The Latin American economies made substantial strides in living standards over the course of the twentieth century: per capita income in Latin America grew five-fold; the percentage of the population that was literate nearly trebled; and people lived nearly trice as long as they had in 1900 (Table 1). Most of these improvements in per capita income, literacy, and life expectancy occurred during the middle decades of the century, a period typically characterised by state-led industrialisation.[2]

<Table 1 here>

Indeed, the middle decades from about 1940 to 1980 are striking because growth was both faster and more stable than during the export-economy period that preceded it and the post-Debt crisis period that followed (Table 2). Not only was per capita growth more rapid and more stable during the period from 1940-70, but it was also accompanied by the greatest improvement in living standards, as proxied by life expectancy in years, and literacy.

<Table 2 here>

The middle decades from 1940-60 saw life expectancy in the LA6 rise by an average of 8.5 years per decade, compared with an average of 2.8 years per decade from 1900 to 1940, and 3.3 years per decade from 1970 to 2000. The LA13 again lagged behind the LA6, with life expectancy rising from 46 years in 1950 to 67 by 2000. As in many developing countries, increasing life expectancy reflected declining infant mortality, but the fact that the LA6 and LA13 experienced the most rapid improvements in life expectancy in successive decades suggests a common pattern of intervention or of social change, although the subsequent slowdown in life expectancy improvements also partly reflects their natural asymptotes.

In the case of literacy rates, in the LA6 these rose by an average of 7 percent per decade from 1940 to 1980, faster than in the preceding 4 decades (5 percent per decade), and faster than in the following 2 decades (4 percent per decade).[3] The LA13 followed a similar pattern, but with a delay of about 2 decades, rising from 25 percent literacy in 1900 to 40 percent in 1940 and 82 percent by 2000. What is

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[2] For more detailed discussion of trends in living standards in Latin America during the twentieth century, see Astorga, Bergés and FitzGerald (2005).

[3] Adult literacy is defined as the percentage of the population of or above a certain age (usually 15) who cannot read and write a simple statement about everyday life. In practice, however, it may refer to the percentage of the population of or above a certain age with less than two years of primary school enrolment, or may even be self-defined.

more, while the Latin American economies struggled to converge on US per capita income levels, they have significantly narrowed the gap in literacy rates and life expectancy.

The discussion above noted that the middle decades witnessed higher and less volatile rate of per capita income growth in Latin America, and that this growth was also high quality, having been accompanied by rapid improvements in literacy and life expectancy. However, these aggregate indicators are not particularly informative regarding their distribution across different income and social groups. This paper aims to complement pioneering research on historical income inequality in Latin America by focussing on the distribution of non-monetary improvements in welfare in Latin America during the twentieth century.

The discussion is organized as follows. Section 2 focuses on how improvements in one non-monetary aspect of living standards: education as proxied by literacy rates, have been distributed between men and women, and between urban and rural dwellers during the twentieth century. We find that urban-rural and gender gaps in literacy narrowed during the middle decades, suggesting that faster growth during the period was also 'higher quality', more socially inclusive, growth. At the same time, the convergence of rural literacy on urban literacy suggests that rural dwellers, and especially women, have benefited directly from literacy campaigns. However, the comparison also suggests that achieving gender equality in literacy has been easier than improving literacy in rural areas, as evidenced by the greater narrowing of the gender literacy gap compared to the rural-urban literacy gap.

Section 3 turns to educational transition in the largest six economies in Latin America (Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela - LA6), and the shift in the educational attainment of the workforce from predominantly primary schooling to secondary and tertiary schooling, with Spain, Portugal, Japan, South Korea and India offering points for further contrast. Following Barro and Lee (1993, 1996), we introduce new estimates of primary, secondary, and tertiary school enrolment for the LA6, Spain, Portugal, Japan, South Korea and India for the whole of the twentieth century, to allow us to comment on the timing and extent of educational transition in Latin America.

Section 4 closes with some possible explanations – and implications – of the trends in urban-rural and gender literacy gaps in Latin America.

2 Vertical and horizontal inequalities in human capital

The long run trend in living standards suggests that growth in the middle decades was 'high-quality' growth in terms of rising levels and greater stability of per capita income, literacy rates, and life expectancy in years. These middle decades have also been conventionally associated with greater state intervention. But questions remain about how equitably these improvements in long run living standards have been distributed amongst the population.

As in studies of human welfare, the study of inequality has also tended to focus on income (see for instance Kuznets 1955, Altimir 1994, Dollar and Kraay 2002, de Janvry and Sadoulet 2000), but comparisons of non-income measures of well-being among different social groups are equally important.[4] In fact, non-income dimensions may paint a more accurate picture of inequality because income measures reflect the household levels, while health and education indicators reflect individual levels.[5] Because non-income inequalities (in literacy and in life expectancy, for instance) reflect public rather than private expenditure decisions, these indictors may also better reflect the impact of targeted social welfare programmes and other forms of social spending. These inequalities may be captured by differentials between urban and rural areas (Lipton 1977), between primate and other cities (Seers 1977), between different sectors of the economy (e.g., agriculture and industry, see Mellor 1976), as well as between genders. Indeed, by drawing a distinction between urban and rural dwellers and male and female literacy, we hope to comment on vertical inequalities in human capital (urban versus rural dwellers) and on horizontal inequalities in human capital (gender gaps between genders among urban as well as rural dwellers).[6]

The following discussion highlights some of the characteristics in the distribution of education between urban and rural dwellers and between men and women by tracing the trends in their respective literacy rates with new previously unpublished long run and intercountry comparable data series. These data were originally produced by Shane and Barbara Hunt from country censuses for Thorp (1998) and extended by Ame Bergés for the OxLAD databank project (http://oxlad.qeh.ox.ac.uk/). The literacy data refers to the population aged 15 and over.

2.1 Urban-rural gaps in literacy

The evolution in urban and rural literacy in Latin America is shown in Figure 1 and Figure 2. The countries of the Southern Cone enjoyed relatively higher rates of urban and rural literacy compared with the other countries in the region. The

[4] Though dedicated to the study of inequality in Latin America, the 2003 World Bank publication 'Inequality in Latin America and the Caribbean: Breaking with History' focuses in the main on income measures, with only a very brief discussion of non-income inequalities that is limited to the post-1980s period, (pp. 68-72).

[5] Per capita income measures output given the size of the population, and reflects the share of GDP that corresponds to the average citizen. But because GDP per capita measures assume that production is distributed equally, they neglect the implications of income distribution for the actual share of GDP, which can be very serious in countries with very unequal income distributions. However, calculations of income inequality also require assumptions about the distribution of household income among its members, but may not necessarily reflect actual income shares within the household.

[6] Horizontal, or group, inequalities describe inequality that cuts across income classes (vertical inequality) as a result of gender, religious affiliation, race, ethnicity, and other culturally-defined groups. For our purposes, gender gaps in literacy among urban and rural dwellers are indicative of horizontal inequality. In countries with very large, and mainly rural, ethnic populations such as Brazil, Mexico, Bolivia, and Peru, for instance, urban and rural gaps in literacy could also be indicative of horizontal inequality.

available data reveal that urban literacy in Argentina was above 90 percent by 1940s. It took Panama about a decade to reach 90 percent, Chile 2 decades, Ecuador three decades, Colombia and Peru 4 decades, and 5 decades in Venezuela. Of the countries for which there is data in 1950s and 1980s, Venezuela experienced the fastest improvement in urban literacy (27 percent), followed by Colombia, Brazil and the Dominican Republic (15, 13 and 12 percent, respectively), and Chile and Panama (5 and 4 percent, respectively).

<Figure 1 here>

Rural literacy is shown in Figure 2. The countries with the highest levels of rural literacy were Uruguay, Argentina, and Costa Rica (higher than 70 percent in 1950s to 1970s), which took Chile and Paraguay about two decades to reach. Among the countries for which census data are available in 1950s and 1980s, Venezuela experienced the most rapid improvement in rural literacy (average rate of 125 percent per annum), followed by the Dominican Republic (73 percent), Brazil and Colombia (64 and 50 percent, respectively), and Panama and Chile (37 and 22 percent, respectively). Despite higher rates of growth, rural literacy in Venezuela, the Dominican Republic, and Brazil ranged between 54 and 63 percent; only Colombia achieved rural literacy of above 75 percent.

<Figure 2 here>

Urban literacy in Latin America was higher and also less dispersed than rural literacy. For instance, the standard deviation of urban literacy rates in the 1950s was 10.6 compared with 17.6 in rural literacy rates. The countries with the lowest rural and urban literacy levels in the 1950s were also the ones to experience the fastest improvement over time. For instance, Venezuela, the Dominican Republic, Colombia and Brazil had the lowest literacy rates in the 1950s (between 72-50 percent of rural dwellers were illiterate), but also registered the fastest rates of improvements in literacy (ranging from 50 to 125 percent, Table 3). This pattern was also repeated in urban literacy. One plausible explanation for this finding is that countries at the lowest levels stand to improve the most over time relative to those at higher levels. The differences in long run performance of countries starting out at similar initial levels suggest the influence of internal factors, particularly social policy, and policy effectiveness.

<Table 3 here>

As shown in Figure 3, of the countries for which census data are available, Argentina had the narrowest rural-urban literacy gap in the mid-century (ratio of rural to urban literacy of just 84 percent), with far wider gaps in Brazil (45 percent) and Venezuela (40 percent), and El Salvador (35 percent). By the 1980s, the ratio of rural to urban literacy had narrowed to 89 percent in Argentina, 83 percent in Chile and Colombia. The gap remained wide in Brazil (65 percent), Venezuela (70 percent), but these countries nevertheless made significant progress over the century.

<Figure 3 here>

The rates of growth of urban and rural literacy are compared in Table 4. Across the board, rural literacy rose at a faster pace than that of urban literacy, and that the pace of rural literacy improvements relative to urban generally increased over time as well. By the 1980s, rural literacy was with 89 percent of urban literacy in Argentina, 83 percent in Chile and Colombia, and 94 percent in Uruguay. By comparison the gap was much wider in Brazil (65 percent), Venezuela (70 percent), but these countries nevertheless made significant progress over the century. Among the countries for which data are available for 1950s and 1980s, Venezuela saw the most dramatic narrowing of the urban-rural gap, with a 75 percent catch up in rural literacy, followed by the Dominican Republic (57 percent), Brazil (44 percent), Panama and Colombia (33 and 30 percent, respectively), and Chile (17 percent). What these data suggest is that economic and social progress during the middle decades was associated with far faster improvement in rural literacy than in urban literacy from the 1950s to 1980s.

<Table 4 here>

Table 5 shows evidence of enormous strides in combating rural female illiteracy in some countries. In Peru, for instance, the ratio of rural-urban female literacy nearly doubled from 31 percent in the 1950s to 63 percent in the 1990s. In Venezuela, the gap narrowed from 35 to 78 percent from the 1950s to the 1990s, nearly catching up to the male rural-urban gap of 79 percent. These findings raise important questions about what contributed to rising female literacy in rural areas in these countries, in particular in regard to social spending and public policy.

Table 5 also shows evidence of urban and male bias in some countries, with higher literacy rates for rural and urban males than for their female counterparts. Nevertheless, the gains in literacy among female rural dwellers allowed for a narrowing of the gap, although some countries were more successful than others. In Bolivia, for instance, the ratio of rural male literacy to urban male literacy in the 1990s was 80 percent, 12 percent higher than that for rural and urban females – a reduction of just 5 percent from the ratio in the 1980s. In Peru, the difference between rural-urban ratios of males and females narrowed from 32 percent in the 1960s to 23 percent in the 1990s.

<Table 5 here>

Brazil is an interesting case because of the dramatic catch-up in female rural to urban literacy – even before the introduction of anti-poverty programmes *Bolsa Escola* and *Bolsa Familia*, which targeted disadvantaged female-headed households. The male rural-urban gap in the 1950s was 49 percent, compared with 39 percent for women. By the late 1970s, female rural literacy had caught up with female urban literacy to such an extent that female rural literacy rates

were within 69percent of their urban counterparts, one percent higher than the male rural-urban literacy gap.

2.2 Gender gaps in literacy

Male literacy was high in the Southern Cone, even as early as the 1920s and 1940s. In Chile and Uruguay, male literacy ranged from 65 to 89 percent in the 1920s. In Argentina, nearly 88 percent of men were considered to be literate by the 1940s – achieved by Chile only in the 1960s. In contrast, 94 percent of men in Canada and the United States were literate by the 1920s.

Female literacy was also quite high in the countries of the Southern Cone, ranging from 62 percent in Chile and 88 percent in Uruguay in the 1920s. The big push in male and female literacy appears to have occurred during the middle decades, prompting greater convergence within the region by 2000 (standard of deviation in female literacy rates fell from 22.2 in the 1950s to 13.4 in 2000; for men, from 20.7 to 11.9 in the same period.

Nevertheless, by 2000, male literacy rates in Brazil, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, and Nicaragua had not yet reached Uruguay's level of literacy in the 1920s. These countries, along with Bolivia and Peru, had also failed to reach Uruguay's 1920s female literacy rates by 2000. Across Latin America, male literacy was generally slightly greater than that of females. Nicaragua stands out in this regard because female literacy has consistently been higher than, or within, 2 percent of male literacy (see Table A 5).

The evolution in the gender gap in literacy and in rural-urban literacy is even starker. The ratio of female to male literacy rose sharply in the middle decades of the twentieth century. In some countries, the gender literacy gap was closed fairly early on. In Cuba, for instance, the ratio was already greater than 93 percent as early as the 1890s, and by the 1930s, female literacy rates were higher than their male counterparts. The comparison with the rural-urban gap indicates that greater strides have been made in achieving gender equality in literacy, than in improving literacy in rural areas.

That living in urban areas affords marginalised groups greater access to education opportunities is supported by evidence on gender gaps in literacy by urban and rural dwellers, shown in Table 6 below. Though female rural literacy in Guatemala and El Salvador both show an improvement since the 1960s (0.8 and 0.7 percent per annum growth, respectively), the real stars are Peru and Brazil, which experienced greater convergence in rural-urban female literacy. However, in all these countries, the female rural-urban literacy ratio continues to trail behind that of men, with ratios of 68 and 68.3 percent in El Salvador and Brazil in the 1950s and 40.8 and 52 percent in Guatemala and Peru.

<Table 6 here>

What, then, explains the gains in rural and female literacy in Latin America and the cross-country variations outlined above?

It should first be noted that the data themselves may be exaggerating the trends. Because the data refer to percentages, apparent improvements in rural and female literacy may well reflect a slowing down of gains in male and in urban literacy gains as these near the asymptote. It is also important to take into account population structures, since literacy rates (and average years of schooling of adults) reflect education outcomes over many generations. This means that perceived changes may well be due to differences in population structures. For instance, improvements in literacy rates may reflect the dying off of older generations who lacked access to education, rather than greater outlays or more selectively targeted social spending to ensure educational access of marginalised groups.

Rising per capita incomes during the middle decades also meant that citizens had greater recourse to funds with which to pay for food and clothing, medical treatment, education, and other basic needs. But policy emphasis on better access to primary schools and public spending on mass literacy campaigns for rural dwellers and for females appears to have allowed may low per capita income countries to catch-up to some middle and high income countries. Indeed, the variation between countries with similar population and economic size suggests that policy is an important element in convergence.

The role that population size, geography, and urbanisation play in urban-rural and gender gaps is not entirely clear. In some countries, the quality of immigrants explains relatively higher initial levels of male and female literacy, for instance in the Southern Cone. In others, highly segregated ethnic groups in rural areas may help explain low levels of rural literacy, and signal to the challenges to tailoring literacy campaigns to target these groups. Small countries with smaller populations and more hospitable geographies may find it easier to provide marginalised groups greater access to schools and education. On the other hand, the larger countries and commensurate economies may be able to draw on greater fiscal resources to build and equip schools, provide better teacher training and incentives, and fund mass literacy campaigns. Highly urbanised populations would enable public spending on education to achieve scale economies and target marginalised populations more effectively, which likely explains why rates of urban literacy are so much higher than rural literacy.

In this context, it is interesting to note the wide variation among countries of similar size in terms of population and income per capita. For instance, Brazil and Peru are relatively populous countries with high urbanisation rates (45 percent and 46 percent in 1960, respectively), and similar per capita incomes at the turn of the century ($127 and $114 international dollars at 1970 prices in 1900, respectively). However, it was not until 1993 that the gender gap for rural dwellers in Peru caught up to Brazil's 1950 figure of 68 percent, whereas in

Brazil, the ratio of female to male literacy in rural areas had reached 94 percent by 1990.[7]

The variations among the countries that comprise Central America are also worth noting. Costa Rica and Panama had some of the highest female-male literacy ratios among rural dwellers as early as the 1950s. In Costa Rica, female-male ratios in rural and urban areas were both 96 percent; in Panama, the ratio in rural areas was 97 percent and in urban areas 91 percent. Nicaragua too had high female-male literacy ratios in rural and urban areas by 1973: 93 percent compared to 91 percent.

Urban female literacy in El Salvador and Guatemala, however, lagged behind that of their male counterparts (ratios of 81 in El Salvador in 1950, and 80 percent in Guatemala in 1960). Female literacy in rural areas also lagged behind males, with ratios of 68 percent in El Salvador in 1950, and 52 percent in Guatemala in 1960. But what is remarkable is that despite similar population and economic size, and initial levels, female literacy in rural areas in El Salvador experienced dramatic catch-up, rising from 68 percent of male rural literacy in 1950, to 89 percent by 1992. In contrast, female literacy in rural areas in Guatemala in 1989 had not yet caught up with El Salvador's 1950 figure (63 percent compared with 68 percent), as shown in Table 6.

External factors may also help to explain the big push in education in the middle decades and the narrowing of gender and urban-rural literacy gaps. The nationalisation of school systems in the early 1900s and emphasis on universal primary education after the Second World War across Latin America indicate a diffusion and acceptance of educational ideals throughout the hemisphere. Not only was secular education a priority for urban working classes,[8] but public education also marked a state response to the needs of emergent industry and commerce, particularly during the period of import-substitution industrialisation and inward-looking growth.

These findings raise important questions about what motivates policy in the first place. To what extent has the expansion of schooling been a response to the industrialisation process itself, as economic specialisation and innovation increase demand for better educated and better skilled labour? Or does schooling expansion reflect socio-political pressures arising from class conflict? To what extent have class interest and greater incorporation of the citizenry into the national polity created pressures for state policies that prioritize a more

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[7] Brazil's narrowing of the gender gap in literacy may be due to a nationwide adult literacy campaign in 1967, the *Movimento Brasileiro de Alfabetizaçao* (*Mobral*) and related education programs, the restructuring of primary and secondary schools systems during the 1970s and 1980s, and the establishment of a system of integrated educational centres (*Centros Integrados de Assistência à Criança* and *Centros Integrados de Atençaõ à Criança*) in 1990 to include day care, school lunches, and health care.

[8] The Socialist party in Argentina made access to education central to their platform, with heavy emphasis on literacy and secular, publically-funded, education, see Adelman (1992), p. 217-18.

equitable expansion of education? To what extent were the large-scale *campañas de alfabetización* in the early part of the twentieth century organised for political, citizenship, and/or welfare objectives? For instance, would literacy requirements for the franchise that proliferated through the 1940s, in excluding many from political participation, have also placed a premium and hence a demand for education and literacy?[9]

3 Educational attainment in Latin America

As noted in the discussion above, one of the chief issues with literacy rates is that as a result of the natural ceiling, one can expect to see convergence between countries over time. At the same time, literacy rates are imperfect measures of human capital. Being able to read and write is necessary but clearly insufficient to compete in labour markets, which required more advanced skills in numeracy, analytical and logical reasoning, technical knowledge, and critical thinking, acquired and developed in secondary and tertiary education.

Years of schooling are a more helpful indicator of education, as they do not have a natural ceiling. Barro and Lee (1993, 1996) produced estimates for education as four levels of schooling: no schooling, primary, secondary, and tertiary (includes post-secondary) schooling, and mean years of schooling, for a large sample of countries from 1960 to 2000. Employing the methodology and benchmark stocks from Barro and Lee (1993, 1996), as well as OECD (2001) and UNESCO (2002, 2007), school enrolment figures compiled in Mitchell (2000), and population data from Mitchell (2000), US Census Bureau (2009), and UN Common Database (2009), we estimate mean years of schooling and educational attainment from 1900 to 2005 by applying an adapted perpetual inventory method, adjusted for the mortality rate. These estimates refer to the population 15 years of age and older, which is more reflective of the actual working-age population in Latin America, certainly through the first half of the twentieth century. In this section we present our estimates for both years of schooling and school enrolment.

First, a note on the data: any gaps in enrolment series were interpolated by geometric mean. Net enrolment rates are preferable but difficult to calculate due to the lack of information on the total number of students in the corresponding age group at a given level of schooling, so gross enrolment rates were used. There are calculated as the ratio of the total number of students enrolled at a given level of schooling to the population of the age group to which that level of schooling corresponds. Primary, secondary, and tertiary enrolment roughly corresponds to the population aged 5-14, 15-19, and 20-24.

[9] Among the countries that still had literacy requirements for the franchise in 1920-40 were Bolivia, Brazil, Chile, Ecuador, Peru, and Venezuela. These requirements had been repealed in Argentina in 1916, Colombia in 1918, Costa Rica in 1919, Mexico and Uruguay in 1920; see Mariscal and Sokoloff (2000).

3.1 Methodology

We fill in the missing observations on school attainment by using information on school-enrolment and structure of the population by age groups. Following the perpetual inventory method, we construct current flows of adult population that are added to the benchmark stocks. The levels of schooling for the population aged 15 and over are calculated as follows:

Primary educational attainment (H_{1t}) at year t is given by:

(1) $H_{1t} = H_{1,t-5}(1-\delta_t) + L15_t(PRI_{t-5} - SEC_t)$

Secondary educational attainment (H_{2t}) is given by:
(2) $H_{2t} = H_{2,t-5}(1-\delta_t) + L15_t * SEC_t - L20_t * TER_t$

Tertiary educational attainment ($H3t$) is given by:
(3) $H_{3t} = H_{3,t-5}(1-\delta_t) + L20_t TER_t$.

The mortality rate, δ_t, is calculated as:

(4) $\delta_t = \dfrac{L15_t + L_{t-5} - L_t}{L_{t-5}}$, and

$L15_t$ is the number of persons aged 15-19 and $L20_t$ is the number of persons aged 20-24. The variables *PRI*, *SEC*, and *TER* are the gross enrolment ratios for primary, secondary, and tertiary schooling. The equations assume that, if enrolled, persons aged 15-19 would have received primary schooling 5 years earlier and be receiving secondary education contemporaneously, and that persons aged 20-24 would also be receiving tertiary education contemporaneously.

Substituting equation (4) into equations (1)-(3) and rearranging the variables yields the formulas used to backcast the pre-1960 attainment ratios, $h_{j,t-5}=H_{j,t-5}/L_{t-5}$. The sum of H_{ot}, H_{1t}, H_{2t}, $H_{3t}=1$. The results are reported in the Appendix.

(6) $$h_{0,t-5} \equiv \frac{H_{0,t-5}}{L_{t-5}} = \frac{h_{0,t} - \left[\frac{L15_t}{L_t} * (1 - PRI_{t-5})\right]}{1 - \frac{\mathrm{L15_t}}{L_t}}$$

(7) $$h_{1,t-5} \equiv \frac{H_{1,t-5}}{L_{t-5}} = \frac{h_{1,t} - \left[\frac{L15_t}{L_t} * (PRI_{t-5} - SEC_t)\right]}{1 - \frac{\mathrm{L15_t}}{L_t}}$$

$$(8)\ h_{2,t-5} \equiv \frac{H_{2,t-5}}{L_{t-5}} = \frac{h_{2,t} - \left[\frac{L15_t}{L_t} * SEC_t - \frac{L20_t}{L_t} * TER_t\right]}{1 - \frac{\mathrm{L15_t}}{L_t}}$$

$$(9)\ h_{3,t-5} \equiv \frac{H_{3,t-5}}{L_{t-5}} = \frac{h_{3,t} - \left[\frac{L20_t}{L_t} * TER_t\right]}{1 - \frac{\mathrm{L15_t}}{L_t}}$$

3.2 Average years of schooling

Average years of schooling are shown in Figure 4 below. These are calculated as the sum of the proportion of the population age 15 years and older that have attained primary, secondary, and tertiary level education weighted by duration of schooling at each education level:

$$YOS = h_{1t} * DUR_{pri,t} + h_{2t} * \left(DUR_{pri,t} + DUR_{\mathrm{sec},t}\right) + h_{3t} * \left(DUR_{pri,t} + DUR_{\mathrm{sec},t} + DUR_{ter,t}\right)$$

where *DUR* is school duration at the primary, secondary, and tertiary levels. The data on school duration are from the World Bank (2008) and from UNESCO (2007). Due to lack of data regarding changes in school duration over time within countries, we do not account for these. As data on tertiary school duration were not available, we assume a minimum of two years of higher education in the calculations.

Using mean years of schooling can certainly be problematic. Indeed, mean years of schooling were previously included in UNDP Human Development Index calculations to proxy for knowledge, but were replaced by the gross enrolment ratio at primary, secondary, and tertiary levels after 1995 due to problems with the availability, reliability, and legitimacy of the data on years of schooling. To be sure, there are issues that arise with respect to school duration at the various levels of schooling, and the fact that the duration of tertiary schooling can vary greatly, from two-year associate degrees to longer professional career development. They also neglect to account for issues of educational quality. Unfortunately, data on repetition rates and drop-out rates are not readily available before the 1990s. Still, the figures below help to give us an idea of the general trend at the subregional and cross regional level.

Among the LA6, average years of schooling in 1900 were highest in Argentina (3.1) and Chile (3.2), followed by Colombia (2.1). Brazil and Venezuela trailed behind with just 1.4 and 1.3 years of schooling, respectively, while in Mexico the population age 15 and over had less than 1 year of schooling (0.84).

By 2005, Chile and Argentina continue to stand out among the LA6 in terms of years of schooling, reaching 9.7 and 9.6 years respectively, and educational attainment in Mexico blew past the rest of the LA6 to reach 9.6 years in 2005.

Despite promising gains in Colombia through the 1950s, educational attainment stagnated in the 1960s and again in the 1980s, gaining just 2.7 years since in the mid-19780s to reach 7.4 years in 2005. While Brazil and Venezuela had comparable starting points in 1900, progress was slow, but steady in Brazil, reaching 5.6 years in 2005, but much more rapid in Venezuela, where the population age 15 years and older had at least 8.9 years of schooling by 2005.

<Figure 4 here>

If we compare Latin America's educational attainment against that of Portugal and Spain in 1960 (Figure 5), we find that years of schooling in Argentina (6.53) and Chile (6.59) were close to Japan (8.99) and higher than South Korea (4.62), Portugal (3.50) and Spain (5.19). However, just 15 years later, South Korea had surpassed education attainment in Argentina and Chile (7.89 compared to 7.31 and 7.52, respectively), as well as Spain (6.46). Progress in other developing regions, India for instance, was especially swift since the 1980s, with a 2.7% increase in years of schooling to reach 6.91 years, compared to 5.63 years in Brazil by 2005 ().

<Figure 5 here>

3.2 Educational transition

The figures below report the percentage of population age 15 years and older with primary, secondary, and tertiary level education. Insofar as tertiary level education is concerned, we see that at least 30 percent of the population received tertiary education in Argentina, Chile, Mexico, and Venezuela in this decade, and as early as the 1970s in the case of Chile (Figure 6).

<Figure 6 here>

Even in cross regional perspective, this is very impressive. In Japan, comparable percentage was received only in this decade (30%); in Portugal and Spain as of this decade, only 18 percent and 23 percent of the population have tertiary education. Even India, which made significant progress in tertiary education, skyrocketing from 3.7 percent to 12 percent, trails behind the LA6. In this regard South Korea is especially striking, with 30 percent of the population achieving tertiary education in the 1990s, and a whopping 46 percent of the population in this decade.

Equally impressive are the gains in the LA6 in educational transition from no schooling to primary schooling (Figure 7), especially in Mexico and Venezuela, where the percentage of the population with no schooling fell dramatically from 85 percent and 81 percent in 1900s, respectively, to 9 percent by this decade. Even in Brazil and Colombia, where 78 percent and 65 percent of the population, respectively, had no schooling in the 1900s, literacy and primary education

campaigns saw 85 percent and 81 percent of the population move into formal education by this decade, compared to India (60 percent).

<Figure 7 here>

The twist in Latin America's experience with formal education lies in educational transition from primary to secondary education, and from secondary to tertiary education. Despite real gains in formal education in Latin America, the transition from primary to secondary and especially from secondary to tertiary education, has been selective and restricted to a privileged few. Taking 10 percent of the population with tertiary education as a benchmark, we see that Argentina reached this in the 1980s, Chile, Mexico, and Venezuela in the 1990s, while Brazil and Colombia reached the benchmark only in this decade (Figure 6). This is similar to Portugal and Spain, which reached the benchmark in the 1990s, but delayed compared to Japan (1970s) and South Korea (1980s). What is striking, though, is the percentage of the population with secondary education at the time the transition to tertiary education takes place.

By the time that Japan and South Korea reached the 10 percent benchmark, a full 44 percent and 55 percent of the population, respectively, had at least secondary education (Figure 8). In Chile, Mexico, and Venezuela, between 30 and 36 percent of the population had at least secondary education. In Colombia and Argentina, between 25 and 28 percent of the population had at least secondary education when they reached the benchmark for tertiary education, similar to Spain (36 percent) and Portugal (23 percent). What is striking is that for India and Brazil, only 21 percent and 14 percent of the population attained secondary schooling at the time that the 10 percent benchmark for tertiary education is reached. This, combined with the sharp decline in no schooling rates, suggests that a significant proportion of the population is failing to move into secondary education, and that only a privileged few have been able to move into tertiary education.

<Figure 8 here>

4 Conclusions

This paper assessed the distribution of literacy improvements among urban and rural dwellers and among males and females in Latin America, and educational transition in Latin America during the twentieth century. The main findings may be summarised as follows:

1. The middle decades between the 1940s and 1970s saw significantly higher and less volatile rates of per capita income growth in Latin America than in preceding and succeeding decades. This growth was also high quality, having been accompanied by rapid social progress, as measured by literacy and life expectancy;

2. Insofar as how equitably these improvements were distributed, rural literacy converged on urban literacy rates, leading to a closing of the rural-urban gap, suggesting that economic and social progress during the middle decades was associated with far faster improvement in rural literacy than in urban literacy from the 1950s and 1980s, as well as strides in combating rural female illiteracy in many countries;
3. The countries with the lowest rural and urban literacy levels in the 1950s were also the ones to experience the fastest improvements over time, but their literacy levels still lag: despite rising rates of growth in literacy, rural literacy in Venezuela, the Dominican Republic, and Brazil ranged between 54 and 63; only Colombia achieved rural literacy of above 75 percent;
4. Male literacy has generally been higher than female literacy, with the Southern Cone countries enjoying higher rates of both. Both male and female literacy experienced rapid increases through the middle decades and greater intraregional convergence, with a drop in the standard deviation from 20.7 and 22.2, to 11.9 and 13.4, from the 1950s-2000, respectively. Despite rising female literacy rates, many countries have not yet reached Uruguay's 1920s level. Another interesting finding is that in Nicaragua – a low-income countries with less than impressive literacy rates – female literacy rates have consistently been higher than, or within, 2 percent of male literacy rates;
5. Achieving gender equality has been easier than improving literacy in rural areas, as evidenced by greater narrowing of the gender literacy gap than the rural-urban gap in literacy.

Plausible explanations include social welfare policies in the middle decades of the century that accompanied the state-led model of industrialisation; the impact of population and economic size on policy effectiveness; as well as the limitations on interpretation entailed by the way literacy is defined and quantified.

These findings raise important questions about what motivates policy in the first place. Was the expansion of schooling a response to the industrialisation process itself, as economic specialisation and innovation increased demand for better educated and more skilled labour force? Or does schooling expansion reflect socio-political pressures arising from class conflict? To what extent have class interests and greater incorporation of the citizenry into the national policy created pressures for state policies that prioritize a more equitable expansion of education? To what extent were the large *campañas de alfabetización* in the early part of the twentieth century organised for political, citizenship, or other welfare objectives? Would literacy requirements for the franchise that proliferated through the 1940s, by excluding many from political participation, have also placed a premium, and hence a demand for education and literacy?

The data for primary and secondary school enrolment examined in section 3 help throw light on trends in educational levels. We found that despite impressive gains in average years of schooling and in entry to formal education at least at the primary level of education, few countries in Latin America have achieved

significant progress in educational transition from primary to secondary education compared with East Asia, where at least 45-50 percent of the population has secondary education. However, weak educational transition into secondary education has not deterred progress in tertiary education, where despite less than a quarter of the population reaching secondary education in India and Brazil, between 12 and 18 percent of the population achieves tertiary education. This, combined with the sharp decline in no schooling rates, suggests that a significant proportion of the population is failing to move into secondary education, and that tertiary education is the domain of a chosen few.

There is clearly scope for expanding the dataset. Filling in data gaps in income distribution before the mid-century would be valuable in helping advance an assessment of the extent to which inequalities in non-income dimensions of welfare have accompanied or diverged from trends in income distribution. This would help to explore two key questions: the role of private versus public funding of education and policy impact. In other words, it would help determine whether private incomes or public policy have played a more determining role in education, which is predicated on the ability to pay for access. It would also shed light on whether public policy has been more effective in targeting inequalities in education (and health) than in income. The present discussion has focussed on the LA6, but educational transition in the smaller economies of the region would be no less instructive in this respect. Certainly further historiographic investigation into the political economy of literacy campaigns in different Latin American countries would also prove to be fruitful in helping to explain why some countries were able to narrow rural-urban and gender inequalities in literacy more resolutely than others.

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