

DEBT **for** EDUCATION

Effects on Growth and Poverty

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literacy
early childhood education
basic education
secondary education
vocational education
higher education

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I. INTRODUCTION

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The processes of debt conversion have been employed to finance different kinds of investment, such as privatization, environment, protection to childhood, education, etc. The major feature of the debt conversion projects is that they match two important positive aspects into one single operation: debt reduction and the financing to projects with high social return rates. However, many governments have imposed several restrictions towards updating this mechanism, due to side effects of fiscal and monetary nature. Usually, these restrictions impair employing the conversion system.

In the second session of this article, we disclose that investments in education bring high private and social return rates, suggesting that these projects should be considered priority to financing through debt conversion. We disclose the costs of the non-investment in education for individuals and for countries, additionally to the effects of education on poverty reduction and income distribution.

In the third section, we discuss alternatives to the traditional schedule of debt conversion aiming at minimizing the side effects of the traditional mechanism, which is usually employed. In this section, we analyze which kind of projects should be eligible to be financed by this mechanism, and how we could outline mechanisms to guarantee that such projects are executed with efficacy and efficiency, i.e., that they reach the expected objectives, at the lowest cost. Section four discloses our conclusions.

II. EDUCATION AND DEVELOPMENT

The economists and social scientists have been studying the positive relationship between incomes and the educational level of the individuals since, at least, early in the 20th Century. However, only in the 1960's the expenses with education started been approached as investments, i.e., the decision of spending resources (time, money, etc.) aiming at expanding in one year the educational level of an individual shall take into consideration the gains entailed by increasing the future income, due to this additional year of education. The comparison between the costs of an additional year of education and the increased income is called private rate of return of investments in human capital.

If when an individual invests in human capital his individual income is increased above the costs of such investment, so the private rate of return to this investment is positive. An important issue discussed in literature is the reason why it occurs. The first possibility is that education increases the workers' productivity and, therefore, their income. Another possibility would be that education is related to other unobserved characteristics of those who determine their productivity. Here, education would be only a signal of these characteristics.

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However, if education increases productivity, the expanded education should generate higher rates of product growth for the countries, also meaning a positive rate of social return to the investment in human capital. The purpose of this section is to disclose the results that reveal the importance of education towards increasing the individuals' income and the economies' growth rate.

II.I. Private return rate *versus* social return rate of education

Since the work by G. Becker (1964), education has been approached as an investment in people. First of all, because education demands the individual's time, and this time could be addressed to obtaining income in the labor market. In this sense, there is a cost in educating, where the major component is the non-earned income when the individual devotes time to the educational process.

On the other hand, the empirical observation reveals that more educated people, i.e., those with longer years of formal education, usually earn higher income than the less educated ones. As we shall observe below, this positive relationship between years of education and income could be the result of increased productivity, resulting from higher education, or a function that signalized the educational process. However, in the purely economic light, the decision of being educated may be approached as an investment where the individual incurs a cost now, towards obtaining future income gains. If the income gain entailed by an additional year of education is higher than its cost, we could say that the private return rate of that additional year of education is positive.

Nevertheless, if additional educational years effectively mean gain of income to individuals, we should ask ourselves which mechanism provides for these monetary gains. In other words, the reason why the labor market compensates additional educational years with higher salaries. A possibility is that education increases the productivity of workers (BECKER, 1964) and that, because of the competition among employers to have the more productive workers, the labor market gains of productivity by paying higher salaries. In that case, higher educational levels should be directly related to higher productivity of the worker in the productive process.

Productivity gains, in turn, mean that the same number of goods and services can be produced using less production factors (work and capital) and, because of the availability of these factors, gains of productivity originate higher rates of growth in economies. If so, increments in the population's educational level would be an important factor to support the countries' economic growth. In other words, besides having a positive private return rate, investments in education would have also positive social return rates.

Another possibility (SPENCER, 1973) is that, indeed, there is no direct relation between education and productivity; rather, there is a high degree of correlation among other non-observed characteristics of individuals (discipline, intelligence, etc.) that are directly correlated to productivity and also to education. That is, the same individuals

would be so productive in the labor market whether with more or less education. What bring about gains of productivity are other factors that cannot be observed as correlated to education. In this way, education would only be an external signal of these additional characteristics.

If the increases of income and productivity result from those additional characteristics, the individuals and societies could be overestimating the educational process as a generator of income gains and of economical growth and, therefore, over-investing private and public resources in education. Here, even if the investments in education have a positive private return rate, their social return rate could be null or even negative, as other methodologies can be developed to identify the non-observable characteristics of the individuals that determine the gains of productivity, the costs of which would be lower than the cost of the educational process.

In face of these two possibilities, the empiric literature has dedicated major efforts to estimate the private return rate of investment in education, or in human capital, and if the increases on the population's educational level are directly related to higher rates of growth to the countries' national product.

Concerning the private return rate of the investment in human capital, Mincer (1974) showed that if the only cost of an additional education year is the cost of time opportunity (that is, the cost of remaining this additional year at school instead of being in the labor market), and if the proportional increase of income entailed by this additional education year is constant through time, the relation between the individual's income and the years of study would form the linear-log. Here, the coefficient of the years of education in this equation would be an estimate of the private return rate of each additional education year.

Based on this observation, Mincer estimated an equation to the United States, relating the natural logarithm of individuals' salaries to their educational level, to their experience in the labor market and to their experience raised to the power of 2 (assuming that the experience increases the individual income in a non-linear way, with decreasing incomes)¹ and found the value of 10% to the private return rate of an additional year in the American economy.

Ever since, many works have been developed to different countries, aiming at estimating the private return rate of the investment in human capital. Psacharopoulos (1994) estimated this equation to different countries in the world, where the private return rates of an additional year of education range from 5% to 15% per year. That is, each additional year of education generate an additional income gain between 5% and 15%, depending on the country, higher than the expense incurred by the individuals to reach this objective.

¹ That is: $\ln W_i = a + b.A_i + c.X_i + dX_i^2 + e_i$.

Where: $\ln W_i$ = natural logarithm of the individual's salary, A_i = years of education, X_i = experience in the labor market.

However, as Spencer (1973) suggests, these results can be overestimating the return rate of the investment in human capital, as they do not control other characteristics of the individuals that could be correlated to educational gains (such as intelligence, perseverance, discipline, etc.). If these characteristics are the real determinants of the additional income gains, the return rates found would be overestimating the real importance of education as a mechanism to generate individuals' income. So the question here is: how much of the return rates of investments in human capital effectively results from increased education years, and how much results from these non-observed characteristics that are correlated to education.

The literature is yet to provide a definite response to this issue. Nevertheless, most of the evidences suggest that education is not only a proxy to non-observed characteristics of the individuals that would be originating the return rates found by the researchers (for a survey of the empiric evidences established in natural experiments; see CARD, 1999). These results suggest that the increased income resulting from the increased education years should be related to productivity gains that are valuated in the labor market.

However, if additional years of study stand for more productivity, the higher level of education of population should be an important determinant of higher growth rates to the countries. In other words, the investment in human capital is an important production factor, together with production factors traditionally considered in the economic literature, physical capital and work. The designation human capital results exactly from this fact.

Based on the remarks above, Benhabib and Spiegel (1994) estimated an equation to 78 countries, to the period of 1965-1985, where the dependent variable is the logarithm of the growth rate of the gross domestic product, and the independent variables are the variation rates of the logarithm of education years, reserve of physical capital and labor force, and the logarithms of education level and gross domestic product at the beginning of the period. Surprisingly to several academics, and in opposition to what could be expected, the coefficient of the logarithm of variation in years of education is negative and insignificant, pointing out that higher gains of education would not be correlated to higher growth in economies. In other words, if this result is true, additional education has a positive private return rate, but do not contribute to the growth of economies.

This result brought about the interest of other researchers who pointed out two problems that could be generating a value to the coefficient of variation of the logarithm of education years, which would be smaller than the real: errors of measurement of the variable years of education and the inclusion of the variation of capital reserve in the equation. Temple (1999) suggests that, when the above-mentioned equation is estimated to a huge number of heterogeneous countries, the existence of important outliers (that is, countries for which the relation between the increase of education and the

increase of product is smaller than most of the sampling) can affect the results, probably because of errors in measuring the variable years of education. In this case, the most correct would be to estimate the equation again, removing these outliers.

Using the same data as the previous study, but withdrawing 14 countries of the sample (thus reducing the sample to 64 countries)², so that the estimate becomes robust in the econometric light, the coefficient of variation in years of education becomes positive (0,165) and significant, as expected, pointing out a positive effect of the increase in population's educational level over the countries' economic growth.

Krueger and Lindahl (2000), on the other hand, have shown that the negative signal of the variation in years of education is highly influenced by the introduction of the capital reserve variable in the equation. When this variable is removed, the coefficient of the variation in years of education becomes positive and significant, both in the linear-log specification and in the log-log specification. The point is if the inclusion of capital reserve variation as a dependent variable in the equation would generate a decreasing bias in the coefficient of variation in education years. The authors argue that, as countries with high growth rate tend to attract huge amounts of capital, this last variable is, indeed, endogenous, what could produce the negative bias in the coefficient of variation in education years.

Based on this observation, the authors estimate new equations, excluding the variation of capital reserve as independent variable, for samples of 5, 10 and 20 years, to no more than 110 countries. The results have pointed out that the coefficient of variation in education years is not significantly different from zero to the 5-year period, but the variation in education years has positive and significant effects on the *per capita* product growth rate for longer periods, of 10 and 20 years. By correcting measurement errors in the variable years of study, the coefficient of variation in education years in the equation for 20 years, increases from 0.18 to 0.30. The authors conclude that this result points out a social return rate of about 30% for investments in human capital, representing 3 to 4 times the estimated private return rates. It suggests the existence of positive externalities and high social return rates for investments in education.

In brief, the results are not totally conclusive in relation to the existence of a positive relationship between years of education and the rate of product growth. However, most of the evidence points out that this is a positive and very strong relationship, suggesting that investments in human capital, besides entailing high private return rate (from 5% to 15% for each additional year of education), also entails high social return rate, which may reach 3 to 4 times the private return rates, due to positive externalities generated by the educational process.

If the social return rate for education is higher than the private rate, letting the families decide, in private, how much should be committed to the education of their

² The following countries have been excluded: Botswana, Iraq, Lesotho, Rwanda, Saudi Arabia, Uganda, Cameroon, Jordan, Nigeria, Nicaragua, Chaad, Mozambique, Pakistan and Sudan.

children should generate a volume of investments in human capital lower than the optimum, in the social light. That is so even if the families make this decision of investing in a totally rational way, in the economic sense of this word. This is the sounder rationale, in the economic light, to public investments in education.

II.2. Private and social costs of non-investment in human capital

An alternative way of presenting the private and social gains entailed by investments in education would be to calculate the non-earned gains to individuals and the society along their lives, if they do not make such investments. In other words, which would be the loss to an individual, along his life, of dropping out the school system before concluding his education? Similarly, one can estimate the loss to the society due to reduced increase in productivity and, therefore, the loss to national income, additionally to the failure in taking advantage of positive externalities entailed by the educational process, since an important share of the country's population drops out the system prematurely. That is to say that, instead of assessing the investments on human capital in the light of gains, this methodology assesses them in the light of the costs incurred due to the non-generation of income. This section will disclose the results of some studies in developing countries that try to calculate these costs.

If, as we could observe in the previous sub-section, education is directly related to productivity, and if the labor market values these productivity gains by paying higher salaries, so the higher cost of the premature school dropout would be to lose the opportunity of increasing an individual's productivity and, therefore, increasing the capacity of earning income in the labor market. On the other hand, if the increased education reduces the possibility of unemployment to an individual, an additional factor to be taken into consideration is the reduced expected income of this individual along his life time, because of increased unemployment among individuals with lower education.

Concerning society as a whole, the main costs of premature school dropout are the increased demand for social programs (health, social assistance, unemployment allowance, etc.) – and, therefore, higher costs to the society for supporting these services–, the reduced tax-related revenues to the government because of the population's lower income level, and the increased possibility for people with lower education level to get involved in high risk anti-social activities (crime, drug use, premature pregnancy, etc.) that generate additional costs to the society.

Assunção and Carvalho (2004) have estimated the private and social costs of premature school dropout in Brazil. The private costs of premature school dropout were estimated by comparing the current value of income, in US dollars (the conversion of reals to dollar employed the exchange rate R\$/US\$ of September 2002) of a graduated worker, with the current income of a worker with education level immediately below. The calculations were made based on data provided by the PNAD 2002. Table I shows the estimate amounts for the private cost of premature school dropout in Brazil.

Table I – Private Costs of School Dropout, by Person (in US\$) – Brazil

School level	Male, white	Male, non-white	Female, white	Female, non-white
Primary	8,151.00	6,876.00	2,848.00	3,089.00
Elementary	8,179.00	6,193.00	4,825.00	3,154.00
High School	20,391.00	13,992.00	13,970.00	9,800.00
University	92,830.00	74,202.00	60,020.00	45,580.00

Source: ASSUNÇÃO, J. L. and CARVALHO, L. S., 2004.

According to the results, a male individual, non-white, who have finished high school, but have not finished university loses, in terms of current amount of non-earned wages, US\$ 74,202.00 along his life. The current value of loss to a white female individual, along her life, who has dropout school after finishing the high school, would be US\$ 60,020.00. The differences among the losses of the four groups of individuals in the table above reflect the current differential of income in the Brazilian labor market.

In the lack of information, the authors could not calculate the financial costs entailed by the higher probability for those who have prematurely dropout school to get involved in risk and onerous activities, in the social light. However, the authors estimate the social costs incurred by society due to the loss in tax-related income – which could be collected by the government and employed to finance programs with positive return rate to the society – when an individual fails in reaching higher education levels and, therefore, is less capable of generating income. Table 2 discloses the results of such estimates.

Table 2 – Cost of School Dropout, by Person (in US\$) – Brazil

School level	Male, white	Male, non-white	Female, white	Female, non-white
High School	55	0	0	0
University	9,337.00	4,814.00	2,081.00	205.00

Source: ASSUNÇÃO, J. L. and CARVALHO, L. S., 2004.

According to the data, a white male individual who has finished high school, but has not graduated, fails in paying to the government US\$ 9,337.00 in taxes, along his life. On the other hand, a white female individual, who has finished high school but has not graduated, would neglect paying taxes amounting to US\$ 2,081.00, along her life.

If we tote up the private and social costs of an individual with this educational profile (finished the high school but did not graduate), the total cost of a white male individual, along his life, would be US\$ 102.167,00. This is an underestimation of the

costs of premature school dropout, since several social costs could not be measured, due to missing information.

A recent study by the World Bank (2003), employing an approach similar to that described above, discloses similar results to the Brazilian ones for five countries in the Caribbean region: Dominican Republic, Guyana, Jamaica, St. Lucia and Trinidad and Tobago. Table 3 discloses the current value of income loss for male and female individuals who complete elementary school, but do not complete high school or university.

Table 3 – Cost of Premature School Dropout, by Person (in US\$) – Dominican Republic, Guyana, Jamaica, St. Lucia, Trinidad and Tobago

School Level	Dominican Republic (1998)	Guyana (1999)	Jamaica (1997)	St. Lucia (1995)	Trinidad and Tobago (1992)
High school					5,200.00
Men	27,400.00		11,400.00		205.00
Women	16,900.00	238,600.00	20,600.00	279,300.00	
University					14,500.00
Men	137,000.00	660,600.00	156,900.00	420,400.00	
Women	86,900.00	1,036,000.00	115,400.00	1,562,700.00	

Source: World Bank, 2003.

According to the results, a young man in the Dominican Republic who has completed elementary school, but has not completed high school, would have losses in the current amount of income along his life equivalent to US\$ 27,400.00. Or a woman who has completed high school, but has not graduated, in Guyana, has a loss of income along her life equivalent to US\$ 1,036,000.00. As in Brazil, the losses resulting from school dropout before completing university are extremely high, thus reflecting the high rates of return of this education level in those countries.

An important result of this study is the disclosure that the possibility for a youngster, with low participation in the schooling process, to be involved in other risky behaviors is much higher than the possibility for a youngster with high participation in the schooling process. According to the study, the probability for a male youngster to start smoking is five times higher for a youngster with low involvement with the schooling process (50%) than that for a youngster with high involvement (10%). The probability of male youngsters with low involvement with the schooling process for perpetrating violence acts is 14 times higher than that for male youngsters with high involvement (69% against 5%). The probability for both groups of using drugs increases 27.5 times (55% for those with low involvement, in comparison to 2% for youngsters with high school involvement).

The data for female youngsters are also remarkable. A female youngster, with no involvement with schooling process, is almost 7 times more likely to smoking than that

with high involvement with the schooling process (68% and 10%, respectively). The probability of getting involved in violence acts drops from 70% to 10%, if the youngster is highly involved with school, and the probability of using drugs is also reduced from 35% to 2%.

These risky behaviors, in the social light, entail important costs to society, since they have negative impacts on the life of other individuals, like the involvement in violence acts. Furthermore, they increase the possibility of those people to become dependent on social programs that are expensive to the federal government, thus generating high social cost.

It would be a mistake to conclude that the reduction in the probability of anti-social behaviors results from increased involvement with the school system, since one can argue that it results from the fact that people who prematurely dropout school have the same characteristics as those who perpetrate violence, use drugs, or have anti-social behaviors in general. Here, these characteristics would be generating the reduced probability presented in the study and the premature school dropout. However, the high correlation among these behaviors, and the non-involvement with school, suggests that an effective commitment to the educational process could be an important inducer of positive social behaviors. If that is so, the school would be generating important positive externalities as a whole, and the private return rates of education are failing to capture them.

The results above disclose the high private and social costs resulting from the families' and civil society's decision of not investing in human capital. Besides the costs resulting from the non-earned income, the results also show high correlation between the non-investment in education and other behaviors that generate important costs to the society, such as drug use, alcohol, violence, etc.

II.3. Education, poverty and income distribution

If the increased education of individuals has the effect of increasing their income in the labor market, low education levels should be an important factor in explaining the families' poverty. Families with low investment in human capital earn lower incomes and are more subject to being poor than those families with high levels of investment in human capital. Similarly, if the individual's education level is an important factor in determining the individuals' income, the structure of distribution of education years should decisively affect the income distribution in the economy.

Barros and Camargo (1993) have developed a simple framework to analyze the relationship between poverty and education. According to these authors, the *per capita* income of a family may be decomposed in seven factors that, altogether, determine it. The factors are:

- The ratio of adults in the family, i.e., the dependence ratio.
- The employment rate among the labor force of the family adult members, i.e.,

the rate of participation of the family adult members in the labor market, and the unemployment rate among those members;

- The quality of the family members who are working, i.e., their education level;
- The power of bargain of the family members who work, i.e., how much of these family members' productivity is appropriated by them;
- The quality of job posts occupied by these family members, i.e., the volume of physical capital of these job posts;
- The volume of monetary transfers that the family receives (retirement benefits, remittances from immigrants, etc.);
- The financial incomes of the family members, resulting from proceedings of savings previously made.

Based on this framework, one can say that a family can be poor if the dependence ratio is high or if, despite the low dependence ratio, the level of utilization of the labor force of its adult members is low (low rate of participation or high unemployment rate), or if, despite the low dependence ratio and the high level of utilization of the labor force, the quality of the family members who work is low, due to their low education level, or because despite the low dependence ratio, high degree of utilization of the labor force and high education levels, their power of bargain is low, and they can only appropriate a small share of the product they generate, or because despite the four above-mentioned factors are high, they are working in low-quality job posts and, therefore, generate low product.

On the other hand, if the correlation among these factors is high, i.e., if the families that have high dependence ratio are simultaneously those with low level of utilization of their labor force, have low education, reduced power of bargain, are assigned to the worst jobs, receive low transfer and have short financial incomes, the possibility of this family being poor is increased.

Barros, Carvalho, Franco and Mendonça (2004) have estimated the contribution of each of these factors to explain the differential of income between the poor and non-poor families in Brazil and Argentina. Table 4 discloses the results.

Table 4 – Differential of Income between Poor and Non-Poor Brazil (2002) and Argentina (1996) (%)

	Ratio of adults	Quality of job posts	Education level	Other sources (Transfers and income of active members)	Level of utilization of the labor force
Argentina	17	49	8	18	8
Brazil	15	45	15	23	3

Source: PAES DE BARROS, at. all, 2004.

In Brazil, the non-poor families earn, on average, 8 times as much as the poor ones. The most important factor that explains this huge difference in the *per capita* income of both groups of families is the quality of the job post held by the members who work. This factor explains 45% of the difference. The differentials of education explain 15% of this difference. In Argentina, the quality of job posts explains 49% of the difference between the *per capita* incomes of both groups of family, while the difference of education levels explains 8%.

Bourguignon, Ferreira and Lustig (2005) analyze the development of poverty levels and income unbalances in Buenos Aires, Brazil, China (Taiwan), Colombia, Indonesia, Malaysia and Mexico. For that, the authors have employed a methodology that decomposes the variations of poverty unbalance into three components:

Price effect: measures the share of the individuals' income variation due to the variation in the prices of their personal assets, such as the return rate of education;

Participation or occupation effect: measures the share of the individuals' income variation due to changes in the occupational position, such as unemployed, self-employed, or wage earner;

Population effect: measures the share of the individuals' income variation due to changes in the individuals' characteristics, such as their education level.

The studies developed herein disclose that, in general, increases in the educational levels tend to reduce poverty, since they increase the individuals' income. Sometimes, they even compensate other factors that could have led to increases in poverty, if the population's educational level had not significantly increased. However, the effect of the increase on the average educational level of population over its income is ambiguous.

Just increasing the average education level of population does not necessarily lead to reduced unbalances. Similarly, the effect of reduced unbalances in education distribution does not necessarily mean higher balance in income distribution. In all of the countries approached by the study, the education distribution became more balanced along the period surveyed. However, in only two of these countries, Brazil and China (Taiwan) the result of this increased balance in education distribution has positively contributed to the income distribution (in the sense of making it less uneven). In the remaining five countries, the greater educational distribution had the effect of increasing unbalances in income distribution.

The explanation for this seemingly paradox is related to two phenomena: first, to the convexity of the education return rate, i.e., the return rate of an additional year of education is higher if the individual has 10 years of education, than if the individual has 5 years of education;

Secondly, to the fact that the relationship between education level and gains to individuals is also convex. That is, the increased income resulting from an increase of 10 to 11 years of education is the major gain of income entailed by the increase from 5 to 6 years of education.

Due to these two phenomena, an increase in the population's average level of education has the effect of increasing the unbalance in income distribution, if this increased average education level is evenly distributed among all individuals in the population. In order to avoid that this increase in the average education level comes to generate increases in income unbalances, the increase on the education level of those with lower education should be substantially stronger than that of the more educated ones. Therefore, focusing on public investments in education for the less educated population – which corresponds to the poorest population – is crucial if we intend to effectively reduce the unbalance level, and not only poverty in the countries.

These results disclose that investments in human capital could have important effects on poverty reduction, since increases in the individuals' education level lead to increased incomes. Therefore, the investment in education could become one of the most important instruments towards fighting poverty worldwide. On the other hand, in order to have public investments in education effectively reducing unbalances in the income distribution, this investment should be concentrated on the less educated individuals and, therefore, on the poorest ones. If all individuals have the same educational gain, the income unbalance shall increase.

III. CONVERSION OF DEBT INTO INVESTMENTS IN EDUCATION

The conversion of the debt of developing countries towards financing projects with specific objectives, such as environmental preservation or education, has been proposed in different international forums. Different countries have been employing this strategy since 1985. The major feature of the debt conversion projects is that they match two important positive points into one single operation: debt reduction and financing to projects with high social return rate, such as those oriented to increase the growth potential, reduce poverty, improve the ecological conditions of the country executing the operation, etc. Based on this observation, many analysts consider conversion as the ideal mechanism towards alleviating the debt charge in developing countries, mainly the poorest ones and, simultaneously, leveling its growth and reducing poverty.

Within this context, the debt conversion towards financing educational projects should be a priority since, as mentioned in the previous section, education is not the only factor that increases the individuals' income (i.e., the private return rate of education is positive), but there are also huge evidences suggesting that social return rates to education are higher than the private return rates. These evidences also point out that the investments on education play a core role, although not enough, towards inducing the countries' development process.

Nevertheless, despite the positive features of debt conversion into educational projects, several aspects should be considered, so that this process effectively benefits the debtor country. If, on one hand, the conversion mechanisms typically employed tend to reduce the debt and direct investments to priority sectors – such as education – there

are important restrictions that should be respected. The respect to these restrictions would prevent these processes from generating negative side effects on the economy, thus voiding the potential positive effects of the investment made. It would be necessary to develop a careful analysis on these aspects, in order to avoid side effects and, therefore, allow for proposals on the conversion of debt into education projects.

Additionally to the issue on how to convert the debt, we should also take into consideration two other aspects in order to achieve the expected results. The first important point is the selection of projects to be financed with the conversion proceedings, which criteria should be employed to make this decision, who would define these criteria and how. Another aspect that makes this process even harder is how to outline mechanisms capable of generating incentives towards having the conversion proceedings effectively invested, with efficacy and efficiency, i.e., for them to be used in such a way as to reach the objectives purposed, at lower financial costs. In this sense, the selection on how conversion should be made is as sensitive as these aspects mentioned.

In this section, our purpose is to present the most usual ways of converting the debt, additionally to presenting alternatives capable of overcoming some of the major problems concerning the mechanisms typically used for conversion. These mechanisms have impaired the debt conversion in several countries, due to tax and monetary restrictions, besides hindering the discussion on the kinds of educational projects that should be executed through these operations. Finally, here we suggest mechanisms capable of generating the required incentives for making investments with efficacy and efficiency.

III.I. Structure of the debt conversion projects

The processes of debt conversion have been employed since 1985, for different purposes. The most typical purposes, here, are those oriented to exchange the debt for shares in privatization processes, aiming at obtaining resources to be committed to environmental projects, and projects on protection to childhood in developing countries (MOYRE, 2001). The processes of debt conversion have employed a consensual format, through which an organization, whether profitable or non-profitable, negotiates the purchase of the debt in the international market, paying the market price to the creditor. Simultaneously, it negotiates with the debtor government the sale of these bonds for their nominal value, or with lower discount than the organization received when purchasing the bonds in the market price (the investor would receive the negotiated value in national currency of the debtor country). The difference is then employed to finance the project, object of the negotiation.

A simple example assists in understanding the above mentioned process. Let us suppose that the external debt of a given country, in the international market, is estimated in 30% of its nominal value. Based on this observation, an organization, whether an enterprise, a non-governmental organization (NGO), or an international organization, proposes to the owners of that debt to purchase it at its market price. Simultaneously, this organization negotiates with the debtor country the advanced quittance of this

debt, in national currency, for the value equivalent to 80% of its nominal value. The proceedings of this operation would be employed to finance a given project of interest to the country and to the investor, such as improving the educational infrastructure quality.

Let us suppose, for example, that the bonds' nominal price is US\$ 1,000.00, and the organization interested in the conversion wants to purchase 1,000 bonds, with market price equivalent to 30% of the nominal value. This organization negotiates with the government that issued the bond a 40% discount on the nominal value. Here, the interested organization would disburse US\$ 300,000.00 and the government would discharge the bonds, disbursing an amount corresponding, in national currency, to US\$ 600,000.00. The difference, equivalent to US\$ 300,000.00, in local currency, would then be employed to finance the investment scheduled.

In this operation, the country's external debt would be reduced in US\$ 1,000,000.00 for the price of US\$ 600,000.00. The owner of the bonds would have sold them in the market price, US\$ 300,000.00, and the organization would employ the difference (corresponding to US\$ 300,000.00 in local currency) to finance the intended investment. Apparently, it is a win-win operation: the creditor sold its bonds in the market price, and the debtor country reduced its external debt paying in local currency the equivalent to US\$ 600,000.00. If the main restriction to the growth of economy is the external one, this is an economically positive operation. Furthermore, it succeeded in raising the resources required to finance a project with high social return rate. Finally, the investor wins because it obtained the resources to finance the intended project and, if the selected project has a high social return rate, the country wins with this operation.

However, two aspects of the above-mentioned operation may hinder the debtor country's acceptance. First, the fact that the government would have to advance the amount equivalent to US\$ 600,000.00 in local currency, for developing the project. This may lead to serious problems, if fiscal restriction is very significant, and thus impair the operation. Secondly, the injection of these resources into the economy, within a relatively short time, depending on the amount of resources and the size of the economy, may bring about relevant inflationary pressures.

A third aspect that limits debt conversions, as described above, is the fact that, in order to achieve a profitable operation, the market value of the debt of the concerned country should be lower than its nominal value, or the organization interested in the investment should be capable of finding a debt owner inclined to sell it for a price lower than its market price, what hardly occurs. As along the last few years the debt of most of developing countries have trended to be valued in the secondary debt market, with prices getting closer to or even exceeding their nominal values, the mechanism described could be hardly adopted for these countries.

In face of the above-mentioned limitations, alternative proposals on the conversion format, where these problems have been abolished, could reduce the problems

entailed by the debt conversion operations, and break the resistance to these operations, mainly in countries with strong fiscal restrictions.

One possibility could be to have an entity (profitable or non-profitable, international organization, etc.) interested in making a given investment, purchasing the country's certificates of indebtedness in the market price. Simultaneously, the government of the debtor country would issue a new bond, to be exchanged for the bonds purchased, and accounted in the market value for the operation purposes. The new bond would be directly transferred to the entity interested in making the investment. The regular interests paid would, then, be used to finance the investment. On the bond maturity, the entity would be paid the bond's nominal value.

Let us suppose, for example, that the government issues a bond with nominal value corresponding to US\$ 1,000.00 in local currency, due in 20 years, and 6% interest a year, with 6-month dividend-warrant. Let us suppose, also, that the market value for the bonds to be exchange corresponds to US\$ 800.00, in local currency. The government would then exchange the new bond for the old one, and the investor would donate the amount corresponding to US\$ 200.00 in local currency to the government, thus complementing the price of the new bond. This donation would be deducted from the investor's income tax.

The bond would be directly transferred to the entity responsible for the investment, which would keep it in its portfolio until the maturity date (20 years). Along this period, the entity would receive, on a 6-month base, the interests corresponding to 6% a year, i.e., the equivalent – in local currency – to US\$ 29.56. By the end of the 20-year period, the entity would discharge the bond at its nominal value, corresponding to US\$ 1,000.00 in local currency. If the entity responsible for the investment wishes to anticipate the bond quittance, it can sell the bond in the secondary debt market, without jeopardizing the country's fiscal situation. Here, although the example has been presented in dollars, the value of the new debt should be denominated in local currency, adjusted by the country's inflation rate along the bond term.

Concerning the traditional conversion schedule, this alternative brings an important advantage, i.e., it does not make pressure over the fiscal restriction since, in opposition to the previous proposal, there is no anticipation of the bond maturity. The resources for financing the investment correspond to the payment of semi-annual interests that, in anyway, the government should disburse, and the nominal value of the bond on its maturity date, deducting the interest rates, since the bonds could be sold in the secondary market with discount. Similarly, as the resources are to be disbursed along time, it would have no significant immediate effect on the quantity of currency and, therefore, would not generate inflationary pressure over the economy.

On the other hand, for a given volume of conversion to be made and in the short term, the resources available for the scheduled investment could be shorter in this alternative, if compared to the traditional mechanisms. These reduced resources depend

on if the debt value in the secondary market is lower than the value that could be obtained if the government anticipates the bond maturity date.

III.2. Projects to be financed

After analyzing the issue of how conversion should be made, now we can discuss which projects should be financed. The issue of projects selection is crucial. Here, it is worth highlighting that there are important social costs involved in the projects of debt conversion, whether fiscal or monetary ones, mainly if one selects the first format presented above. On the other hand, as the debt volume subject to conversion is limited, if a given project is selected for financing through conversion, another one should be excluded, for insufficient resources. Therefore, the question is: which criteria should be employed to select the projects eligible for financing through this mechanism?

The basic principle that should guide the selection of projects to be financed is that the projects' social return rate should be higher than the private return rate that, in turn, should be lower than the private return rate of the alternative investment opportunities available in the market. If the private return rate is higher than the social return rate, the market mechanisms should be capable of allotting the required resources for carrying out the project, with no need of interference by the government.

Within a context where the private return rates of investment in education are very high, as discussed in the previous section, the issue is why the families fail in investing enough in the education of their children. There are several reasons for this paradox. The first explanation for the families to under-allocate resources to education is the existence of credit restrictions. Usually, due to institutional or cultural reasons, the financial sector hardly recovers the educational credit, thus reducing the credit supply to education. If the family lacks resources to invest in the education of their children, the lack of educational credit reduces the investment to levels below the optimum.

An alternative explanation would be the high discount rate of time of some family groups. In other words, when the parents understand that current needs are more important than the further gains entailed by their children's education, the resources that could be assigned to their children's education are employed to afford current needs, thus reducing the investments in education. Particularly, it is worth placing attention to the fact that the major resource for poor families is the capacity of their members, adults and children, of generating income. As education requires the family members to devote time for it, the investment in education shortens the time available for these members to generate income through the participation in the labor market.

The third explanation would be that the quantity of education supplied to these groups of families is so low that the return rate of their children's education do not justify increasing the investments.

Regardless the reason why the families cannot appropriate the private returns of education, the promotion of investments capable of reducing these restrictions should increase private investment in education. This increase could be entailed by higher private return rates in education, or by reduced credit restrictions, or even by reducing time discount rate concerning these families. As these problems more intensively reach the poor families, such investments would reduce poverty in the future.

On the other hand, as we could observe in the previous section, if social return rates are higher than the private ones, due to important positive externalities that could be appropriated by the society as a whole, the family's decision about the investment is not efficient, in the social light, thus justifying the state participation in this sector.

For all these reasons, the projects of investment in education are clearly eligible to be financed through debt conversion. Among these projects, are outstanding those capable of reducing credit restriction and the families' time discount rate, additionally to projects oriented to improve the quality of the public educational system, which embraces the children of families with lower income levels.

An important aspect that should be taken into consideration when selecting the projects to be financed through debt conversion is the interrelation among different projects of investment in education. For example, the improved quality of education is related to the improved educational infrastructure, better school premises, more comfortable chairs, modern equipment available to teachers and students, etc. However, it is also associated to the quality of teachers – and, therefore, to their academic background–, and to the quality of students, which depends on the time at school and their dedication to the studies. It means that there are important positive externalities among the different projects, leading their joint implementation to result in much higher social return rates than would their isolate implementation. In other words, it is important to have each specific project inserted into a coherent set of projects, with a given objective.

However, the governments of developing countries usually lack material and human resources to outline a set of interconnected projects. Within this context, UNESCO, due to its institutional relations with education institutions and the international academic community, and the results of the researches it develops, etc., could play an extremely important role in the assessment and definition – jointly with the country's government – of priorities and the projects to be implemented. For that, it would be important to find the causes why the families under-invest in education, and fight these causes. However, the government participation is crucial, because this is the only way of establishing an effective commitment by the local authorities towards the project.

To define a coherent set of projects, we should consider where and on what we should invest. First of all, recent empirical evidences have disclosed that improvements in the school infrastructure, as well as the long-term effects of pre-school programs,

such as reduced criminality, reduced dependence on welfare and income programs, tend to be more important for lower-income students (LANG (1993), CARD (1995) and DUFLO (1998)) than for the average students. On the other hand, the above mentioned empirical evidence reveals that the return rates of education and income are convex to the years of education, and the unbalance reduction demands the less educated individuals to have greater gains than the more educated ones. Therefore, if we intend to maximize the return rate of the investment to be made, and reduce the unbalances in income distribution in the society, the investments should be oriented to those families with shorter resources, i.e., to the poor families. In other words, the programs should focus on the poorest individuals.

If we add these empirical evidences to the main causes of the families' underinvestment in education, we could suggest a set of projects, complementary one another, towards increasing the private return rate of education, mainly for the poor ones, thus reducing the uneven income distribution. This set of projects could generate important externalities to be appropriated by the society as a whole. The projects eligible for financing through debt conversion would be those oriented to:

1. Improve the access to pre-school programs in the poor regions of the involved countries;
2. Reduce credit restriction and the time discount rate for poor families;
3. Improve the educational system's infrastructure in the poorest regions in the countries;
4. Improve the quality of teaching staff of schools at the poorest regions in the countries.

In more specific terms, priority should be placed on programs of construction, maintenance, management and administration of school buildings for pre-school and child education, combined with the financing to programs such as the *bolsa escola* (programs that pay the poor families to keep their children in the school system) – both for children and adolescents – capable of reducing the opportunity cost of the children's participation in the labor market, additionally to programs on income complementation for the teaching staff, requiring these teachers, in turn, to invest in improving their qualification. The orientation of projects to the poorest regions in the countries makes their focalization cheaper, besides reducing the possibility of resources leakage to ineligible audiences.

III.3. Efficacy and efficiency

The third aspect, which is very important, is how should be outlined the mechanisms capable of ensuring the effective and efficient employment of the conversion proceedings. In other words, to have the purposes effectively achieved, at the lowest cost. This issue concerns the incentives generated by the kind of contract to be signed between the organizations responsible for making the investments and the country government. The contracts theory has proved that this is not an easy task.

Ideally, the government should disburse the resources along the project implementation, directly bound to the results achieved, according to assessment criteria previously established in the contract. Here, the resources should be deposited in a fund and released as the project is implemented, and its performance assessed. This could be considered an additional advantage of the alternative conversion proposal, presented herein.

An important issue is who should be in charge of assessing the project performance. This assessment could be performed by a governmental organization, bound to the educational sector, or by an international organization, such as UNESCO. The advantage of assigning this assessment to an international organization is that this is a neutral organization, which is not directly involved in the process. This would lead to potentially more neutral results.

In this sense, a proposal would be to have the country government – based on its external, fiscal and monetary restrictions – defining the amount and the format of the debt conversion it intends to develop. Simultaneously, UNESCO – jointly with the government – would outline the set of projects eligible for financing through the debt conversion. Here, a crucial issue is to clearly define the expected results and assessment criteria, and if such results have been effectively achieved in the time established in the contract. The institutions interested in executing the projects would seek, in the financial market, the debt to be converted, and would submit their conversion proposal to the government.

Let us suppose, for instance, that priority is placed on the construction, maintenance, management and administration of a set of schools in a poor region in the country, on the payment of scholarships to students of families with *per capita* income lower than a given value, and the complementation of the teaching staff remuneration, bound to the accomplishment of given refreshing courses. Let us suppose that this project is planned to render services along 20 years.

The government, jointly with UNESCO, would prepare the draft contract, which would comprise the kind of school to be built (the architectural project), the equipment to be provided and the quality of maintenance and administrative services after the school is built. By binding the construction project to the maintenance and administration, one would establish an incentive for the investor to execute the construction project with the maximum quality and at lower costs, because it would reduce the maintenance cost along the school's useful life. Over the service period, i.e., after construction, there would be regular inspections to check for compliance with the quality hired.

As the binding of the construction project to the maintenance establishes incentives to make the investment at the lowest costs as possible, assigning to the investor the duty of implementing *bolsa escola* generates the incentive towards effectively allotting the resources to the groups of family targeted by the program. That would be

so because the leakage of resources to families with *per capita* income higher than the established threshold would increase the program cost to its executor. The same comment is valid to the training program to teaching staff. After evidenced that the educational services were provided in compliance with the quality standards set forth in the initial contract, the fund would then release the resources.

An important issue to be highlighted in the above-mentioned proposal is that it generates the right incentives for making the investments at the lowest costs possible, complying with the intended quality. That is so because the resources' release depends on the assessment of the quality of services rendered, and the incentive by the investor is to reach this quality at the lowest cost as possible. Therefore, the inspection-related costs, whether by the State or by any organization in charge of this duty, are reduced. In principle, any investment project could be assessed following this schedule, provided that the assessment criteria are clearly defined *a priori* and the penalties for in compliance with these criteria are clearly set forth in the conversion contracts.

IV. CONCLUSIONS

In this paper we show that there is a consensus in the specialized literature on what refers to the effects of the increase of education levels over people's individual income. Estimates carried out by different researchers disclosed private return rates of the investments in education ranging from 5% to 15 %, to each additional education year, in different countries. On the other hand, the relation between private return rates, as well as the personal income, and the education years are convex.

After considering matters related to the econometric specification and measurement errors concerning the variations in education years, the increases in education years of the population tend to originate expanded increase of the product in the countries analyzed. This suggests that the social return rate of the investment in education is positive. Particularly, some researches disclose social return rates of this investment three or four times higher than the private return rates found.

These high social return rates have correspondent costs to the individuals and countries with high rates of premature school dropout. We have disclosed that the private and social costs of premature school dropout are extremely high. On the other hand, recent researches show that the probability of risky behaviors, such as drug use, violence, etc., is substantially higher to youth less involved with school than to those very involved with school. This result suggests that education can have positive externalities to the society, which are not reflected in the private social rates, justifying the interference of the State to avoid the investments in human capital to stay below the optimal level, under the social point of view.

Based on those observations we can conclude that projects of investment in education are natural candidates to be financed by the debt conversion mechanism. However, debt conversion projects can have important side effects to the economy, because of the fiscal and monetary restrictions. As a result, the net effect of conversion can be negative, mainly to the poorest families, with weaker capacity of protecting themselves against the effects of situations of accelerated inflation rates and recessions. To avoid these effects, we suggest a strategy of conversion where, instead of anticipating the sum of the debt to be converted, the governments would issue the new debt and remunerate the investment by disbursing the interest resulting from these new papers.

The article analyzes the projects that should be selected to be financed through debt conversion. The basic criterion is to maximize the social return rate. Finally, we present a proposal on how the investment projects should be structured, in order to achieve the intended objectives at the lowest cost possible. In other words, to endow them with efficacy and efficiency.

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