Human Capital vs. Screening Hypothesis: An Exploratory Analysis of the Labor Market of the City of La Paz*

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Research has revealed the benefits that educational investments have on economic growth and social welfare. Among the topics studied, the effect on income distribution is one of the most important; it has been shown that the differences in the level of schooling represent the main explanatory factor of wage differentials.

Hence, educational investment is considered a primary force to fight poverty and inequality. It is believed that if qualification gaps between population groups are reduced – through more and "better" education –, it will be possible to reduce income gaps.

In Bolivia, the Education Reform Program (PRE) has required a major financial effort throughout the last four governmental periods. During 1990-2001, current expenditure on education increased from 3.1% to 5.6% of GDP and education investment in elementary schools from 0.0019% to 0.525% of GDP. In total, $361 million were designated to investment projects.

Even though there hasn't been a systematic examination, there are clear results from this process. For instance, the gross enrollment rate in elementary school increased from 96.6% in 1990 to 107.7% in 2000. In addition, during 1997-2000, the abandonment and reprobation rates in elementary decreased from 9.4% to 5.9% and from 7.1% to 4.4%, respectively.

* Number 723 of the collection of thesis (Department of Economics - UCB)

However, it's not evident that these results turn into immediate improvements of welfare levels. From a private point of view, studying is profitable because it increases salaries. Nevertheless, private profitability doesn't necessarily imply social profitability.

Economic theory describes this dilemma with two explanatory models of the role of education in the generation of earnings. On one hand, the Human Capital Theory declares that education increases salaries because it raises the productivity of workers. From this perspective, education not only benefits individuals with higher wages, but benefits society in general with the enhancement of productivity. On the other hand, the Screening Hypothesis states that education has no effect on labor productivity, that it is merely a signaling device that employers use to select the more skilled workers. Since there is no gain in productivity, according to this theory, the benefit of educational investment is smaller.

The effect education has on productivity is essential when deciding the importance given to school quality. If education did raise the students' productivity, it could be considered that differences in productivity between individuals are due, among other factors, to differences in the quality of schooling they received. If, in contrast, education couldn't affect productivity, school quality would be irrelevant. Likewise, the government's effort to improve the educational system would only be effective if education could influence the students' productivity. If the opposite were true, the current educational policy would represent over-investment in education.

Thus, the objective of this dissertation is to provide empirical evidence about the role that education plays in increasing earnings. For this, it analyzes the existing connection between the level of schooling, school quality, natural ability and earnings.

Due to the inexistence of information concerning school quality and the innate ability of workers, this investigation uses a database built with surveys and tests applied to a sample of 253 people of the city of La Paz[1]. The survey gathers information referring to personal characteristics, family background, schooling process (level of instruction, inputs of the educational process, and student's performance), and occupation. The ability of each person was measured with an intelligence test (Dominos

1 The sampling was done through a two-step stratification process of the censual zones of the city of La Paz using the Poverty Magnitude Index as a proxy for the level of income, the stratification variable.

Test), with which it was possible to segregate the intellectual quotient of the people surveyed into three ranges: inferior, equal or superior to the average capacity.

The econometrical analysis uses the Human Capital Earnings Function to examine what factors the labor market remunerates; more specifically, how it remunerates innate ability, the level and the quality of education received by the individuals.

Therefore, the dependent variable, in all cases, is the natural logarithm of the income measured in Bs./hr. On the other hand, the principal independent variable is schooling, measured in years or completed levels; the others are related to the quality of education –inputs and outputs–, innate ability and socioeconomic background.

This study uses educational quality as an approximation of productivity. In this way, differences in human capital are represented through indexes that include variables related to the quality of educational inputs (access to "key" facilities) and outputs (student's performance).

The analysis is divided into four sections. The first section estimates the basic model which includes standard variables and others referring to school quality and innate ability. The second classifies schooling by completed level or credentials acquired. The third considers the endogenousness of the years of education. Finally, the fourth studies only individuals who have completed all university credits or are finishing the fourth or fifth year, correcting selection bias through Heckman's methodology. In every section, both the coefficients and the FIW[2] of each variable are examined.

The diverse specifications of the model used reveal a positive relationship between schooling and earnings. In all cases, education is the most significant explanatory factor of the total variation of earnings.

The years of education have different importance depending on the level in which they are studied: elementary and secondary school years are irrelevant to the regression, and post secondary school years highly significant. Out of the three post

2 Factor Inequality Weights, Fields' methodology used to decompose the total variation of the dependent variable explained by each independent variable.

secondary options considered –university, technical school and–"normal"[3]-, university is the most profitable and the only one important for the explanation of income.

When analyzing schooling by credentials, the high school diploma turns out to be greatly significant in the regression. Alternatively, finishing technical or "normal" school is not significant and does not explain any of the variance of income. Finally, university graduation explains almost a fourth of income inequality.

Combining the results from the regressions that estimate schooling through the years spent in each level and by completed levels, we can see that the high school diploma seems to be more important than the years studied in school; whereas for technical and "normal" school, graduating isn't relevant, but the years spent in the level (however, these two levels are not important for wage differentials). For university, both graduation and the years studied are important.

It is found that ability is positively related with income through two mechanisms. In the first one, the labor market remunerates ability directly. According to the results obtained in the different specifications for the entire sample, the more capable individuals earn more. Ability is the third most valuable explanatory factor of income.

The second mechanism relates ability indirectly with income through higher schooling. In the university and post university sub sample model, it can be seen that a higher intellectual quotient increases the probability of completing four or five years of college. Likewise, when the income regression of this sub sample is run, ability ceases to be significant in the explanation of earnings even before the insertion of the selection term; which suggests that the people in this group have similar ability. Moreover, when regressing the years of schooling, the IQ is the second most important explanatory factor of the variation of schooling among individuals; the most able study more years.

No substantial evidence can be found for the direct remuneration of educational quality in the labor market since the only case in which the human capital index turned out to be significant was when schooling is examined through completed levels.

3 School teacher education.

However, we found an indirect relationship between quality and earning, through schooling. In the selection model of the university and post university population, it can be seen that both input and output quality increase the probability of graduating or being in the fourth or fifth year of university. Likewise, the regression of years of schooling shows that input quality is the most important factor to explain the differences in schooling among the people surveyed. Output quality explains 5% of these differences.

The results presented expose mechanisms from the screening hypothesis and the human capital theory. There has been found evidence that the most able are the ones best remunerated by the labor market and, also, the ones who attain higher levels of education. However, it was also found that individuals who reach higher levels of schooling are those who have had "better" educational quality, with respect to access to "key" inputs, and have had a better performance when studying.

More specifically, in the sub sample studied, it can be seen that the most able and those who had a better educational quality are those who conclude their university studies or are about to conclude them. Therefore, the completion of university can be a good "signal" not only to choose the more able workers, but to select the most productive"–those who have accumulated more or better human capital during their educational process.

On the other hand, evidence found indicates that, within the university group, human capital differences are not remunerated. The conclusion of this educational level can "signal" more able and more productive individuals with respect to the entire population, but once they are chosen, the labor market doesn't remunerate differences in productivity or ability within the group. The earnings regression for the sub sample shows that differences in the level of schooling (post university studies) are, once again, the most important factor to explain'wage differentials.

In this regression, university dependency is significant and important when explaining earnings even after including the variable referring to differences in educational quality (human capital index). The 59% negative effect against those who have studied in a public university is not defined by quality differences.

On one hand, it could be that part of the adverse effect related to the university dependency has to do the variety of offered careers because some are better remunerated than others. On the other hand, it is possible that employers use university dependency as a "signal", not necessarily of a better quality of education, but of certain socioeconomic and cultural characteristics that they consider desirable. It may also be that, in private universities, social links that allow the acquisition of well paying jobs can be established. In this case, the university diploma would permit access to better positions, but the "contacts" would be determinant. This hypothesis could also be sustained by the direct relationship between parents' and their progeny's earnings - second most important explanatory factor of earnings-, since it gives some evidence that the hiring process is defined, in a certain degree, by the economic and social circle of people. All these hypotheses demonstrate the need to elaborate more in-depth studies about the labor market imperfections and their consequences.

This research has found that differences in the level of education of individuals act as a "sign", not only of innate ability but of productivity acquired during the educational process. Within this "signaling" mechanism, human capital also matters. Educational quality allows people to attain higher levels of education, presumably because it increases their productivity. In this way, differences in educational level – since they represent contrasts in educational quality – may help select the more productive people. Apparently, the labor market does not distinguish productivity differences, but it does remunerate them through the "signal" of the education level.

From public policy perspective, improving the quality of the educational system would be important because it would increase students' productivity and their schooling level. However, to assure the profitability of educational investments, the government should complement educational policy with labor policy. If the imperfections in the labor market could be reduced, it would possibly allow the market to remunerate productivity differences more directly, without needing any "signaling" device. For example, they should try to enhance staff recruitment information systems and hiring processes. This way, hiring processes would be more efficient and merit-based.