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# Human Capital Policies: What they Can and Cannot Do for Productivity and Poverty Reduction in Latin America

by

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## **Abstract**

Raising labor productivity is recognized as a critical factor for increasing economic growth and reducing poverty levels in Latin America. Low levels of education continue to be singled out as the main obstacle to higher productivity in the region. We examine the scope for education to lift labor incomes above poverty levels in Latin America and find that in many countries education, by itself, has a positive, but limited, potential to increase wages above a minimum level. In general, the prospects are dim because progress in raising average schooling levels has been slow even under the best historical scenarios. We also examine whether the apparent failure of education can be explained by low wage returns to schooling, and poor underlying conditions. We find that investments in education continue to have important payoffs but poor underlying conditions explain the modest prospect for the role of education in the short run. This leads us to consider what additional policies should be pursued in order to ensure higher productivity for workers in the region.



## 1. Introduction

Raising labor productivity is recognized as a critical factor for increasing economic growth and reducing poverty levels in Latin America. In the 1990s only meager reductions in poverty are found throughout the region. For example, Székely (2001) finds that over the decade moderate poverty fell on average by only 4 percentage points from a level of 43 percent to 39 percent, based on calculations for 11 countries. Nonetheless, a series of United Nations resolutions and agreements have set ambitious international development goals to be achieved by the year 2015, including a reduction of poverty to half of its early 1990s levels. U.S. Treasury secretary Paul O'Neill has repeatedly asserted that multilateral development banks and international institutions should focus on raising productivity. In testimony to the US Congress in May 2001, he noted that programs that raise workers' labor income are the critical link for reducing poverty. In turn, low levels of education are consistently singled out as the main obstacle to higher productivity in the region.

The focus on productivity is understandable: countries with high labor productivity tend to be rich societies. This is because when each worker is responsible for a large share of goods and services, real wages tend to be high.<sup>1</sup> Unfortunately, the factors behind a high level of labor productivity are not well understood—as the number of poor countries reflects. Although higher education scores high in the potential list of policies that can increase labor productivity, the economic literature has found conflicting evidence on the relationship between education, income per capita and economic growth. At the microeconomic level, higher education tends to be associated with higher income. An additional year of education has a value revealed by higher remuneration in the labor market. Mincer equations (i.e., that is, regressions of individual earnings on age, education and other individual characteristics) show that returns to schooling tend to be positive and significant. At the aggregate level, however, there is less agreement on whether education contributes to income per capita and economic growth; some studies even find an empirical link between increases in women's schooling and slowdowns in economic growth.<sup>2</sup> While the jury is out regarding the effect of changes in aggregate

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<sup>1</sup> This is particularly true in countries with democratic governments as shown in Rodrik (1999).

<sup>2</sup> See Pritchett (1996) and Barro and Sala-i-Martin (1995).

education on aggregate per capita-income using cross-country data, there is broad consensus that, at the level of the individual, higher education is associated with higher labor income.

In this paper we assess the role of education and other human capital policies in productivity growth and poverty reduction. We find that when educational levels are low, educational attainment is deeply unequal, and the quality of education in Latin America lags behind that of other regions. We also examine the scope for education to lift labor incomes above poverty levels in Latin America and assert that for many countries education, by itself, has a positive, but limited, potential to increase wages above a minimum level in the short run. In general the prospects are dim because progress in raising average schooling levels has been slow even under the best historical scenarios. We also examine whether the apparent failure of education can be explained by low wage returns to schooling and poor underlying economic and institutional conditions. While returns to every extra year of education are high relative to other countries, an expansion of education that made secondary schooling universal will not be able to lift all workers above poverty levels. This is because, while education can lift the earnings of a worker without schooling or experience by a relatively large percentage, the base to which that percentage is applied is very low. These low “base” wages are a reflection of the low quality of the economic and institutional environment in which workers produce. Policies addressed to improve this environment can have large effects on earnings. Moreover, the better the quality of this environment, the larger the absolute gains in earnings given by any expansion in education.

The paper is organized as follows. Section 2 assesses education in Latin America relative to other regions of the world. Section 3 evaluates how fast education can be expanded. Section 4 calculates the impact of an education expansion in reducing the share of “poor” workers and shows that education, by itself, cannot remedy the productivity deficit in the region. Section 5 examines the reasons behind the limited role of education in reducing the share of poor workers. Section 6 suggests interventions for a high productivity agenda. Section 7 concludes.

## **2. Education and Productivity**

The positive relationship between schooling and higher earnings is well documented in the microeconomics literature for industrialized as well as developing countries. There has been intense discussion on whether earnings of educated workers reflect their inherent abilities or instead reflect the increases in productivity associated with education. If the most able workers are those who can complete higher levels of education, education may be a way to signal higher ability. If this were an important part of the story, expansions in education would not necessarily lead to more productivity. However, recent research suggests that higher earnings do indeed demonstrate that education imparts knowledge and skills that increase workers' productivity.<sup>3</sup>

Despite the established relationship between education and earnings at the individual level, some studies have found no relationship between changes in education attainment and GDP growth.<sup>4</sup> Some have even found an empirical link between increases in women's schooling and slowdowns in growth.<sup>5</sup> There are a variety of reasons driving inconsistencies in research with aggregate macro data. One is that it is extremely difficult to collect comparable measures of schooling across countries. For example, the schooling level classified as completed primary in one country may be considered completed first cycle of secondary in another country, and average levels of quality may differ widely. The resulting measurement error would bias the results against finding that aggregate measures of schooling affect income growth. Krueger and Lindahl (2000) find that once one corrects for these errors in measuring years of education, changes in education positively affect GDP growth. So while the jury is out regarding the best estimation approaches with aggregate level data, both the microeconomic and macroeconomic literature suggests a strong link between schooling and productivity.

## **3. Education in Latin America**

Given the strong relationship between education, earnings, productivity, and GDP growth found by many studies, it is not surprising that Latin America's deficit in educational

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<sup>3</sup> See Krueger and Lindahl (2000).

<sup>4</sup> See for example Benhabib and Spiegel (1994).

<sup>5</sup> See Pritchett (1996), and Barro and Sala-i-Martin (1995).

attainment has been identified as the leading cause of low incomes and high poverty rates in the region.<sup>6</sup> Low levels of education, deep inequalities and very poor quality characterize education outcomes in Latin America.

### ***Low Levels of Schooling***

Educational attainment in Latin America lags behind attainment in other regions. Using estimates from the Barro-Lee data set on education, Table 1 shows that the average years of schooling attained by the population older than 25 in Latin America was approximately 6 years of schooling in 2000. With averages over 11 years in the United States, Canada and Sweden, attainment in these countries is twice the Latin American average. There is, of course, much dispersion in average schooling levels within Latin American and the Caribbean, with the lowest average attainment in the table found in Guatemala (3.12 years) and the highest in Argentina (8.49 years).

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<sup>6</sup> See IDB (1998) and *Latin American Economic Policies* (2000).



**Table 1. Summary Measures of Schooling Attainment Across Countries, Population Age 25 and Older**

	Average Years of Completed Schooling				Percentage Completing at least Secondary			
	1960	1980	2000	Change per decade over period of 1980 to 2000	1960	1980	2000	Change over 1980 to 2000
<b>East Asia and the Pacific</b>								
South Korea	3.23	6.81	10.46	1.83	8.4	27.6	60.3	32.70
Singapore	3.14	5.52	8.12	1.30	7.7	8.4	23.8	15.40
Taiwan	3.32	6.37	8.53	1.08	8.8	22.6	42.0	19.40
Thailand	3.45	3.77	6.10	1.17	2.2	5.2	15.4	10.20
<b>Advanced Countries</b>								
United States	8.66	11.91	12.25	0.17	35.4	76.9	71.7	-5.20
Canada	8.37	10.23	11.43	0.60	34.4	53.4	64.9	11.50
Japan	6.87	8.23	9.72	0.75	21.7	29.7	41.4	11.70
Sweden	7.65	9.47	11.36	0.94	25.9	51.1	66.0	14.90
<b>Latin America</b>								
Argentina	4.99	6.62	8.49	0.94	8.3	14.7	30.1	15.40
Bolivia	4.22	4.00	5.54	0.77	13.2	12.9	20.4	7.50
Brazil	2.83	2.98	4.56	0.79	6.0	7.7	13.8	6.10
Chile	4.99	5.96	7.89	0.97	13.1	18.8	30.9	12.10
Colombia	2.97	3.94	5.01	0.54	5.8	10.9	18.5	7.60
Costa Rica	3.86	4.70	6.01	0.66	5.1	12.8	23.3	10.50
Ecuador	2.95	5.40	6.52	0.56	4.0	15.5	27.0	11.50
Guatemala	1.43	2.34	3.12	0.39	1.5	4.4	8.6	4.20
Honduras	1.69	2.33	4.08	0.88	2.2	4.6	12.5	7.90
Mexico	2.41	4.01	6.73	1.36	2.9	10.5	24.6	14.10
Nicaragua	2.09	2.86	4.42	0.78	3.9	7.5	13.7	6.20
Panama	4.26	5.91	7.90	1.00	6.7	19.8	35.9	16.10
Paraguay	3.35	4.64	5.74	0.55	3.8	10.6	17.5	6.90
Peru	3.02	5.44	7.33	0.95	6.7	20.8	35.2	14.40
El Salvador	1.70	3.30	4.50	0.60	2.5	6.9	14.3	7.40
Uruguay	5.03	5.75	7.25	0.75	10.0	13.0	21.8	8.80
Venezuela	2.53	4.93	5.61	0.34	3.7	16.2	22.0	5.80
<b>LA Average</b>	<b>3.20</b>	<b>4.42</b>	<b>5.92</b>	<b>0.75</b>	<b>5.85</b>	<b>12.21</b>	<b>21.77</b>	<b>9.56</b>
<b>Caribbean</b>								
Dominican Republic	2.38	3.36	5.17	0.91	1.5	7.2	19.2	12.00
Barbados	5.22	6.84	9.11	1.14	5.7	12.7	25.6	12.90
Jamaica	2.46	3.60	5.22	0.81	2.1	6.4	15.2	8.80
Trinidad and Tobago	4.19	6.60	7.62	0.51	4.2	6.9	17.3	10.40
<b>Caribbean Average</b>	<b>3.11</b>	<b>4.57</b>	<b>6.19</b>	<b>0.81</b>	<b>3.38</b>	<b>8.30</b>	<b>19.33</b>	<b>11.03</b>

Source: Barro, Robert J. and Jong-Wha Lee, International Data on Educational Attainment: Updates and Implications (CID Working Paper no. 42), Harvard University.

The availability of skilled workers can be proxied by the share of population who has completed at least secondary schooling. Again using the Barro-Lee figures shown in Table 1, the percentage of skilled workers in South Korea, Taiwan, the United States, Canada, Japan and Sweden is at least twice that of the Latin American or Caribbean average. For example, 42 percent of adults age 25 and above in Taiwan have completed at least secondary school, whereas the average for Latin America is 22 percent. Among the countries with the lowest share of potential workers with completed secondary schooling are Guatemala, Honduras, Nicaragua, Brazil, and El Salvador, in which less than 15 percent of the adult population has completed secondary school.

### ***Slow Progress***

Of particular concern is that not only attainment levels are very low, but also progress has been very slow, especially in recent decades. As shown in Table 1, the average years of schooling for the population older than 25 in Latin America rose from about 3 years in 1960 to 4.5 years in 1980 and then to 6 years in 2000. Thus the average years of schooling increased less than 1 year per decade in the region over both the 1960 to 1980 period as well as the 1980 to 2000 period.

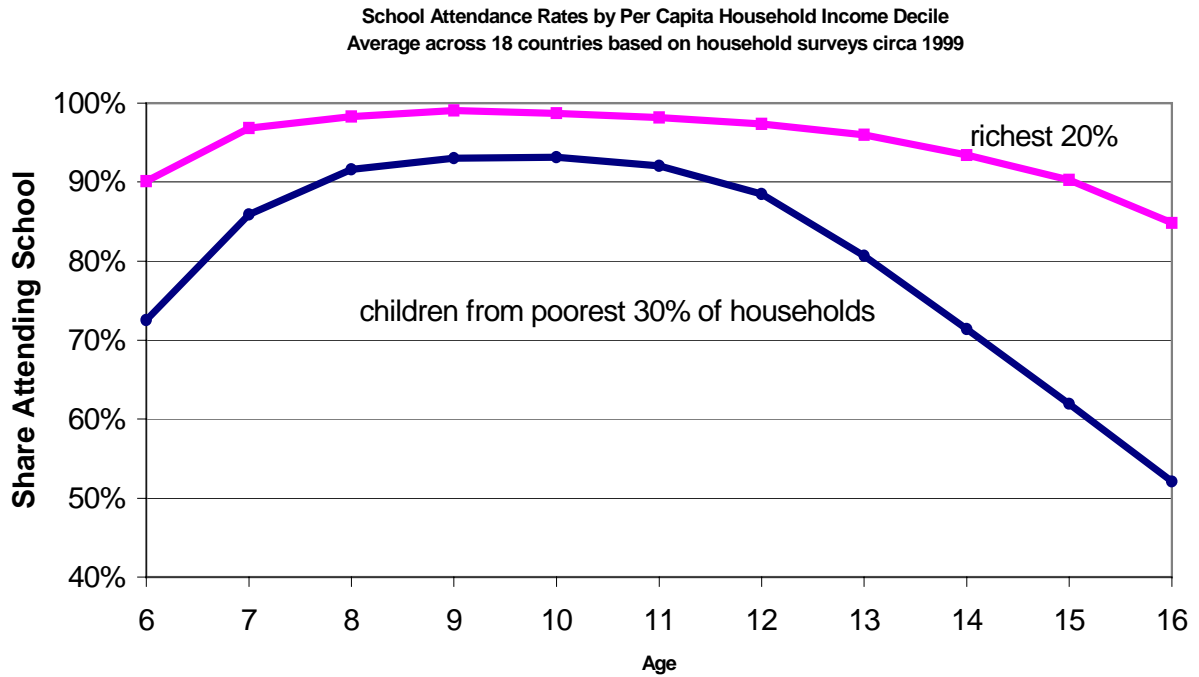
Some countries were more successful than others; Mexico, Chile, Panama, Peru and Argentina increased their schooling by one year per decade between 1980 and 2000. Others, such as Colombia, Guatemala, Paraguay, and Venezuela, grew at a dismal rate. This is particularly troubling because some of these countries were already among the worst performers in 1980.

### ***Large Inequalities***

Differences across income, area of residence and race in educational outcomes remain a challenge for Latin America. Figure 1 shows that on average across 18 countries, children from the poorest 30 percent of households are less likely to be attending school than children from the richest 20 percent of households. The gaps are most pronounced in the early years, at ages 6 and 7, and then again after age 12. For example, at age 6, 90 percent of children from the relatively higher income households attend school, while only 73 percent of children from the poorest households do. At age 16 the gap is over 30

percentage points. There are also large inequities between rural and urban areas. The PREAL (2001) study reports differences in enrollment between urban and rural areas of more than 30 percentage points while in Nicaragua they exceed 50 percentage points.

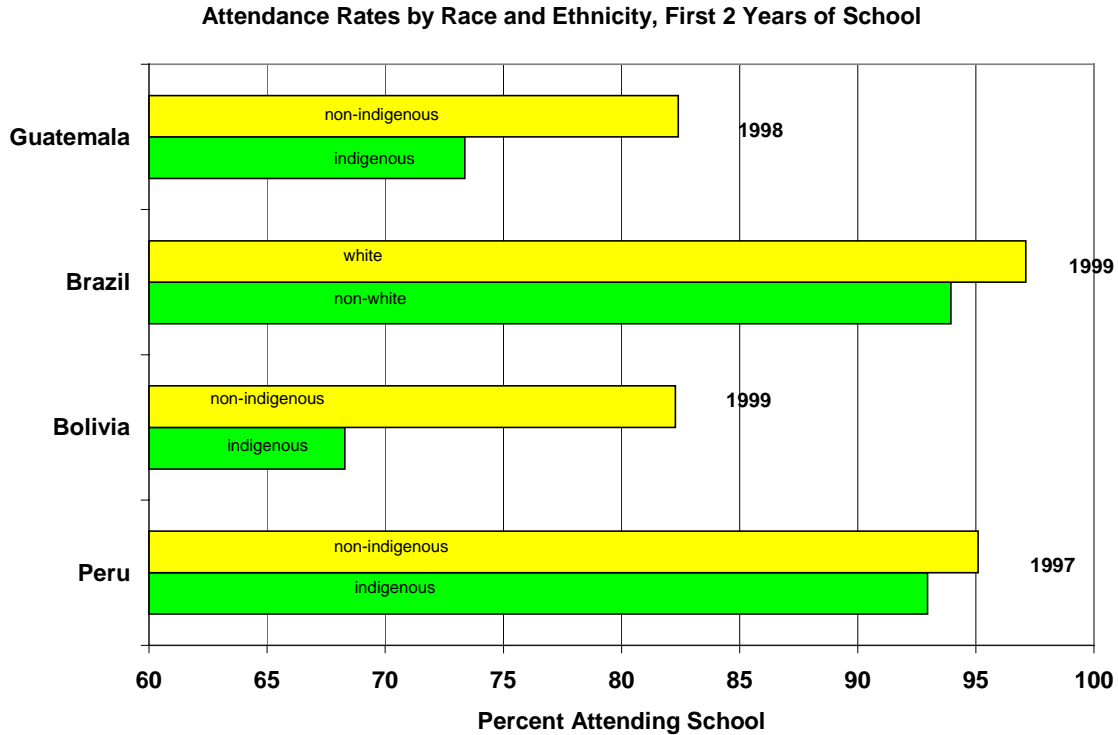
**Figure 1.**



The few available data suggest that inequity persists across racial and ethnic groups as well. Using information on self-reported race and ethnicity from household surveys, Figure 2 shows that indigenous children are less likely to be attending school than non-indigenous children during the first 2 years of primary school. In Brazil, Afro-Brazilian children are slightly less likely to be attending school than their white counterparts.<sup>7</sup> Although the gaps in attendance are much smaller in Brazil and Peru, they do not bode well for equity among future workers because differences tend to be magnified with age as children who start school at later ages are more likely to quit school earlier.

<sup>7</sup> Primary school officially starts at age 6 in Peru and Bolivia, and at age 7 in Brazil and Guatemala. The Afro-Brazilian category includes children who were identified by the respondent in the household as “preta” (black) or “parda” (brown).

**Figure 2.**



One notable development, however, is that the traditional gender gap in schooling is no longer an issue in most countries in the region. Girls are receiving as much schooling as boys except in specific regions of Latin America such as Guatemala, rural Bolivia, and rural Mexico. Again, the 18-country average is illustrative of overall tendencies. Whereas women born before 1950 tended to have almost one year of schooling less than their male counterparts, women born in 1980 have completed almost half a year more schooling than men.

***Poor Quality***

There are scarce measures of schooling quality available for Latin America, but they all suggest that the quality of schooling in the region is very low. Only a few countries participate regularly in internationally comparable achievement tests, making comparisons across countries and regions very difficult. However, in the few occasions where a Latin American country has participated, students perform below other countries,

particularly relative to those in East Asia.<sup>8</sup> Colombia and Mexico participated in the International Mathematics and Science Study in 1996. Colombia ranked fortieth out of 41 countries and Mexico refused to release the results. Similarly, Chile participated in the same test in 1999 and finished thirty-fifth out of 38 countries, below any other participating Asian, Eastern European and Middle Eastern countries. Moreover, the only test that so far allows comparing countries within Latin America—although it is not comparable to other countries outside the region—indicates that most countries would achieve even lower levels in internationally comparable tests. In 1998, UNESCO’s Latin office developed the first regionally comparable test in the subjects of Language and Mathematics.<sup>9</sup> The results indicated that Chile was among the best performers in the region (after Cuba and Argentina in Math scores and after Cuba, Argentina and Brazil in Language). The Dominican Republic, Venezuela, Honduras and Peru were the lowest performers in both math and language tests.

Although it is not clear what is causing such failures in education, some culprits have been identified. They relate to the low level of per-student expenditure in education, the lack of mechanisms of control and accountability in most education systems, inadequate pay for teachers, and credit constraints and other barriers that drive parents to take their children out of school.

Most countries in the region do not spend enough in education. Thus, while expenditure in education, as percentage of GDP, is higher in Latin America than in Southern or Eastern Asia (although lower than in other more developed regions), education per student remains very low. Thus, expenditure does not reflect that in the region, populations tend to be young and therefore, a relatively large part of the population is school-age. Once these demographic differences are accounted for, Latin America spends less per student (as a proportion of GDP per capita) than any other region in the world, with the exception of Sub-Saharan Africa (see Figure 3).

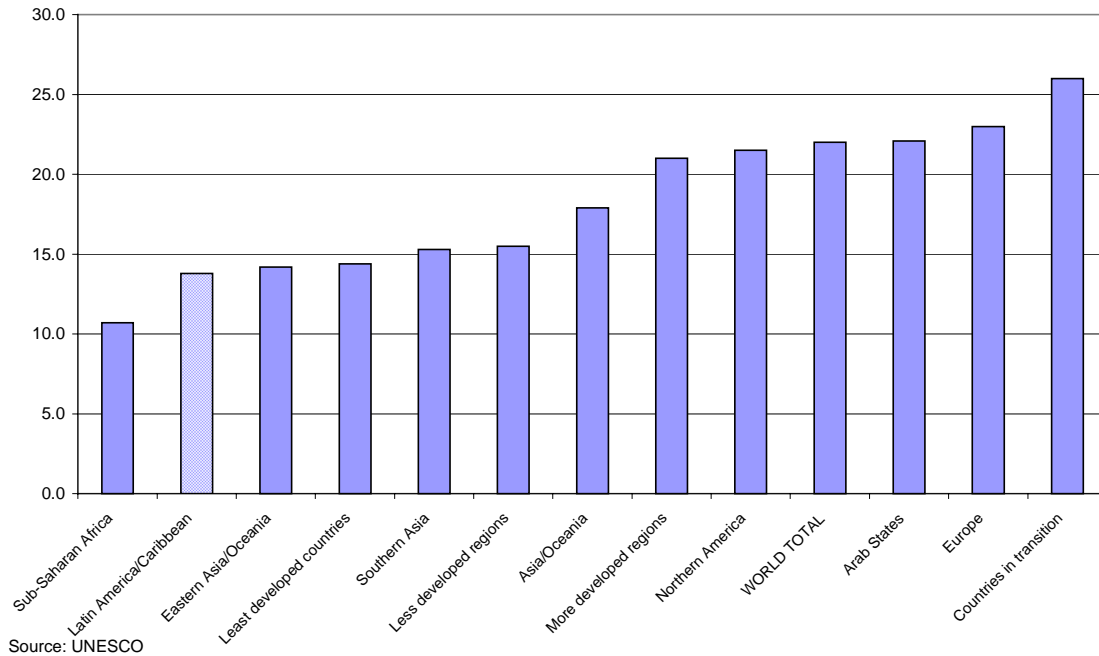
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<sup>8</sup> For more information on schooling quality in Latin America see PREAL (2001).

<sup>9</sup> See UNESCO/OREALC (1998).

**Figure 3.**

**Public expenditure in education per student  
(as % GNP per capita)**



Second, educational systems lack mechanisms of control and accountability at all levels. In many countries, education authorities do not have the mechanisms and technological systems to collect relevant information regarding number of schools, number of students per school, teachers per school, projected needs in each geographical area, etc. Moreover, there are very few built-in incentives to produce high-quality teaching or, in some instances, to even show up for work. For example, while teachers are (informally) evaluated by students, parents and school directors, pay and other incentives are usually determined at the Ministry of Education or local Education Secretary level. Teachers' performance (or even attendance) is hardly monitored, and when it is, there are no premia or penalties associated with performance. In addition, in most cases school budgets are directly allocated by the government without leaving much scope for directors, parents or teachers to allocate resources in ways that are conducive to better education outcomes. Moreover, since resources are allocated independently of school outcomes (generally as a function of the number of teachers) there is no positive reinforcement or negative feedback associated with school outcomes. Finally, all

countries lack a set of standards that clearly define what should be known at each school level and what constitutes excellent, average and mediocre performance.

Teachers are also victims of poor educational systems. In many countries they finish formal training without the required skills. In others, people without the required qualifications are appointed as teachers. Often, when teachers are administered the same tests given to their students, they achieve only slightly higher grades. Although this is not the case in all countries, low teacher pay remains a problem. Even so, teachers' wages account for most of education budgets; investments in textbooks, computers and other education inputs remain very low.

Finally, poor and disadvantaged families face important financial constraints that force them to take children out of school. Even if they realize the market value and the importance of education, they need the extra income (or help) brought by the work of their children.

#### **4. How Fast Can Education be Expanded?**

Since measures that track average years of schooling for the adult population change very slowly because only a small part of the population changes their schooling between periods, it is instructive to examine educational progress across generations using individual records from household survey data. Table 2 contains information for 18 countries in LAC and four non-LAC countries. The evolution of educational attainment across birth cohorts indicates that no country grew faster than 2 years across decades. For example, persons born in 1975 in Venezuela had on average 9 years of schooling, whereas the generation born a decade before in 1965 had an average of 8.6 years of education. For the region as a whole, between 1955-1965 the increase in schooling was less than one additional year per decade. Indeed, educational progress has slowed to almost half a year per decade for those born from 1965-1975. Within LAC, Peru, Bolivia, Ecuador, El Salvador and the Dominican Republic have progressed at the fastest rate over cohorts born from 1955-1975, at a rate of 1.2 years per decade. Although these patterns are discouraging, it is important to acknowledge that while East Asian countries progressed faster, the maximum increase observed across a decade is under 2 years of

schooling. This suggests that changing the distribution of education across a 10-year period is a fundamentally difficult endeavor.

**Table 2. Mean Years of Completed Schooling by Birth Cohorts**  
(Three year moving averages.)

	Survey	Born in 1935	Born in 1945	Born in 1955	Born in 1965	Born in 1975	Change 1955-1965	Change 1965 to 1975	Change 1935 to 1975
Argentina *	1998	8.16	9.03	9.96	10.55	11.02	0.59	0.47	2.86
Bolivia	1999	3.79	5.52	6.24	7.45	9.07	1.20	1.62	5.27
Brazil	1999	3.36	4.56	6.14	6.97	7.43	0.84	0.45	4.07
Chile	1998	6.80	8.18	9.83	10.70	11.46	0.87	0.76	4.66
Colombia	1999	3.99	5.46	6.99	7.75	8.59	0.76	0.83	4.59
Costa Rica	1998	5.34	6.08	8.13	8.41	8.45	0.28	0.04	3.10
Dominican Rep.	1996	4.17	5.59	7.36	8.73	8.97	1.38	0.24	4.81
Ecuador	1998	4.35	6.14	7.99	9.33	9.41	1.33	0.08	5.06
Guatemala	1998	2.23	3.27	3.94	4.65	5.66	0.71	1.01	3.44
Honduras	1999	2.17	3.30	4.66	5.86	6.29	1.20	0.43	4.12
Mexico	1998	4.26	5.30	6.87	8.29	9.03	1.41	0.75	4.77
Nicaragua	1998	2.35	3.21	5.30	5.92	6.17	0.62	0.24	3.82
Panama	1999	6.74	8.10	9.45	10.08	10.49	0.63	0.41	3.75
Peru	2000	5.65	7.44	8.58	9.54	10.92	0.96	1.39	5.28
Paraguay	1998	3.86	5.12	6.35	7.72	7.89	1.37	0.17	4.03
El Salvador	1998	3.01	3.79	5.73	7.02	7.76	1.29	0.74	4.75
Uruguay *	1998	6.86	8.24	9.72	10.36	10.47	0.64	0.10	3.60
Venezuela	1999	4.66	6.64	7.96	8.59	8.95	0.62	0.36	4.28
LAC Average	circa 198	4.54	5.83	7.29	8.22	8.78	0.93	0.56	4.24
Taiwan	1996	5.31	7.73	9.94	11.75	12.55	1.81	0.80	7.24
Thailand	1998	3.81	4.94	5.72	6.75	8.29	1.03	1.54	4.48
USA	1998	12.22	13.05	13.33	13.19	12.80	-0.14	-0.39	0.58
Korea	1997	6.62	8.68	10.26	11.63	12 +	1.37	na	5.38 **

Source: Author's calculations for household survey data. Data for Korea was taken from UNESCO Statistical Yearbook, 1997.

\* Surveys cover urban areas only.

\*\* The mean years for cohorts born in 1975 was not available. 5.38 is the increase in mean schooling across cohorts born in 1935 to 1970.

## 5. Quantifying the Effect of Education on Poverty

What if one does not accept the maximum observed increase in schooling in East Asia as a natural limit for improvements in LAC? If the region managed to make significant changes in schooling within a decade, how might productivity be expected to change? What is the expected reduction in the share of workers with low wages, or “poor” workers? In Duryea and Pagés (2001) we examine this question by estimating the expected changes in wages associated with changes in education. In this section we summarize the main findings and conclusions and refer the reader to our technical paper for additional information.

Economists tend to associate wages with productivity. This is because standard economic theory predicts that in sufficiently competitive labor markets, workers’ wages will be equal to workers’ contribution to productivity. We therefore refer interchangeably



to workers' earnings and workers' productivities. To assess how changes in education affect productivity and, in particular, the share of workers that have very low incomes (and therefore are expected to belong to poor households in per-capita income terms) we define a productivity threshold that can be compared across countries. We consider a worker to have "low productivity" if he/she earns less than one dollar per hour in his primary job.<sup>10</sup> The one-dollar threshold has been adjusted in each country to reflect differences in the cost of living by adjusting for purchasing power parity (PPP). We use this definition of "low productivity" because of its simplicity and because it is meaningfully related to the moderate poverty measure.<sup>11</sup>

We use individual wage data from males age 30-50 in urban areas gathered from the most current household surveys of 12 countries to compute our measure of low wages.<sup>12</sup> It can be noted in Figure 4 that although our individual-based measure of low wages is not a perfect proxy for the poverty status of the household, there is a strong relationship between our measure of low wages and other per capita measures of poverty such as the "moderate poverty" indicator. The latter measure is computed by aggregating all incomes from all sources within a household and dividing by household size.

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<sup>10</sup> All results are computed out of the incomes in the primary job. However, except when otherwise mentioned, our results do not differ much when we use a more comprehensive measure of income including all jobs.

<sup>11</sup> Thus, considering that the average worker in the region works an average of 44 hours a week and shares his or her income with two dependents, earnings of less than PPP\$1 result in a per-capita household income of less than PPP\$2 per day, a standard measure of moderate poverty.

<sup>12</sup> We focus on males ages 30-50 in urban areas because hourly earnings are less likely to be contaminated by factors such as the urbanization rate of the country and selection into the labor force.

**Figure 4.**

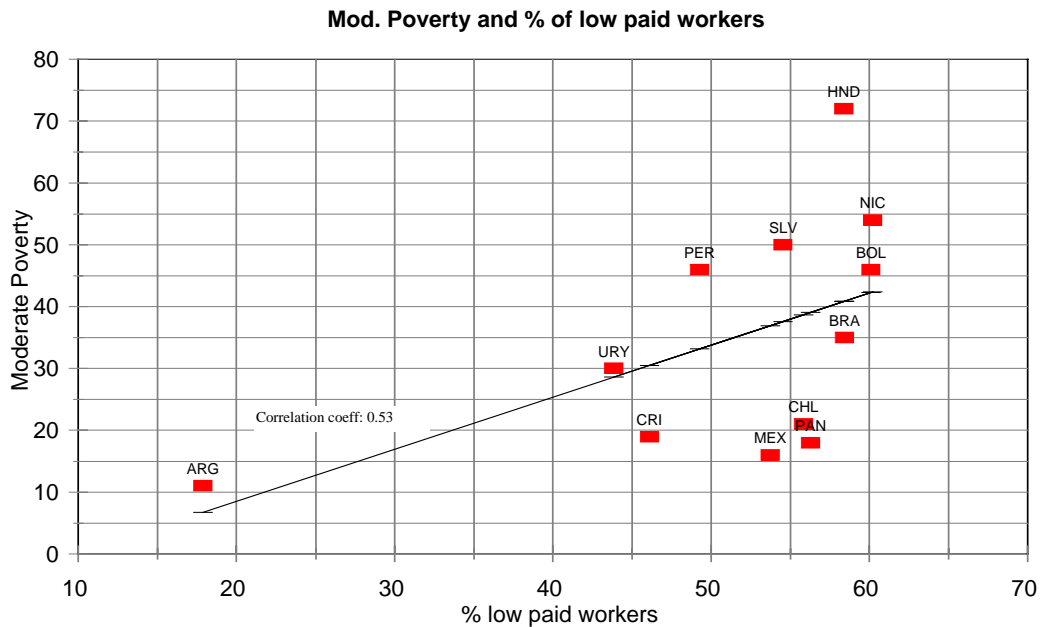
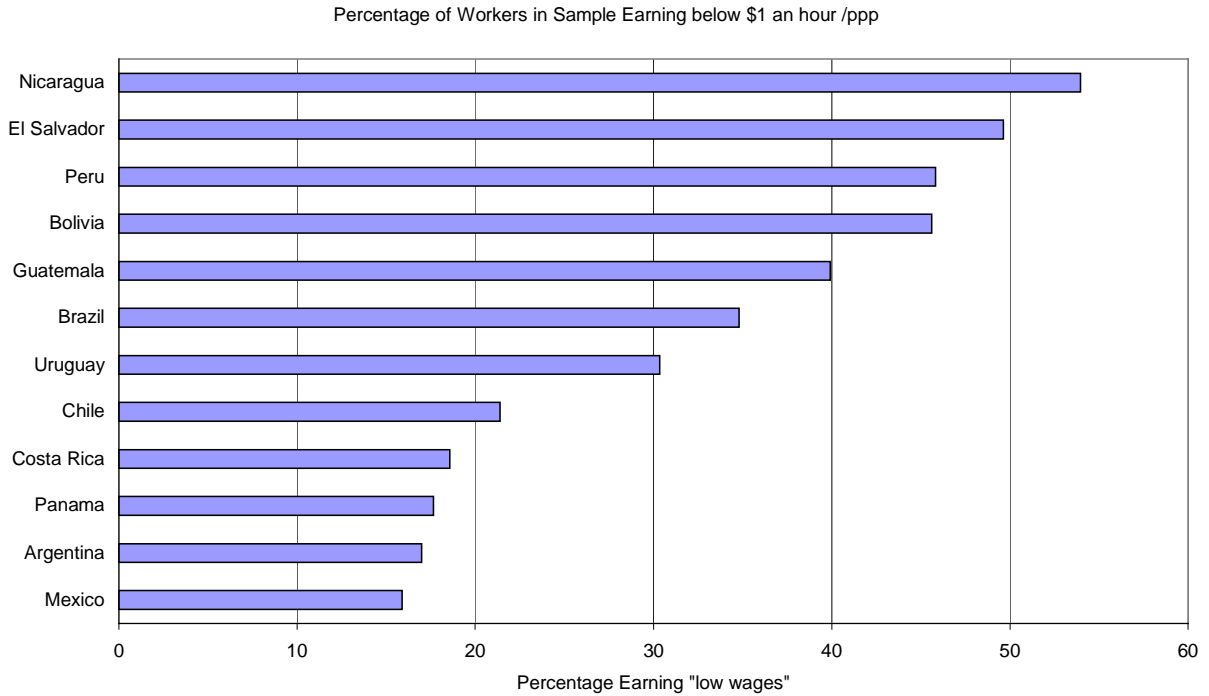


Figure 5 shows the share of low-paid workers among urban males, age 30-50 for 12 countries in the region.<sup>13</sup> For this sample, over 45 percent earn less than the \$1 threshold in Nicaragua, El Salvador, Peru and Bolivia, while less than 25 percent have hourly earnings below \$1 in Chile, Costa Rica, Panama, Argentina and Mexico.<sup>14</sup> These figures suggest that in the Latin American region, wages, and productivity levels (to the extent that wages reflect productivity) are very low, at least for a large share of workers. It is interesting to note that, in general, the share of low-paid workers is higher in countries with poor educational attainment and it is lower in countries with high schooling. An exception to this rule is Peru, a country with higher than average educational attainments and a high share of low-paid workers. Why has Peru, with its outstanding educational progress, not reduced the share of low-paid workers? Moreover, can an expansion of schooling reduce the high shares of low paid workers in the region?

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<sup>14</sup> The derivation of the \$1 PPP nominal currency cutoffs per household survey can be found in the technical appendix.

**Figure 5.**



To assess how an expansion in education will affect productivity, and in particular the share of workers that have very low incomes, we simulate the results of making secondary school universal. That is, we compute what would be the effect on incomes and the share of “poor” workers if all workers who in the late 1990s have completed less than secondary school had their schooling raised to secondary complete. It should be noted that this simulation ignores the possible reduction in the returns to secondary school caused by an increase in the supply of skilled workers. We interpret this simulation as an upper limit to the scope for the change in education to directly affect hourly wages in the short run. Table 3 shows the baseline shares of low-paid workers (column 1) and the estimated reduction in that rate (column 2) as a consequence of the change in schooling. While the share of poorly remunerated workers falls by over half in Brazil, Mexico, and Guatemala, in four countries (Bolivia, Peru, El Salvador and Nicaragua) 30 percent or more still earn below the threshold. Even in Uruguay, almost 20 percent of the workers still qualify as “low productivity” according to our measure. Taking the average across countries, the percentage of low-paid workers falls by about one-quarter, that is, from 36 percent to 27 percent of all workers.

Although such a reduction is impressive and encouraging, it is useful to consider the extraordinary effort that is required to achieve this effect. Column 4 in Table 3 reports the education effort required to give every worker at least secondary education. Education effort is defined as the increase in the average years of schooling under the simulation.<sup>15</sup> In some countries, such as Argentina, Chile, Costa Rica, Panama and Peru, this increase could be achieved in two decades if current progress were maintained in the future, or in one decade, if the education progress attained the levels achieved in South East Asia. In others, however, the required education progress is huge. In Brazil, it is necessary to increase average years of education by at least four years, which at historical rates of progress would require another 40 or 50 years!

**Table 3. Results of Simulations Expanding Education Coverage**

country	year	Percent of workers earning "low wages" (baseline)	Percent earning "low wages" if all have completed secondary	Percent earning "low wages" if all have completed 4 years of college	Education effort to achieve results in (2) [in years of education]	Education effort to achieve results in (3) [in years of education]	Percent earning "low wages" if country assigned median "underline conditions"	Percent earning "low wages" if country assigned minimum "underline conditions"	Percent earning "low wages" if country assigned maximum "underline conditions"
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Argentina	1999	17.00	13.00	3.53	0.60	4.60	39.96	54.09	11.42
Bolivia	1999	45.62	45.93	35.33	3.31	6.29	61.84	69.43	36.66
Brazil	1999	34.80	13.72	2.32	4.42	7.79	31.20	42.45	11.91
Chile	1998	21.38	11.38	1.17	2.02	4.91	42.86	55.65	16.27
Costa Rica	1998	18.55	14.17	3.12	2.12	6.12	52.38	63.31	17.52
Guatemala	1998	39.92	16.55	8.12	4.68	8.68	49.65	59.02	22.52
Mexico	1998	15.89	6.67	1.51	3.27	6.58	42.75	55.14	15.89
Nicaragua	1998	53.96	36.16	17.30	3.94	7.35	53.38	61.91	28.98
Panama	1999	17.64	10.76	2.22	1.98	4.88	48.11	63.42	14.39
Peru	2000	45.83	40.39	18.17	1.23	3.82	31.51	45.83	9.10
El Salvador	1998	49.63	42.67	15.97	3.89	7.12	46.36	59.53	19.08
Uruguay	1998	30.35	24.38	9.85	2.95	6.21	30.35	45.51	9.34

Source: Duryea and Pagés (2002) based on individual household surveys.

Can incomes be lifted above the low wage threshold merely by increasing education? To answer this question, we perform a second simulation addressing an even more outlandish counterfactual: "How would the share of workers earning less than \$1 an

<sup>15</sup> Unlike the change in the share with completed secondary schooling, the change in the mean is less dependent on the initial distribution of education and thus a better indicator of "education effort."

hour change if all workers with less than four years of tertiary schooling were to have their schooling raised to that level?" Column 3 of Table 3 reports the results of this exercise. Overall, the percentage of poorly remunerated workers falls by more than 20 percentage points, from 36 percent to 13 percent. Nonetheless, even in this partial equilibrium simulation, when the congestion effects of such a dramatic expansion in education are not considered, more than 15 percent of the workers earn wages below the poverty threshold in Bolivia, Peru, El Salvador, and Nicaragua.<sup>16</sup>

### ***What Limits the Effect of Education?***

The results above highlight the fact that a tangible expansion in education can bring increases in productivity and earnings, as well as reductions in poverty. However, they also show that expansions in education by themselves will not lift everyone's productivity and earnings above poverty levels. It is important to understand what it is that limits the effect of education, not only because it allows more realistic assessments of the impact of education, but also because it yields interesting insights about how expansions in education can be made more effective.

In order for expansions in education to have a large effect on individual incomes, the effect of every additional year of education on wages (the so-called returns to education) has to be large. Despite the widespread failures in the quality of education and the poor results obtained in internationally comparable exams, in Latin America the percentage increase in earnings associated with one extra year of primary, secondary or tertiary education is quite high. Table 4 presents the estimated returns to one year of education across countries.<sup>17</sup> In our sample of countries, the median return to one year of primary schooling is 7 percent, while the median return to secondary and tertiary schooling are even higher (9 percent and 16 percent, respectively).<sup>18</sup> By comparison, Krueger and Lindahl (2000) report average returns to schooling across all schooling

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<sup>16</sup> Our results are consistent with those found by R. Paes de Barros as presented for Central America. Using highly sophisticated microsimulations, he asserts that in Central America the quality of the job is more important than education or experience in explaining the high rates of poverty in Honduras, Guatemala and El Salvador relative to the low rates found in Costa Rica.

<sup>17</sup> See Duryea and Pagés (2001) for a description of the methodology used to estimate returns to schooling in Latin America.

<sup>18</sup> Properly speaking, these coefficients do not measure returns but wage effects, since in order to capture returns to education we should subtract foregone earnings and other costs of education.

levels from 3 percent in Sweden, to 6-7 percent in Canada, 9 percent in the United States in US and 13 percent in Austria.

**Table 4. Returns to Education, Experience and Other Factors: Urban Male Workers 30-50**

country	year	Percent of workers earning "low wages" (baseline)	Average Years of Completed Schooling	Returns to primary*	Returns to secondary*	Returns to tertiary*	Returns to 5 years of Experience	Hourly Earnings of a worker without schooling or experience (in ppp-adjusted \$)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Argentina	1999	17.00	10.40	0.05	0.08	0.17	0.22	0.48
Bolivia	1999	45.62	9.72	0.05	0.03	0.13	0.18	0.44
Brazil	1999	34.80	7.03	0.12	0.15	0.22	0.18	0.28
Chile	1998	21.38	10.88	0.07	0.12	0.24	0.09	0.50
Costa Rica	1998	18.55	9.83	0.06	0.06	0.19	0.14	0.54
Guatemala	1998	39.92	7.32	0.08	0.13	0.14	0.17	0.37
Mexico	1998	15.89	9.17	0.07	0.10	0.15	0.18	0.55
Nicaragua	1998	53.96	7.39	0.09	0.13	0.15	0.10	0.30
Panama	1999	17.64	10.96	0.06	0.08	0.16	0.10	0.51
Peru	2000	45.83	11.10	0.10	0.09	0.15	0.09	0.24
El Salvador	1998	49.63	8.67	0.05	0.08	0.20	0.20	0.29
Uruguay	1998	30.35	9.63	0.09	0.09	0.15	0.22	0.31

\* Return is the percentage increase in hourly wage for an additional year of schooling.  
Source: Duryea and Pagés (2002) based on individual household surveys.

However, large returns to schooling are only a necessary but not a sufficient condition for education to have a large effect on earnings. Indeed, even when more educated workers earn higher wages, returns to schooling are measured in percentage rates. This implies that the final impact on absolute wages depends on the base to which that percentage applies. Since in Latin America, a worker without education or skills earns very little, a relatively large increase in their wage (in percentage terms), as a result of education, may still leave the worker with very low wages. This explains why a large percentage of educated workers earn wages below poverty levels. Table 5 shows that in Bolivia, 46 percent of workers with secondary education and 18 percent of workers with four years of university education earn very low wages. These percentages are similarly high in Nicaragua and Peru. In contrast, in Mexico only 5 percent of workers with

secondary education and 2 percent of workers with university schooling are poor according to our measure. The proportions of low-paid workers at the high levels of schooling are also relatively low in Argentina, and Costa Rica.

**Table 5. Percentage Earning “Low Wages” by Education Levels: Urban Males Ages 30-50**

		By Education Level			
		All Education Levels	By Education Level		
			Primary	Secondary Complete	Four or more years of higher
Argentina	1999	17.00	15.32	7.54	5.66
Bolivia	1999	45.62	65.70	41.30	17.60
Brazil	1999	34.80	47.40	15.70	2.70
Chile	1998	21.38	38.90	16.80	2.40
Costa Rica	1998	18.55	30.60	14.70	2.20
Guatemala	1998	39.92	29.81	8.56	0.33
Mexico	1998	15.89	27.70	5.10	1.00
Nicaragua	1998	53.96	71.00	43.50	14.00
Panama	1999	17.64	33.20	15.10	2.70
Peru	2000	45.83	72.80	48.10	19.00
El Salvador	1998	49.63	69.20	35.90	6.30
Uruguay	1998	30.35	28.37	18.16	8.09

Source: Duryea and Pagés (2002) based on individual household surveys.

The hourly wages of a worker without education or experience is a reflection of the productivity that an unskilled worker is able to obtain with other factors of production such as physical capital, utilities and telecommunications, or public goods such as institutions or infrastructure. Therefore, they reflect the “quality” of the institutional and economic setting in which workers live and produce. Moreover, the better the quality of economic and institutional conditions for production, the higher is the increase (in absolute terms) in earnings produced by an expansion in education. Column 7 of Table 4 reports this measure across countries in Latin America. Perhaps not surprisingly, countries such as Argentina (in 1999), Mexico and Chile show larger values than countries like El Salvador or Peru. It is also remarkable that in all cases, the hourly earnings of workers without education or experience are below our individual “poverty” line. However, while in some countries, like in Argentina, they are nearer the threshold than others, the “poverty gap” is very large.

While our simulations have considered the impact of an increase in the quantity of schooling, we have made no reference to the effect of schooling quality. What is the role of improvements in the quality of education in increasing earnings and reducing poverty? Quantifying the scope for improvements in the quality of schooling is an extremely challenging task. In the absence of a standardized measure, attempts to measure the impact of quality of schooling on wages typically consider a reduction in the pupil-student class size, an increase in the education of teachers or an increase in expenditures on education. Behrman and Birdsall's seminal work (1983) finds that an increase in the schooling of teachers by region in Brazil increases the return to schooling. For South Africa, Case and Yogo find that a reduction in class-size by five pupils is found to increase returns to schooling by 1 percent. In their synthesis of the literature on the quality of schooling, Card and Krueger (1996), find that reductions in class size can increase returns by 50 percent. The range of quality found in the region suggests that improving quality can hasten increases in wages but again in a modest manner. For example, returns to secondary school in Chile are only 25 percent higher than in Peru, even though these countries are at the two extremes of the range of results in the UNESCO exams. It is clear from these estimates that while better quality will deliver higher earnings, the magnitudes involved will not suffice to lift a large share of workers out of poverty.

### ***Job Training***

Human capital policies can also take the form of job training. However, there is an intense discussion on whether public training policies can increase earnings and reduce poverty in the Region. This is because (1) around the world there is little evidence that public training programs translate into large returns, and (2) Latin American training policies have been particularly ineffective. Although there are interesting innovations in Latin America that are worth examining and that can bring interesting results, the fundamental problem is that it is very difficult to remedy educational shortcomings with short-term, vocational training. The returns are likely to be small and probably the best option is to bring adults back to school.



A recent study by the IDB (2001), shows that a significant percentage of firms provide on-the-job training for their workers. This is particularly true for firms that are undergoing major investments or technological changes. However, the relevant questions pertain to whether disadvantaged workers benefit from these investments and whether on-the-job training can remedy learning deficits. The IDB study shows that in all countries, technicians, supervisors, and skilled workers are much more likely to receive on-the-job training than unskilled workers, suggesting that investing in such workers commands higher returns. These results also suggest that employer-financed, on-the-job training is not likely to do much to improve the productivity of low skilled workers. The question is whether public policy in the region can perform that role.

Evaluations of public training programs suggest that for workers without basic skills, job training programs are not cost-effective. Returns to job training programs tend to be particularly low (of the order of one-fifth of returns to schooling) for disadvantaged male workers, and somewhat higher for women. Instead, studies tend to find that the returns to formal adult education tend to be similar to the returns to young-age schooling (Krueger and Lindahl, 2000). These findings suggest that rather than providing remedial short-term training to highly unskilled workers, resources can be better allocated by extending adults' formal education. They also suggest that since formal education and job training tend to be complementary rather than substitutive, workers that benefit from extended adult education will also benefit from more employer-financed job training.

In Latin America, training policy has been channeled through public training institutes funded by a training levy or tax (1-2 percent of payroll) and administered by the government with the participation of employers and workers. Vocational education/training programs began in Brazil in the 1940s, and then expanded in the late 1950s and 1960s in Colombia, Venezuela, Peru, Costa Rica, Chile and Ecuador. During the 1970s a new generation of these training institutions emerged in Paraguay, Honduras, Brazil, Guatemala and Panama. With a few exceptions, public training systems have suffered from the same lack of control and accountability mechanisms as educational systems. Operated as public monopolies, the systems have lacked discipline to manage human resources. Instructors have been poorly trained and poorly paid, and they have had limited experience in the private sector. Administrative costs have consumed almost the

totality of operational budgets while investments have been kept to a minimum. In addition, public training systems have lacked incentives to adapt the subjects and contents of their courses to ever-changing labor market needs. Contents have been excessively formal and classroom-based, without sufficient firm-based experience. Moreover, middle or high-skilled workers have been more likely to attend than low-skilled workers. In consequence, the public training institute model does not appear to deliver high quality training to unskilled workers. An evaluation for Colombia found that the impact of training on wages is lower for trainees who attended public relative to private institutions, although the difference in returns could be attributed to the higher motivation and higher learning abilities of private sector trainees.<sup>19</sup>

In summary, although job training might be an interesting policy option for middle and high-skilled workers, the evidence suggests that extensive investments in training the unskilled would have only a limited role in increasing earnings and reducing poverty.

## **6. What Lies Ahead**

Low productivity is the main source of poverty and low competitiveness in Latin America (IDB, 2001) In order to speed up productivity growth, public policy needs to address Latin American educational shortcomings. However, a policy based solely on education investments is not likely to reduce poverty sufficiently. To boost the effects of education reforms, Latin American policymakers should also promote an economic and institutional environment conducive to productivity growth.

### ***Expanding the Quality, Quantity and Equity of Schooling in the Region***

If Latin American countries want to overcome their educational deficits, public expenditure per student should rise. Increasing the amount of resources that goes to education is already a priority in the countries that are under the HIPIC initiative, but it should be made a priority in less indebted countries as well.<sup>20</sup> In addition, the opportunity

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<sup>19</sup> See the evaluation by Medina and Núñez (2000).

<sup>20</sup> The HIPIC is an initiative of the International Financial Institutions to reduce the external debt of highly indebted and poor countries. By means of this initiative countries agree to expend a large share of the foregone debt service in education and other social expenditure.

brought about by more favorable demographic conditions should not be wasted. Thus, as the population ages and the school-age population declines relative to adult population, it will be possible for per student investments to increase even if total expenditure in education remains constant. These additional resources per-capita can finance higher pay for teachers and higher investments in books, computers and other educational inputs.

However, increasing per-student expenditure is not likely to bring substantial gains in education without parallel reforms aimed at improving the control and accountability mechanisms in educational systems. For this to occur, it is necessary to improve management within the education administration. It is also necessary to transfer authority and resources from the Ministries and local education departments to school directors and parents. This transfer will make possible that important decisions regarding teacher recruitment, teacher evaluation and resource allocation can progressively be made at the school level. At the same time, it is necessary to implement learning standards and to monitor the performance of schools and students relative to those standards and relative to other countries. Finally, schools should be made accountable. Transfers to schools should be made dependent both on the characteristics of the students and communities they serve, awarding more resources to poorer and disadvantaged communities, and on their progress in achieving educational standards. Lastly, demand-side constraints should be addressed as well with programs that provide financial relief to poor families with children in school age.

Not all countries start from square one. Indeed, there are a host of interesting new experiences in the region. As far as improving control and accountability mechanisms, some countries, particularly in Central America, have experimented with giving more autonomy to schools, although in most cases these efforts have only applied to new or rural schools (PREAL, 2001). This is the case of the EDUCO schools in El Salvador, or the PROHECO initiative in Honduras.<sup>21</sup> In other countries, such as Nicaragua, school autonomy is being extended at the national level. Although it is too soon for conclusive results, the available evidence shows that giving more authority to parents and school directors increases teachers attendance and punctuality, as does interaction of teachers

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<sup>21</sup> For a description of the nature and the results of different experiences of school autonomy in Latin America see Espinola (2000). For a description of the PROHECO system see Reyes and Meza (2000).

with parents. It also suggests that school autonomy increases learning as measured by scores in math and language exams. There are also interesting experiences in addressing demand-side constraints. Conditional cash-transfer programs targeted to the poorest families are showing encouraging results. This is the case of the PROGRESA program in Mexico or the Bolsa-Scola program in Brazil, where low-income families receive a cash transfer in exchange for investments in health and keeping children in school.

Another promising area for policy is adult education. Although providing adult education has been a low priority in most countries, research suggests that bringing adults back to school can be an effective policy for increasing productivity (particularly when compared with the results of public job training targeted to unskilled workers). Latin American governments should devise ways to bring adults back to school. Possible measures include issuing tax credits to employers that provide the time or the resources for employees to attend formal school, or giving tax relief to adult workers who enroll to finish formal schooling.

### ***Improving the Quality of the Economic and Institutional Environment***

While expanding the coverage and improving the quality and equity of education are important development goals, the simulations reported in Section 4 make clear the shortcomings of productivity-growth and poverty-reducing strategies that are based solely on human capital development. Thus while education can increase the earnings of a person relative to the earning of someone who does not have education, educated workers will not be able to productively use their skills if the economic and institutional environment in which they live and work is not sufficiently “fertile.” This is why without simultaneous investments in the institutional and economic environment, the productivity and earnings of a large share of the population will not be lifted above poverty levels any time soon.

To assess the importance of these other environmental factors, we report the result of two additional simulations. First, we ask how much would the share of workers with very low earnings decline if countries could instantaneously achieve the economic and institutional conditions of Mexico—the country with the best “underlying” conditions in the sample—as measured by the earnings of a person without education or labor market

experience. Second, we compute what would be the share of low-paid workers in countries such as Argentina or Mexico if they were to have the quality of the economic and institutional conditions of Peru—the lowest in our sample.

Columns 7-8 in Table 3 show the results of changing the quality of the economic environment. In column 7 we report the percentage of low-paid jobs that would result if workers in all countries worked with the economic and institutional conditions of Peru. The results are quite remarkable. Under these conditions, the percentage of low-paid jobs in countries like Argentina, Mexico or Panama would increase to more than 50 percent. This comparison illustrates that Peru has a relatively lower share of low-paid workers, given its underlying conditions, as a consequence of its high investment in education. In contrast, the share of poor workers would decline substantially in most countries if they had the underlying conditions of Mexico. Peru's share of low-paid jobs would drop dramatically, from 46 percent to 9 percent, while El Salvador's share would decline from 49 percent to 20 percent (Table 3: Column 8).

The results above demonstrate that improving the economic and institutional environment can bring substantial increases in productivity and reductions in poverty. Moreover, expansions in education will have larger effects on income when they occur in countries with better underlying economic and institutional conditions. The relevant question is how countries should go about improving these conditions, and the magnitude of the effort involved. In Duryea and Pagés (2001), we attempt to answer some of these questions by examining the statistical relation between the hourly income of a non-educated worker (that is, our measure of the underlying conditions of a given country) and different variables that are expected to affect those conditions. Among the variables we analyze are labor relations and regulations, financial development, degree of technological innovation, physical infrastructure variables and finally, institutional variables.

### ***Labor Relations and Regulations***

Labor relations and regulations affect productivity in multiple ways. By defining the set of rules that govern employment, labor relations can be conducive to high motivation, high effort and high productivity, or instead, promote low moral and poor outcomes. In

Latin America, labor market regulations alter labor relations by shifting the balance of power between employers and employees. In many instances, by banning forms of labor relations that are not acceptable, government regulations level the playing field and improve workers' welfare. In other instances, however, governments simply fuel the fire between labor and management: by restricting forms of payment that align the objectives of the firm with the objectives of workers, such as profit or revenue-sharing, or by interfering in conflict-resolution and being partial to employers or employees. The available evidence suggests that the quality of labor relations in Latin America is poor. According to the 2000 Global Competitiveness Report, of the six countries of the region included in a sample of 47 countries worldwide, two ranked among the countries with the most hostile labor relations, while the others were at the median or below. Moreover, the 1997 Latinobarómetro, an opinion survey covering the urban areas of 17 countries in the region, suggests that a wide majority of the respondents mistrust employers and think that relations between employers and employees are poor. In addition, a large majority of respondents think that success in life does not depend on hard work, but rather on connections. Given this state of affairs, employers, employees and governments should invest in promoting more cooperative and productive labor relations. This could be achieved by removing legislative constraints to high performance pay schemes, facilitating permanent venues for dialog between employers and employees and, finally, by educating managers and workers' representatives in conflict resolution and management of human resources.

### ***Financial Development***

Despite intense financial liberalization and improvements in financial supervision, access to capital remains tight in the region. The World Business Environment Survey, an opinion survey addressed to firms worldwide, suggests that the limited access to capital is one of the biggest constraints to productivity and growth in Latin America. The available research suggest that in order to expand access to credit, public policy should concentrate on creating a stable economic environment, preserve low inflation rates, promote better

creditor rights, and expand registry services.<sup>22</sup> It should also continue improving the quality and the independence of financial supervision.

### ***Technological Innovation and Adoption***

Growth theory emphasizes the role of new technology adoption and development as the engine of productivity and growth. However, in Latin America, the rates of technology innovation and adoption are below the world average (WEF, 2000 and IDB, 2001). Improving educational attainments in the region will help to boost innovation, which in turn will foster more productivity. However, promoting an environment conducive to innovation is also fundamental. This requires clear property rights as well as institutions and resources to enforce them. It also requires financial institutions specialized in start-ups and venture capital.

### ***Physical Infrastructure***

Poor infrastructure remains a barrier to productivity growth in Latin America. There are too few roads, and most are in very poor condition, while sea transport is hampered by the inefficiency of ports (IDB, 2001). Utility prices, particularly electricity and the price of telephone service, remain high despite intense restructuring and privatization; limited competition and poor regulation have turned public monopolies into private ones. In the near future, governments should improve the technical capabilities and the independence of regulatory agencies. They should also limit the monopoly power of large firms by further opening the market to competition.

### ***Social Infrastructure***

Hall and Jones (1999) denominate the set of institutions, regulations and laws that make economic transactions possible as “social infrastructure.” Kaufmann *et al.* (1999) assemble quantitative measures of social infrastructure in the areas of political stability, quality of government, quality of the regulatory framework, rule of law, and control of corruption. These indicators suggest that Latin America ranks significantly lower than

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<sup>22</sup> See Galindo (2001) and Galindo and Miller (2001) for an assessment of the importance of creditor rights and credit registries in the supply of credit.

OECD and South East Asian countries. Hall and Jones (1999) and Duryea and Pagés (2001) find these variables to be highly associated with productivity per worker and earnings. While some of this association may be due to reverse causation—i.e., richer countries can afford better institutions—there is some evidence of causality running from institutions to earnings. Therefore, efforts devoted to improve the quality of the institutional environment in any of these areas can provide large payoffs. As an example, Duryea and Pagés (2001) report that improving the quality of the Peruvian institutions to the level achieved in Chile would achieve a reduction in poverty equivalent to that attained with 2.71 extra years of college education, or 4.3 extra years of secondary education. This is a remarkable gain since, assuming that education progress continues at the current rate and returns to education remain constant, achieving this expansion in education would take between 30 and 45 years!

## **7. Conclusions**

Education progress has been slower in Latin America than in other developing regions. This has prompted many to single out education as one of the most pervasive barriers to achieving sustained productivity growth and poverty reductions in the region. However, we have shown that education, by itself, cannot remedy the productivity deficit in the region. Thus, the expansion of education should be complemented with policies addressed to make all workers more productive. Some of the options suggested by our results are: improving the institutions and government regulations that prevent diversion of resources from productive uses, motivating workers with schemes that increase their stakes and their participation in firms' success, providing a stable and fertile environment for innovation, and expanding the provision of basic infrastructure.



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