

# Human Capital, Educational Level, and Income: A Case Study in Latin America

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## Introduction

In the past decade, various scholars have been vigorously debating whether a relationship exists between education and income levels of a country, and whether that relationship supports the theory that national income levels are affected by human capital stock.<sup>1</sup> In this paper, we will try and further investigate this issue within the context of three Latin American countries, which are seemingly similar to each other—Brazil, Mexico, and Chile.

We first offer a literature background of human capital, and its main components. Second, we discuss the income levels of three Latin American countries, and develop a hypothesis. Third, in order to empirically corroborate this hypothesis, we discuss the educational levels of these three countries. Finally, we develop key findings of this research, and offer certain policy recommendations to other governments in Latin American countries.

## Human Capital

Theodore Schultz's seminal paper introduces his theory of human capital.<sup>2</sup> He argues that both knowledge and skill are a form of capital, and that this capital is a product of "deliberate investment." Schultz highlights developed Western countries, and explains their increase in national output as a result of investment in human capital. He also makes a direct link between an increase in investment in human capital, and the overall increase in workers earnings. More specifically, Schultz's study is based on his observation that U.S. income has been increasing faster than land, man-hours, and physical capital stock. He believes the difference can be explained by *unidentified growth in human capital*. He therefore recommends that developing nations seeking to increase national income should not focus entirely on increasing physical capital stock, but should also invest in human capital in terms of education and health. Since this article first appeared, there has been much praise (in 1979 Schultz shared the Nobel Prize in Economic Sciences) and much criticism for human capital theory. Today, many still believe that society needs to invest in people for the sake of a stronger, more productive economy, and also to increase the opportunities and choices open to the individual. At the same time, however, many criticize the human capital theory as serving the needs of those in power (i.e., government and business), and not the individual.

Nevertheless, Shultz extends his findings to less developed nations in his 1979 Nobel lecture on *The Economics of Being Poor*.<sup>3</sup> In it, he argues, "The decisive factors of production in improving the welfare of poor people are NOT space, energy, and cropland; the decisive factor is the improvement in population quality." Shultz asserts that poor people are equally inclined to make rational economic decisions and try, where opportunity exists, to improve their situation. In other words, since education is a key aspect of human capital and population quality, we need to investigate whether enhancing education levels in a country would have a direct effect on the income of that country.

## Income In Latin America

The following table provides some introductory data offering a general description of income, with respect to each of the countries under review:

*Table 1: Income Descriptions in Latin America*

|                             | Chile        | Mexico        | Brazil        |
|-----------------------------|--------------|---------------|---------------|
| <b>Population (2001)</b>    | 16 million   | 100 million   | 175 million   |
| <b>GDP (2001)</b>           | \$71 billion | \$575 billion | \$600 billion |
| <b>PPP per capita</b>       | 9,420        | 9,023         | 7,625         |
| <b>Growth rate ('91-01)</b> | 5.4%         | 1.8%          | 1.9%          |

(Source: [www.worldbank.org](http://www.worldbank.org); March 2006)

## General Economic Analysis

The economies of Chile, Mexico, and Brazil are varied. The Chilean economy has remained relatively unchanged over the past twenty years. Over that time, agriculture has made up less than 10% of GDP, while industry has remained at approximately 35%, and services at 55%. In 2001, Chile's exports roughly equaled imports at 30% of GDP, and were made up of mostly primary goods (81%). Exports also included manufactured items which accounted for 16% of GDP, of which 3% were high technology manufactures.

Mexico experienced a decline in agriculture over the same period. From 1981 to 2001, agriculture dropped about 50% to less than 5% GDP. Industry also declined slightly, while services experienced significant levels of growth from 58% of GDP in 1981, to 69% in 2001. Like Chile, Mexico has maintained an equal ratio of exports to imports at roughly 30% GDP. However, unlike Chile, Mexican exports are made up of just 16% primary goods. Manufactured goods make up 88% of exports and 22% of those are high-technology items.

Brazil has also experienced a decline in manufacturing by 25% and an increase in services by 25%, while agriculture continues to make up roughly 10% of GDP. Exports in 2001 were equal to imports at about 11% of GDP. The make-up of Brazilian exports was also different from both Chile and Mexico, with 40% of exports in primary goods, 59% in manufacturing, and within manufacturing 19% came from the high tech sector.

## Income Analysis

All three of these nations qualify in the upper/middle-income group of developing nations. They each have urban populations equal to 74% of the population or higher, and each maintains poverty levels of roughly 20-25%. Income inequality as indicated by the *Gini-coefficient*, reveals that these three nations are all similar in the equality of income distribution. For 2001, the *Gini-coefficients* for Chile, Mexico, and Brazil, were 56.6, 53.1, and 60.7, respectively, illustrating relative unequal distributions for all three nations.

As noted in the Table 1 above, per capita income is higher in Chile than in Mexico and Brazil. Brazil lags noticeably behind Mexico by over \$1,500, whereas the difference between Chile and Mexico is less than \$400. *Therefore, based on extant literature, we arrive at the following hypothesis:*

H<sub>1</sub>: Due to higher per capita income of Chile, we will see higher education attainment levels and investment in human capital, when compared to Mexico and Brazil.

## Education In Latin America

In order to corroborate our hypothesis, it is now appropriate to investigate the education attainment levels in these three countries. Table 2 provides data for Chile, Mexico, and Brazil in terms of national spending patterns. Since we are interested in human capital, the table includes spending information for both health and education, though education is the primary focus for this paper. Education and health investments are expressed in % GDP terms. We have also included military spending for the purpose of comparison, as well as each nation's debt services as a percent of exports.

**Table 2: Investments in Human Capital in Latin America (in 2001)**

|               | Education* | Health* | Defense* | Debt/Exports |
|---------------|------------|---------|----------|--------------|
| <b>Chile</b>  | 3.6        | 2.7     | 3.3      | 26           |
| <b>Mexico</b> | 4.9        | 2.6     | 0.5      | 30           |
| <b>Brazil</b> | 5.1        | 2.9     | 1.3      | 91           |

\* All figures are expressed as a % of GDP (in 2001)

Source: *World Bank Development Report, 2004*

We can see that Brazil spends slightly more than Mexico on both health and education, but is also financing a serious debt burden. Mexico spends little on the military and is roughly equal to Chile in health spending. More importantly, Chile is outpaced by both Mexico and Brazil in terms of spending on education. Thus, we can conclude that *our hypothesis is not supported.*

Since our findings contradict our hypothesis, further research is needed to better appreciate the complexity of the situation. Therefore, we further examined the actual enrollment levels in these three countries. Contrary to our previous finding regarding the relationship of overall educational spending on income levels, we found supporting evidence when we took into account actual enrollment levels.

## Enrollment Levels

Table 3 provides contrasting enrollment levels for the three countries. The data for primary, secondary and tertiary enrollment are represented as a percent of school-aged children at each level of schooling. The final column depicts the percentage of those students enrolled in tertiary education who are engaged in technical studies such as science or engineering.

**Table 3: Distribution of Enrollment in Various Education Levels in Latin America**

|               | Primary* | Secondary* | Tertiary* | Technical** |
|---------------|----------|------------|-----------|-------------|
| <b>Chile</b>  | 88       | 70         | 28        | 43          |
| <b>Mexico</b> | 100      | 56         | 14        | 31          |
| <b>Brazil</b> | 98       | 15         | 11        | 22          |

\* All figures are expressed as a % of school-aged children at each level of schooling (in 2001).

\*\* Percentage of those students enrolled in tertiary education who are engaged in technical studies such as science and engineering (in 2001).

Source: *United Nations Development Program Report, 2005*

We find that while all three nations achieved a high level of primary enrollment, Chile possesses much higher levels of secondary and tertiary enrollment, as well as technical enrollment, than either Mexico or Brazil. It is evident that Chile has clearly emerged as a leader in secondary, tertiary, and most importantly, technical education. Given the similarities of these three economies in terms of income inequality, urbanization, and poverty levels, it seems pertinent to conclude that the *degree of enrollment in higher education (with emphasis on technical subject areas) may be responsible for the difference in per capita income.*

## Key Findings And Explanations

Based on our research, we now discuss four key findings followed by their explanations. First, there is a positive correlation between income and education levels for the three countries. We have observed that providing higher-level education to a larger portion of the population might be an important factor for the degree of economic success experienced in these Latin American countries.

Clearly a more educated population could translate into a higher level of workforce efficiency and effectiveness for many reasons—such as being able to create and use new technologies, or being able to better understand problems and come up with innovative solutions for them. This, in turn, could translate into higher yields per dollar invested, and thus contribute to higher levels of production and GDP. A complementary explanation for this trend could be that a more educated population would probably be more likely to elect better prepared politicians to key governmental offices, which could translate into the development of more financially sound economic institutions and policies. This could potentially promote a much higher level of economic development, particularly as it pertains to import and export policies.

Second, even though Chile has had more relative economic success (interpreted from the higher GDP per capita income and GDP per capita growth), the income distribution coefficient (interpreted as Gini-coefficient) for Chile is comparable to the other two countries. In other words, income inequality is about the same, even though Chile enjoys a better economic status.

The explanation for the similar levels of income distribution inequality could be due to weak governmental policies that fail to establish a framework whereby a majority of the population could benefit from growing levels of output. For example, weak policies may encourage monopolies and may cause low minimum wage limits, which large corporations could abuse and profit from without providing a respectable standard of living for their workers.

The third noticeable finding is that Chile spends much less than both Mexico and Brazil on education, yet they are able to put more of their population through higher-levels of schooling. An intriguing challenge is to explain how Chile currently spends less of their GDP on education than Mexico or Brazil, and yet is still able to provide higher levels of

education for a larger share of their population. The reason is that Chile already has enough infrastructures in existence to provide such high level of service to its people (such as buildings, readily available studying materials, and well equipped classrooms). Thus, Chile needs to spend less than the other two countries because it only needs to mostly maintain the level of infrastructure it currently has.<sup>4</sup> On the other hand, Mexico and Brazil are spending more of their GDP on education because they do not have enough infrastructure yet to satisfy their population's demand for education (i.e., buildings and classrooms) and also because the infrastructure already in existence is in high need for replacement due to a lack of maintenance.<sup>5</sup>

Lastly, it is also relevant to point out that overall spending on health services did *not* show a direct correlation with perceived changes on income levels (based on the very similar health spending levels shown by all three nations and the variance in their respective income levels).

At this point, let's recall that Schultz's proposal stated that in order to increase national income, developing nations should not focus entirely on increasing physical capital stock, but should also invest in human capital in terms of education and health. Keeping such a premise in mind, Chile seems to be better economically situated, even though it does not show higher levels of relative spending on either health or education than Mexico and Brazil. The explanation could follow what we just explained regarding our third finding. Chile does not have the need to spend so much on human health services because a better infrastructure is in place to take care of such a basic need. Thus, most of their spending is going toward maintenance, rather than infrastructure development.

In summary, we do find concrete signs that education may have a positive correlation to economic development and income. But since we examined only three countries in Latin America, further research would be needed to prove a true relationship between these variables. In other words, it would be interesting to conduct research by comparing these countries with that of China, India, and South Africa.

It is also very important to keep in mind that political occurrences may have affected the outcomes of the numbers that were provided for GDP and PPP per capita income. Thus, a further analysis of major political events would also be in order to be able to provide a sound base to draw a clear conclusion about this issue.

## Proposed Policy Suggestions

Looking toward the future, with respect to policy recommendations for other Latin American countries, governments should consider promoting the development of human capital, not only at the basic primary level, but also at higher education levels. Special attention should be paid to creating incentives for those entering high schools and universities, to consider study in the fields of science and engineering, as the returns to society may be large. Also, accumulation of human capital should be elevated to a level of

importance at least equal to that of the acquisition of physical capital. The current focus on increasing physical capital stock in order to facilitate economic development is too limited in scope. Those who operate capital equipment tend to benefit from improved cognitive skills and improve productivity. Coupled with a skilled class of researchers, engineers and the like, nations may be better equipped to develop more efficient applications of their physical capital.

Additionally, if higher levels of education are going to be of any effect, economic and social frameworks will need to be developed in order to promote the best use of human resources. For example, a sound financial and banking system encourages citizens to save and invest into the country's economy. This would minimize the amount of profits leaving the country to support foreign industries due to excessive domestic risk. At the same time, a strong financial system would provide a level of comfort and security to citizens so they are more likely to have a positive attitude toward retirement and might be more likely to take a longer-term and sounder personal finance management approach as they use their income.

Another framework that must be developed in order to maximize education benefits is the taxing system. A taxing system that places most of the liability on the richer parties could definitely equal the playing field as far as leveling some of the income distribution inequalities common to Latin American nations. Additionally, a taxing system that provides tax breaks to small/medium-sized businesses and enterprises, and that encourages investment into new technologies or industries would promote entrepreneurship and creativity. Entrepreneurship is the key to innovation and a more effective use of educated and prepared human capital.

## Conclusions

Common sense tells us that education has a very relevant role on how economies have developed over time. The emphasis in developing countries has been for many years on increasing literacy rates. However, it is our opinion that this should no longer be the *main focus* as most developing countries have already reached a decent literacy level. For instance, Chile's literacy level is 95.8%, while that of Mexico and Brazil is 91.4% and 92.9% respectively. The focus should move toward encouraging students throughout their schooling to consider *higher levels of education*. This consideration could be enhanced via student counseling. Counseling would ensure that the student has a clear understanding of the benefits and potential a higher level of education would provide for their lifestyle. Additionally, as suggested by Knack and Keefer, providing psychological and aptitude tests to determine possible areas of success based on the student's personality and interests, would guide the student toward careers better suited to them.<sup>6</sup>

This should be complemented by providing more government sponsored loans and grants for students with

middle- and low-income backgrounds who have shown talent and dedication. This is particularly important if the opportunity is made available for students to be able to attend colleges overseas so they can learn new perspectives in different areas of study and get familiar with different cultures, languages and markets. With this in mind, governments must constantly guard against the "*brain-drain*" phenomenon. In other words, it will be beneficial for governments to ensure that abundant opportunities are made available so that students who reach higher levels of education do not migrate to other countries due to lack of employment and professional development opportunities. Thus, retention is most important if long-term benefits are expected to be produced from promoting education. In conclusion, developing and under-developed countries must specifically invest in higher education in order to increase their overall income levels.

## Endnotes

1. For a comprehensive review, please see M. Boissiere, J. B. Knight, and R. H. Sabot, "Earnings, Schooling, Ability, and Cognitive Skills," *American Economic Review* 75 (1985): 1016–1030; Alan Krueger and Mikael Lindahl, "Education for Growth: Why and for Whom?" *Journal of Economic Literature*, 39, 4 (2001): 1101–36; David Lindauer and Lant Pritchett, "What's the Big Idea? The Third Generation of Policies for Economic Growth," *Economia*, 3, 1 (2002): 1–39; and Lant Pritchett, "Where Has All the Education Gone?" *World Bank Economic Review*, (December 2001): 13–25.
2. Theodore W. Schultz, "Investment in Human Capital," *American Economic Review* 51 (1961): 1–17.
3. <http://nobelprize.org/economics/laureates/1979/schultz-lecture.html>
4. For an insightful commentary on the educational system in Chile, please see Beatriz Fried and Mario Abuhadba, "Reforms in Higher Education: The Case of Chile in the 1980s," *Higher Education*, 21, 2 (March 1991): 137–49; and Francoise Delannoy, "Education Reforms in Chile, 1980–98: A Lesson in Pragmatism" in *Education Reform and Management Publication Series*, 1, 1 (June 2000).
5. For a description of Brazilian and Mexican educational infrastructures, please refer to the European Investment Bank report to OECD countries titled "The Appraisal of Investments in Educational Facilities" available online at <http://portal.mss.edus.si/eurydice/pub/oece/apraisal.pdf>
6. Steven Knack and Philip Keefer, "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *Quarterly Journal of Economics*, 112, 4 (1997): 1251–88.