Costing and Financing Education in LDCS: Current Issues

World Bank Staff Working Paper No. 216

May 1975

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Bank Staff Working Paper No. 216

May 1975

COSTING AND FINANCING EDUCATION IN LDCS: CURRENT ISSUES

This paper reviews two different issues of current concern to educational planners and policy-makers involved in the costing and financing of education.

The first one - presented by Mats Hultin in the first part of the paper - highlights the financial impossibility of continuing upward trends in educational costs. It does so by presenting the theoretical case of a country affected by the problems of rapidly rising enrollments and unit costs, increasing share of public expenditure claimed by education and government's inability to devise an alternative strategy acceptable to all segments of the population. The data base corresponds to typical situations of the developing world.

The second part of the paper - prepared by Jean-Pierre Jallade - digs into the issue of education and income distribution. It argues that, contrary to the views held by many social reformers, there is little chance that education per se is an adequate policy tool to achieve a more equitable distribution of income. The point is made that education may be conducive towards greater equity only if the policies concerning the pricing, financing and taxing of education are actually geared towards this goal. The conclusion of the paper stresses the importance of educational finance policies in a development strategy aiming at using education to promote equity.

Prepared by: Mats Hultin and
Jean-Pierre Jallade

Education Department
Central Projects Staff

COSTING AND FINANCING EDUCATION IN LDCS: CURRENT ISSUES

TABLE OF CONTENTS

I. The Costs of More and Better Education in Developing Countries[1/]

1. Problems in Quantity and Quality

Unesco, the World Bank, OECD and other agencies have analyzed the state of education in the developing world during the 1960's and early 70's.[2/] They have shown that a heavy demand for education had prompted a linear or even exponential expansion of the educational systems in many countries. But the expansion has taken place within a traditional framework. A system which was originally designed for a minority of the population - an elite - has been used to cater for the majority, and few serious attempts have been made to restructure it to meet a new situation. The result has often been increased class sizes, an increase in the number of unqualified teachers, and in the rates of dropouts and repeaters. Also quality of education remained low. The upshot was that despite the expansion of the educational system the number of illiterates in the world has increased and serious shortages of skilled manpower continue in critical areas.

The developing countries' education plans for the 1970's and 80's show that the authorities are generally aware of the deficiencies of their education systems - both in external productivity and internal efficiency. Remedies are suggested. Literacy campaigns and more primary education are sometimes proposed for the illiterate. Expansion of secondary and tertiary level education and easier access to them are being proposed to meet demands for skilled manpower. To increase the internal efficiency and the quality of the system, smaller classes, better teachers, increased supply of learning materials, and other ways to decrease the dropout and repeater rates are also proposed. The proposals may not be too costly if taken separately, but a combination of these proposals could be extremely expensive and detrimental to the country's economy.

This article intends to analyze the financial consequences of some educational reforms using a fictitious country as a model, that in terms of GNP, demography, school enrollment and teacher salaries, resembles a "typical" developing country.

1/ This paper is based on an idea originally developed by Mr. C. van Dijk at a lecture at the Economic Development Institute of the World Bank, Washington, D.C. The author is, however, solely responsible for the paper.

2/ See for example: International Bank for Reconstruction and Development, Education Sector Working Paper, Washington, D.C., September 1971 and December 1974. Unesco. International Commission on the Development of Education Report (Learning to Be) 1972.
Rockefeller-Ford Foundation, Education and Development Reconsidered, Conference Papers. Bellagio, Italy, 1972 and 1973.
International Bureau of Education, Educational Trends in 1970 Geneva, 1970.
OECD Conference on Policies for Educational Growth, Conference Papers, Paris, 1970.
Coombs, Philip H. The World Educational Crisis, Oxford University Press, 1968.

2. The 1974 Situation in Independencia

Independencia is a country of 5 million people, with 800,000 people in the primary education age group (6-11), 650,000 in the secondary education age group (12-17) and 370,000 in the tertiary education age group (18-21).1/ The school enrollment ratios are assumed to be 50% of the appropriate age group in primary education.2/ GNP in 1974 is the equivalent of US$500 rillion, or US$100 per capita.3/ Twenty four percent of the GNP are public revenues and 4% of the GNP4/are dedicated to public education (private education is considered negligible). The Ministry of Education is responsible for all education and training in the country and it absorbs consequently 18% of the public revenues.5/ The population growth is assumed to be 2.5% per year,6/the GNP growth 5.0% per year. The per capita growth would then be about 2.5% per year.7/

3. Independencia's 10-Year Plan, 1974-1983

Expansion. There are great social and political pressures in Independencia to eradicate illiteracy, and the government has therefore decided to increase school enrollment in primary education to 90% of the appropriate age group in 1983. There is also a serious shortage of skilled middle and high level manpower, and to meet increased manpower demands it is planned that the annual number of graduates from secondary and tertiary education will be increased from the low 9,000 and 1,000 respectively in 1974 to at least 30,000 and 5,000 respectively in 1983. This expansion will be achieved by the provision of additional student places in schools to be constructed, and by a decrease in the dropout rates.

Improvement. The 10-year plan places much emphasis on the improvement of the quality of education, and it is therefore planned to reduce class sizes in primary and secondary education, and to supply the secondary general technical and agricultural schools with more and better learning equipment. Since the quality aspects of the higher education system have been over-emphasized by the authorities in the past, the government does not propose any changes in student teacher ratios, in the quality of the teachers, or in the supply of learning materials in higher education. It will, however, try to reduce its high dropout rates to achieve a better internal efficiency.

1/ This corresponds to an average age group distribution in many developing countries (Unesco, Learning to Be, 1972).

2/ The ratios were 43%, 5% and 0.4% in a group of 23 developing countries with 168 million people in 1970 (World Bank Education Sector Working Paper, 1974).

3/ 29 developing countries had a GNP/capita of US$120 or less in 1973.

4/ Four percent correspond to the median percentage of 64 countries in World Bank comparative education indicators tables, 1974 (World Bank Education Sector Working Paper, 1974).

5/ This figure corresponds to the median for 64 countries in 1974 (World Bank Education Sector Paper, 1974).

6/ 2.5% corresponds to the average growth rate in the developing regions of the world during 1967-1974 (World Bank, Trends in Developing Countries, 1973).

7/ The average annual growth rate of GNP per capita was 2.2% in Africa and 2.5% in some major Asian countries in the 1960's. (World Bank, Trends in the Developing Countries, 1973).

4. Consequences of the 10-Year Education Plan

It is assumed that Independencia's population would increase at the same rate as the population of the developing regions of the world in general around 1970. The school age groups might increase by 2.8% per annum or by 32% during the next 10 years, while the total population would increase by 2.5% per annum or by 28% during the period. The school age group distribution and total population would be as shown in Table 1 below.

Table 1

School Age Populations

School Age Groups	1974	1983	Increase in %
6-11 years (primary)	800,000	1,050,000	+ 32%
11+ (primary school output level)	122,000	160,000	+ 32%
12-16 years (secondary)	650,000	850,000	+ 32%
17+ (secondary school output level)	102,000	135,000	+ 32%
18-21 years (tertiary)	370,000	490,000	+ 32%
21+ (tertiary school output level)	90,000	120,000	+ 32%
Independencia's total population	5,000,000	6,400,000	+ 28%

The manpower targets in secondary and tertiary education imply that the enrollment ratios at the appropriate examination levels have to increase from the current ratios of 8,5% and 1,1%1/ to 22,5% and 4,2% respectively in 1983.

The cumulative effects of the enrollment targets and quality increases on school output, teacher demand and recurrent costs in primary education are shown in Table 2 below.

1/ Compare Tables 3 and 4.

Table 2

Primary Education
Relative Effects in 1983 of Changes during 1974 - 83
on

	1974-1983	Total Enrollment	School Output	Teacher Demand	Recurrent Costs
School age population growth	2.8% p.a.	+1.32x	+1.32X	+1.32x	+1.32x
Income[1/] Growth/ cap.	2.5% p.a.				=1.28x
Enrollment ratio	50 % 90%	+1.8x		+1.8x	+1.8x
Enrollment ratio at output level[2/]	40 % 85%		+2.12x		
Student:teacher ratio[3/]	50:1 40:1			+1.25x	+1.25x
Teachers and administrators qualified[4/]	50 % 90%				+1.27x
Supply of materials as % of other recurrent costs	5 % 5%				+1.0x
Cumulative effects (rounded)		1.32x1.8 = 2.4x	1.32x 2.12 = 2.8x	1.32x 1.25 = 3.0x	1.32x1.28 x1.8x1.25x x1.27x1.0 = 4.8x

1/ Teachers' and other staff salaries are conservatively assumed to follow the GNP/ capita increases of 2.5% p.a., although in practice they tend to increase faster.

2/ The increase in the enrollment ratios of the output level would imply a reduction in the dropout rates from approximately 35% to 10%. (Mean values for dropout rates are 50% in Africa, 47% in Asia and 23% in Latin America, Unesco, 1972).

3/ Fourteen countries have ratios of about 50:1 or higher, although the average of the developing world is 36:1 (Unesco and World Bank statistics).

4/ Statistics about teacher qualifications are insufficient, but 50% unqualified teachers in expanding educational systems is not unusual. A figure of 90% should be considered appropriate and would allow for sufficient flexibility in planning and administration. A fully qualified teacher is assumed to have double the salary of the unqualified, which is a conservative assumption as the qualified often receives more.

We thus find that the total enrollment would increase by 2.4 times, the teacher demand by 3 times and the cost by almost 5 times in primary education during 10 years as a consequence of the increases in quality and enrollment ratios.

Secondary Education: The manpower targets will require that 22.5% of this age group at the secondary education output level be enrolled. This corresponds to an overall secondary education enrollment ratio of approximately 27% during the end of the period if no reduction in current dropout rates of 25% is assumed. As in primary education, the government aims at an improvement of school quality through better teachers and smaller classes. Furthermore, it is planning to increase the supply of didactic materials to the secondary schools. The relative effects of the government's reforms are shown in Table 3 below.

Table 3

Secondary General, Technical and Agricultural Education and Training
Relative Effects in 1983 of Changes During 1974-83 on

	1974-1983	Total Secondary Enrollment	Secondary School Output	Secondary Teacher Demand	Sec. Ed. Recurrent Costs
School age population growth 1/	2.8% p.a.	+1.32x	+1.32x	+1.32x	+1.32x
Secondary teachers' and other staff income growth 1/					+1.28x
Total secondary school enrollment ratio	10 % 27%	+2.7x		+2.7x	+2.7x
Enrollment ratio at output level	8.5% 22.5%		+2.7x		
Secondary school 2/ class size	36 27			+1.25x	+1.25x
Secondary teachers qualified 1/					+1.27x
Supply of materials as a % of other recurrent costs (mainly salaries)	5 % 15%				+1.10x
Cumulative effects (rounded)		+3.6x	+3.6x	+4.5x	+8.0x

1/ The same assumptions as in primary education.
2/ The secondary school class sizes would correspond to student-teacher ratios of approximately 25:1 and 20:1. (The mean student-teacher ratios is about 23:1 in 50 developing countries with World Bank Education Projects; the world ratio is 18:1).

The recurrent costs in secondary education will increase by 8 times and the teacher demand by 4.5 times because of the reforms and the school expansion.

Tertiary Education: The plan assumes that the increased output at this level will be achieved through a reduction in the dropout rates from 50% to 25% and through an automatic increase in the enrollment caused by the increased secondary school output without any radical change in the progression ratio between secondary and tertiary education. The target enrollment ratio at the output level of 4.2% corresponds to an overall enrollment ratio of about 4.9% in 1983. Changes in student - teacher ratios, teacher qualifications or in the allocation of funds for equipment and materials are not contemplated. The government considers also that there is no need of much quality increase in higher education. With the above assumptions we would arrive at the following relative effects in 1983 due to the changes during 1974-1983 (Table 4).

Table 4

Tertiary Education
Relative Effects in 1983 of Changes During 1974-83 or

	1974-1983	Total Enrollment	School Output	Teacher Demand	Recurrent Costs
School age population growth 1/	+2.8%	+1.32x	+1.32x	+1.32x	+1.32x
Teachers and other staff income growth 1/					+1.28x
Dropout rates	50% 25%				
Total tertiary education enrollment ratio	2.0% 4.9%	+2.5x		+2.5x	+2.5x
Enrollment ratio at output level	1.1% 4.2%		+3.8x		
Student - Teacher ratios 2/	10:1 10:1			+1.0	+1.0
Supply of materials as a % of other recurrent costs	25% 25%				+1.0
Cumulative effects (rounded)		+3.3x	+5.0x	+3.3x	+4.2x

1/ The same assumptions as in primary education.
2/ The means are 9:1 in Latin America, 12:1 in Africa and 14:1 in Asia as deducted from Unesco statistics (1972).

Because the government would refrain from any radical changes in student-teacher ratios, in the supply of didactic materials, etc., the cost per graduate student would decrease and the desired increase in output would be achieved at increased internal efficiency of the higher education system.

In summary, taking into account the development of all levels of education, Independencia would achieve the following school enrollments and annual school outputs in 1983 after a successful implementation of the 10-year education plan (Table 5).

Table 5

	1974	1983	Increase	For comparison: (Situation in 1974 in the developed world. Unesco-IBRD statistics)
Primary Education				
Enrollment:				(100%)
% of age group	50%	90%	+ 40	
In absolute numbers	400,000	950,000	+550,000	
Output:				
% of age group	40%	85%	+ 45	
In absolute numbers	49,000	135,000	+ 86,000	
Secondary general, technical and agricultural education and training				
Enrollment:				
% of age group	10%	27%	+ 17	(80-85%)
In absolute numbers	65,000	230,000	+165,000	
Output:				
% of age group	8.5%	22.5%	+ 14	
In absolute numbers	8,700	30,000	+ 21,300	
Tertiary education				
Enrollment:				
% of age group	2.0%	4.9%	+ 2.9	(25-30%)
In absolute numbers	7,500	24,000	+ 16,500	
Output:				
% of age group	1.1%	4.2%	+ 3	
In absolute numbers	1,000	5,000	+ 4,000	

These include quantiative and qualitative improvements. But the impact on recurrent costs are considerable.

5. The Recurrent Cost Implications

The increases in school output, teacher demand and recurrent costs of the suggested school reforms are summarized below. As a fraction of the data for 1974 the increases in 1983 would be as follows:

Table 6

	Relative Increase in School Output	Relative Increase in Teacher Demand	Relative Increase in Recurrent Costs
Primary Education	+2.8x	+3.0x	+4.8x
Secondary Education	+3.6x	+4.5x	+8.0x
Tertiary Education	+5.0x	+3.3x	+4.2x

We thus see that the primary education recurrent costs would increase by almost five times to achieve a threefold increase in output. In secondary education the situation is more serious. An output increase by four times (3.6) would be followed by an eight time increase in cost. Because of the particular assumptions the situation would be more favorable in higher education.

A closer study of primary education shows that the quality and salary increases would raise the cost by about 100% while the population and enrollment increases would be responsible for a cost rise of 140%. In secondary education the quality increase would raise the recurrent costs by about 125% while the quantitative increase would be responsible for 260%. (This figure includes enrollment increase due to the reduction in the dropouts and reflects therefore also partially a quality increase.)

We have analyzed relative increases in enrollment, teacher demand and costs so far. It is necessary to calculate the absolute costs, if we want to carry out analysis further and obtain more information about recurrent and capital costs of the suggested education expansion and improvement.

It was assumed that the student - teacher ratios in Independencia are 50:1, 25:1 and 10:1 in 1974 at the three levels of education. If we add a reasonable amount of school principals and other administrators and researchers Independencia would have (in 1974):

8,800 staff in primary education (of which 4,000 unqualified)
2,900 staff in secondary education (of which 1,300 unqualified)
900 staff in tertiary education.

Given the prevailing salary rates in poor developing countries it is reasonable to assume the following salaries:

a qualified primary teacher	US$ 1,200 p.a.
an unqualified primary teacher	600 p.a.
a qualified secondary teacher	2,300 p.a.
an unqualified secondary teacher	1,150 p.a.
a qualified tertiary teacher	5,000 p.a.

We assume furthermore that local administrative costs, materials and maintenance add approximately 5%, 15% and 30% to the costs of the staff of respective levels.

With above assumption the recurrent costs in 1974 would be:

(a)	Primary education	US$ 8.6 million equivalent
(b)	Secondary education	6.0 million equivalent
(c)	Tertiary education	5.9 million equivalent
		US$20.5 million equivalent
	Central Admin. Costs	US$ 1.5 million equivalent
	Grand Total	US$22.0 million equivalent

Primary education will thus absorb 45% of total costs, secondary education 30% and tertiary education 25% which is close to actual percentages in many countries. The US$22.0 million comprise 18% of public expenditures or 4% of GNP.

If we use the cumulative figures in Tables 2, 3 and 4 we obtain the following recurrent education costs for 1983. (We assume that non-teaching recurrent costs would increase at the same rate as the teaching costs.)

Primary education	4.8x8.6 US$ Mill. =	US$ 41 Mill. equivalent
Secondary education	8.0x6.0 US$ Mill. =	48 Mill. equivalent
Tertiary education	4.2x5.9 US$ Mill. =	25 Mill. equivalent
Total		US$114 Mill. equivalent
Central Administration	5 x1.5 US$ Mill.	US$7.5 Mill. equivalent
Grand Total (rounded)		US$122 Mill. equivalent

The total recurrent costs in 1983 of the reformed and expanded education system would thus be US$122 million equivalent or almost 6 times as much as 10 years earlier.

From 1974 to 1983 the recurrent cost of education in Independencia would increase from US$22 million to US$122 million equivalent or by 18% per annum, while in the 1960's the spending on education on a world wide basis increased by 10 - 12% per annum with a school enrollment increase of 4 - 5% per annum (Unesco, Learning to Be, 1972). The apparently reasonable expansions and reforms would thus lead to greater than expected expenditures. Without an elasticity in the public revenues considerably above unity the government would continue to receive 24% of the GNP in public revenues and, therefore, it is very questionable if it would be able to finance the recurrent costs of the education plans despite expected increases in the GNP. Table 7 illustrates the situation.

Table 7

	1974	1983
GNP	US$ 500 Mill.	US$ 880 Mill.
GNP/capital	100 Mill.	138 Mill.
Public Revenues	120 Mill.	210 Mill.
Public Revenues as a % of GNP	24%	24%
Education Recurrent Costs	US$ 22 Mill.	US$ 122 Mill.
Education Recurrent Costs as a % of Public Revenues	18%	58%
Education Recurrent Costs as a % of GNP	4%	14%

The recurrent cost implications of the proposed plan are in fact so considerable that increased taxation would hardly help. With few exceptions almost no country is allocating more than about 8% of its GNP on education. It is doubtuful if other priorities of a developing country such as agriculture, industry, communication, health, will receive enough funds if education receives more than, say, 30% of the public revenues. The financial situation would become still more severe when the capital costs necessary to implement the plan are added to above recurrent costs as shown below.

6. The Capital Cost Implication

It is more difficult to estimate the capital needs caused by the proposed changes of Independencia's education system because information on building costs in developing countries are scarce and unreliable. The building costs of internationally financed education projects (which are known) are generally higher than national averages; a rough estimate is however presented in the following. Both, expansion and improvement will require capital. This is obvious regarding expansion, but is also true for the improvement. The reduction in student-teacher ratios and class sizes will increase the demand for new classrooms, laboratories and workshops and it is furthermore assumed that the schools will receive additional learning materials.

Table 5 shows that about 550,000 new places would be needed in primary education, 165,000 in secondary education and 16,500 in tertiary education during the period 1974-1983. An expected annual demand (for replacement and expansion) of 1700 new primary teachers and 1100 new secondary and tertiary teachers would be included in above new places. The replacement of old buildings could be, more or less, offset by the reduction in dropout rates. The government expects to construct primary schools including equipment and furniture for US$100 equivalent, secondary schools for US$600 equivalent and simple tertiary institutions for US$800 equivalent per student place.[1/] The government's estimates are low and might be too optimistic but lead nevertheless to a very large capital outlay.

1/ A study of unit costs in World Bank financed projects shows that the unit costs of the lowest deciles for general secondary education was about US$300; for vocational education US$800; and for general post secondary education and teacher training US$550 (1970 prices). The primary education cost is close to some African self help estimates.

The absolute minimum capital cost to implement the educational plan might be:

Primary education	US $ 55 Mill. equivalent
Secondary education	100 Mill. equivalent
Tertiary education	13 Mill. equivalent
Expansion of central administration	1 Mill. equivalent
Total	US $169 Mill. equivalent

Independencia is a poor country and it expects to obtain the capital through soft loans. It is nonetheless conceivable that the government would require, say, US$ 8 Million equivalent in 1983 for the governments' own share in the education financing and for amortization and interests. This would consitute about 1% of the GNP and 4% of the Public Revenues in 1983 to be added to the recurrent costs previously calculated.

7. Conclusions

The hypothetical Independencia is in many respects typical of a number of developing countries. The demographical, educational and financial data which have been used represent means and averages from the developing world. Its educational system needs expansion and improvement to allow for a necessary socio-economic development. The government has consequently suggested a number of measures of the type we traditionally have encountered in developed and in developing countries alike to achieve the desired development.

The quantitative and qualitative targets suggested in Independencia's 10 year education plan are modest by standards of the developed countries. There would still be great gaps and deficiencies in the education system, and a large portion of the population would remain illiterate. The targets in terms of financing are fairly modest, but their cumulative effect would be substantial, even with the fact of reduced unit costs in higher education.

This education plan could place a heavy burden on Independencia's economy despite an increase of the GNP by 76% and of the GNP/capita of 38%. The aggregate recurrent and capital education costs would amount to 15% of the GNP and to 62% of the public revenues at the end of the period. The latter percentage assumes that 24% of GNP would continue to be public revenues. It is not economically feasible, and politically possible to give such a high priority to education in any country, be it rich or poor.

"Average" plans such as the one described here are common among developing countries, but they are seldom viable in financial terms. Developing countries will have to find other ways to meet the society's need for education and manpower. The current interest in basic education and in nonformal adult education should be seen in this context. Let us hope that new types of education and training will be able to meet the demands at a price that poor countries can afford. The additional financial constraints because of the energy crisis make a search for less expensive education mandatory.

II. Education Finance and Income Distribution

1. Introduction

The belief that the development of education has a beneficial effect on the distribution of income has always been widespread among both laymen and scholars. This optimism is now being shattered by the works of many scholars, and in some circles, disenchantment with education as a privileged policy tool to achieve more progressive societies is already as great as expectations once were. The extent to which such disenchantment has already reached policy-makers - especially those living and working in less developed countries - is not clear however. One would rather say that believers in education are still numerous, even if the need for drastic changes is sometimes acknowledged.

This paper argues that the ability of education *per se* to achieve a more equitable distribution of income is unwarranted, but that investment in educational services *could* have such a positive effect were the pricing, financing and taxing of such services appropriately designed to meet this objective.

2. The Education-Income Connection[1/]

Part of the present disarray about the possible ability of education to achieve a more equitable distribution of income has to do with the confusion of two neighboring issues, namely, (i) the relationship of education and income, and (ii) the influence of changes in the distribution of education on income inequality. The fact that education provides individuals with extra earning-power and enables them to move up in the social ladder is not denied by anybody, although the numerous earning functions computed around the world have, so far, failed to give an undisputed picture of the influence of education on individual incomes. Controversies over the respective importance of socio-economic background, native ability and education in the process of determining incomes will be with us for some time to come as progress is made in the specification of those variables, in the treatment of measurement problems and in the elaboration of adequate econometric models.[2/] In this connection, the recent work by Jencks, et.al.,[3/] points, however, toward a pessimistic conclusion, namely, that the effect of education on income is, in any case, marginal, which means that income inequality cannot be greatly affected by changes in the distribution of education. Furthermore, the likelihood that the respective influences of education and of other variables on incomes probably vary according to the time period under consideration, levels of education, socio-economic groups, ability, economic environment, etc., does not simplify the problem. In other words, the ability of these variables to "explain" individual incomes is not necessarily constant.

1/ Bhalla, Surjit., "The Education-Income Connection: An Investigative Report", Research Program in Economic Development, Woodrow Wilson School, Discussion Paper No. 40, October 1973, Princeton University.

2/ Bowles, Samuel, "Schooling and Inequality from Generation to Generation", *Journal of Political Economy*, Volume 8, Number 3, Part II, May/June 1972.

3/ Jencks, C., et.al., *Inequality: A Reassessment of the Effect of Family and Schooling in America*, New York, Basic Books, 1972.

Whatever the exact effect of education on incomes, the dead-end reached by Jencks and his colleagues is an invitation to take a broader view of the problem. Among other things, it is important to remember that an inequitable distribution of income may coexist with a fair amount of social mobility within a given social structure. First, upward mobility for some may be counteracted by downward mobility for others. Second, it can also be part of a general rise in incomes which may be larger in absolute value for the already rich than for the poor. And third, individual social promotion is something quite different from group mobility; only the latter entails drastic change in income inequality.

Socio-economic groups may attempt to effectively use the education system as an instrument of group mobility. In many developing countries, the middle class is engaged in such a process as witnessed by the importance granted by this social group to university education. This interest is reflected on the social composition of the student body and the emergence of what could be called a "middle-class university" in countries having a still small middle class. Whether such ventures will, in the long run, result in a more equitable distribution of income, is still an open question.

The inescapable, but sometimes overlooked, starting point for a discussion of education and income distribution is the existing income inequality. The fact that unequal incomes lead to unequal consumptions of educational services, is a truism grounded in the well-known, above unity, income elasticities of family spending on education. Whether these elasticities mean more education or a different (better?) kind of education for upper-income than for lower-income groups, is certainly a debatable point which depends on the particular situation under consideration.

In the same way, one could argue that unequal incomes result in unequal savings and investments. Whether such investments are in real estate or education makes little difference. Given the smaller size of the investment made by the poor as compared to the rich, there is a priori no reason why educational expansion should lead to an improved distribution of income, rather the contrary. It could be the case, however, if unequal investments in education were offset by unequal rates-of-return on these investments. Thus, any analysis of the impact of educational development on income distribution must address itself to two separate questions: first, to what extent educational development lead towards a reduction in the inequality of schooling? And second, are the poor likely to compensate for their lower-than-the-rich educational investment through higher rates-of-return on their investments?

The first point is very often taken for granted as the generalization of compulsory education, together with the diversification of educational opportunities are designed to benefit the poor in the first place rather than the rich. In this regard, it is probably correct to conclude that educational development leads, in most cases, to a better distribution of education, provided that it is measured in years of schooling. Such a measure is, however, a poor proxy for the distribution of education investment as it focuses exclusively on formal schooling and gives the same value to all years of schooling. Formal education is a "finite" good; approximately 18 years can be considered as a maximum. Obviously, as the poor increase their participation in elementary education and the rich face a ceiling, the distribution of education is bound

to improve. But this overlooks the "option value" of each year of formal education for out-of-school educational opportunities. Should this "option value" increase with the level of formal schooling, the distribution of out-of-school education might offset the progress made in the distribution of formal schooling.

Apart from non-formal education, investment in formal education is not adequately assessed by years of schooling. This measure fails to take into account both the different quality and costs of each year of schooling. While the debate over the quality of the education received by the rich versus that of the poor has not yet been fully documented at least in developing countries, there is plenty of evidence that the costs of a year of schooling increase, sometimes drastically, with the level of education. In some developing countries, the costs of one year of higher education may be fifty times as high as the costs of one year of primary education. In order for the poor to offset one year of investment in higher education made by the rich, they should invest in fifty years of primary education. Thus, it is far from obvious that educational development should, necessarily, pave the way for a better distribution of education investments.

Do the poor tend to get a higher rate-of-return on their investment in education than the rich? Although the question has seldom been raised, at least in this form, in the literature, there exists little evidence to substantiate a positive answer. The case for primary education - which is made on the basis that rates-of-return at this level of education are higher than at other levels of education - can be an argument insofar as primary education is the education of the poor. But this argument is of dubious value from the point of view of income inequality because even a high return to a small investment - such as investment in primary education - may still be lower in absolute values[1] than a small return to a big investment in, say, secondary or higher education. The simple fact that the various levels of education are not independent from each other but present a continuum, according to which one should invest in primary education before investing in secondary education, appears to guarantee that the absolute returns to the higher levels of education "include", in a certain way, the returns to primary education and are therefore always superior to them.[2] In other words, the fact that there is some kind of a law of diminishing returns to investment in education is hardly a convincing argument in favor of an improved distribution of income.

The effectiveness of high rates-of-return to primary education as a policy tool to bridge the income gap between the poor and the rich is dubious for another reason. In most developing countries, these rates are based on samples which are not representative of the whole population eligible for primary education. The male-urban-modern sector bias is inescapable in countries where educational opportunities for females and in the rural/traditional sector of the economy are limited. Of course, this is even truer for older age groups

1/ Absolute changes in income are actually what matters from the point of view of income inequality.

2/ Except in the case where the rate-of-return to higher levels of education is zero or negative.

than for younger ones. In any case, one can certainly wonder whether these high rates will be repeated when the so far disadvantaged groups gain access to education.

According to traditional human capital theory, rates-of-return to education are not affected by changes in the supply of educated manpower because the elasticity of substitution between different types of educated labor is infinite and consequently, keep relative earnings from falling. Such an extreme assumption is, indeed, hardly plausible in the real world. The rate-of-return to education may also be prevented from falling as the supply of skilled manpower increases, if there is a strong complementarity between educated labor and capital intensity in production.1/ Both the nature of the technology and the rate of growth of the economy could generate a demand for skilled manpower which would keep pace with increased supply, thus maintaining relative wage levels. Such situations are certainly plausible as long as they are restricted both in time and space. But one can hardly expect them to become a general rule for all economies at all times.

The case for falling rates-of-return to education as the supply of educated manpower increases has been made by various authors.2/ It rests on the fact that the ability of education to determine income tends to weaken as education becomes more and more widespread. As a corollary, the influence of other factors than education on earnings such as ability and socio-economic background, tends to increase. The first point will be intituitively clear to all those who consider that the education system is nothing but a screening device to sort out those few people who will get the high-paid jobs. Obviously, the "democratization" of a given level of education means that no screening process is any longer carried out by this particular level and that factors other than education must explain incomes.

Although there is no agreement yet about which factors are becoming important in the determination of earnings as the influence of education is decreasing, it is likely that the "employment" factor will become more and more important. The variable "weeks worked" explains almost half of the variation in income distribution observed by Chiswick and Mincer in the United States since 1939.3/ According to Thurow and Lucas,4/ the workers facing a relatively rigid job distribution in the economy are ranked along a "labor queue"

1/ Dasgupta Asim K., "Income Distribution, Education and Capital Accumulation", IBRD, January 1974, Draft.

2/ See, among others, Carnoy, Martin, "Class Analysis and Investment in Human Resources: A Dynamic Model", The Review of Radical Political Economics, Volume 3, No. 4, Fall 1971; and "Schooling, Income, The Distribution of Income and Unemployment: A Critical Appraisal", CD/EDS (73)", OECD, 1973 (mimeographed).

3/ Chiswick, Barry R. and Mincer Jacob, "Time-Series Changes in Personal Income Inequality in the United States from 1939, with Projections to 1985", Journal of Political Economy, Volume 80, Number 3, Part II, May/June 1972.

4/ Thurow, Lester C. and Lucas, Robert E.B., "The American Distribution of Income: A Structural Problem", Joint Economic Committee, Congress of the United States, U.S. Government Printing Office, March 1972.

according to decreasing training costs and other characteristics such as age, sex, and color. This concept points out to the importance of the "access to jobs" factor in determining incomes. In developing countries the tendency to "overqualify" educationally is usually interpreted as an insurance against prospective unemployment as the supply of educated manpower exceeds the number of job opportunities.

To sum up, the strategy which consists in allowing the poor to invest in education more than they have done in the past in order to improve the distribution of income, may be frustrated by the inability of the late comers to reap a sufficiently high return to their investment in education. In other words, progress towards income equality requires not only to allow the poor to invest in education, but to allow them to do so before everyone else has made a similar investment.

Our starting point was that, in a context of income inequality at the start, investments - whether in education or in anything else - may contribute to lift the incomes of the poor more than those of the rich only if the former invests more and/or gets higher returns to their investments than the latter. We have just seen that it is very unlikely that these two conditions be fulfilled. There is, however, a big difference between education and other investments such as, say, real estate. And that is the way these investments are financed, as public financing has traditionally supplemented private financing in the case of education. From the policy point of view, the relevant question is not so much whether education contributes to the increase or decrease of inequalities but whether government involvement in the financing and taxing of education endorses or counteracts the impact of education on these income inequalities. The matter can be analyzed at two different stages, namely, when education is provided, and when its returns accrue to the educated individuals.

3. The Provision of Education and the Distribution of Income

The financing of educational services through a mix of public and private funds is common practice all over the world. The case for government involvement in the provision of education is usually made on two grounds: economic efficiency and social equity. To be specific, the presence of externalities calls for some form of public subsidization of education in order to avoid underinvestment in education. This "modern" justification reenforces the traditional but still valid concern for social equity according to which the limited ability to pay of the poor should not prevent them to consume or invest in education just as much as the rich.

In most countries, the subsidization of education is governed by a general and simple rule which states that everyone is equally entitled to the same amount of public subsidy for a given amount or type of education. In other words, education is subsidized, and, therefore, priced regardless of incomes. This is true for free public education and for fee-paying education as long as fees do not cover the total costs. Needless to say this pattern of subsidization is at best "neutral" as far as income inequality is concerned. In fact, it has probably an adverse effect on the

distribution of income because the rich tend to remain longer in the education system than the poor as the financial and other obstacles to the latter's enrollments are never completely removed.

To put it bluntly, equal education subsidies in a world of unequal incomes cannot plausibly contribute to improve the distribution of income. In order to overcome the better ability-to-pay of some as compared to others, public subsidies should be inversely related to incomes. One could easily imagine a continuous pattern of subsidization going from total subsidization - tuition-free education plus a grant equivalent to foregone earnings - for the poorest stratum to zero subsidization for the richest stratum who would thus pay for the full costs of education.

As the above proposal has never been experimented, it is hard to foresee its impact on other major parameters such as the demand for education, the quality of education and the internal and external efficiencies of education systems. There exists two important situations, however, in which education is subsidized and, therefore, priced differently for the poor and the rich, two cases the examination of which should yield useful clues about what would happen if subsidies were inversely related to incomes. The first situation refers to the coexistence of public and private education and the second one to student aid policies.

First, a fully subsidized public education sector coexists with a not-so-heavily subsidized private education sector in many countries. Whenever western traditions previal, it is fair to assert that, on the whole, public schools, which, thanks to public subsidies, charge no or very small fees, tend to recruit a student body whose social composition is biased in favor of low income groups. Conversely, little subsidized, expensive private schools tend to cater to the needs of high income groups. Though the validity of such a dichotomy can certainly be questioned in some countries,[1/] it gives rise to a more equitable system of education finance as public subsidies decrease when incomes rise.

In spite of its apparent beneficial effect on income inequalities, the gradual "privatization" of education services as incomes rise has always faced fierce opposition from many policy-makers. The argument - which is not an anachronic remnant of education finance history as some would like to think - runs as follows: It is acknowledged that the gradual removal of public subsidies to the education of middle and high income groups would make the

1/ Two important exceptions are worth noting: in some Asian countries, Japan, for instance, the prestigious, elitist sector is the publicly subsidized sector. From the income distribution point of view, this amounts to the worst of all possible worlds. In many African countries, self-help education is sometimes advocated for the rural poor. Insofar as this means a form of education wholly or partially financed by those who attend it, this is hardly a satisfactory situation from the distributive view point as the education of the better-off urban middle classes is - sometimes heavily - subsidized by the government.

provision of education much more equitable than a system of equal subsidies to all. But it is feared that, as soon as the full cost - or something sufficiently close to it - of educational services will be charged to some groups, incentives to acquire the most common type of education will disappear altogether. Investors in education will gather together according to their ability-to-pay and foster a differentiation of the educational product as those with the highest purchasing-power will be looking for the "best" service and those with a lower purchasing-power will go for cheaper education. To the extent that the returns to different quality of education may vary, the "privatization" of education may serve to maintain, if not foster, long-term income disparities, especially if the size of the returns to education is positively associated with the importance of the private finance component in educational costs. In this case, the search for equity in the provision of education through an income-related pricing system might run against long-term equity.

Why should private education yield higher returns than public education? Although there is, admittedly, little evidence available to support this assertion, one must wonder how the opposite assertion can be true. When investors in education are faced with widely different private costs for the "same" investment - such as, say, a degree in engineering or a high school diploma - they all should go for the cheapest alternative and private schools should have priced themselves out of the market long ago. This is not what is happening in many countries and the only way to explain the economic behavior of the clientele of private schools is to assume that the higher costs of private education are offset by its expected higher returns.

The extent to which the rate-of-return to private education is at least identical or perhaps higher than the rate-of-return to public education because of the differences in both the costs and the benefits of the two kinds of education is impossible to document at this stage as rates-of-return calculations have, so far, never been carried out simultaneously and comparatively for public and private education. Although the situation probably differs from country to country, it is not reasonable to assume from an economic standpoint that those who seek and gain access to fee-paying schools in spite of sometimes fierce competition and dire financial strain, do so only to match the rate-of-return which they could get from an equivalent education in a tuition-free school. In some developing countries, the suspicion that the returns to private education do more than simply offset its higher costs is founded on the above average ability of private schools to prepare students to gain access to the upper levels of the education system. In those cases, private education does contribute to foster future income inequalities. As such, it can hardly be considered as an acceptable policy tool to promote equity in the provision of education.

Student aid policies are often singled out as a second, promising policy tool to bring fairness and equity in the provision of education. In many countries, they are being used to introduce some progressivity in the pricing of education, especially when they seek to increase the level of subsidization of low-income students. Unfortunately, such policies are a one-tail affair as they have seldom resulted in a decrease of government subsidization for high-income students. This is, however, the ambition of the often made proposal

which consists in charging the full-cost of education on students and making loans available to students with limited ability-to-pay. On redistributive grounds, this proposal is subjected to the same two criticisms already meantioned: First, it does not scale subsidies inversely to income but merely provide low-income students with an ability to invest in education similar to that of high-income students. Second, the full "privatization" of education implied in the proposal would trigger a differentiation of the quality of education purchased by communities homogenous with respect to income and tastes for education, thus preparing the ground for future inequalities in life income streams.

To sum up, neither the coexistence of public and private education nor student aid policies come effectively to grip with the objective of an equitable pattern of subsidization for education. In both cases, apparent progress towards more equity in the provision of education are made at the cost of generating long-term income inequalities. The urgency of a breakthrough in this area is nevertheless pressing as the system of equal subsidization for all may lead to income transfers from the poor to the rich through the tax system. In some countries, the rich may claim that they pay for the education of their children via taxation when the tax system is sufficiently progressive. But this is far from being the case everywhere especially in the developing world where progressive direct taxation is a much less important source of revenue than indirect taxation.

The extent to which an adverse redistribution of income via taxation takes place depends on the shapes of the distributions of both education subsidies and tax payments across income groups. If the rich who receive more subsidies contribute to finance those subsidies by their taxes, a pattern of subsidization unrelated to income is not necessarily the sign that an adverse redistribution of income takes place since, from the distributive point of view, it makes no difference if education is paid for through a "direct" price or a "tax" price. In developing countries where educational participation is very unequal, the distribution of education subsidies may be very much biased in favor of high income groups and the whole tax system has to be very progressive if subsidized education is not to become a vehicle to transfer incomes from the poor to the rich.

Here again, the situation varies from country to country. In Colombia, for instance, it was shown that government involvement in the provision of education contributes to redistribute income from the rich to the poor. When each level of education is examined separately, only the public financing of primary education has a strong and positive redistributive effect on income. This effect is partially but not wholly offset by the adverse effect of the public financing of secondary and higher education on income distribution, and this, in spite of the importance of little subsidized, private education among middle and high income groups.1/

1/ Jallade, Jean-Pierre, "Public Expenditures on Education and Income Distribution in Colombia", World Bank Occasional Paper No. 18, The Johns Hopkins Press, 1974.

Whether or not the Colombian case is "typical" of many other developing countries is an open question. It is clear, however, that any policy aiming at making a system of finance more equitable may act on either the structure of subsidies or the structure of taxation. One way to make sure that education subsidies benefit the poor more than the rich is to foster a private, little subsidized education sector in which the rich can enroll their children. Thus, the rich will receive little subsidy while they are still paying taxes. This is, to a certain extent, the course followed by Colombia. As it was suggested earlier, the presence of a strong, private education sector may help to achieve equity in the provision of education, but it may also preserve and, possibly, exaggerate inequalities of economic opportunities in the future. It is very likely that students having favorable socio-economic backgrounds and enrolled in private schools will receive a "better" education than students in public schools or, at least, an education with a "better", distinctive, label with the resulting effect that these students' subsequent economic opportunities may be systematically brighter than those of students coming from public schools. In other words, while private education may be the vehicle to achieve present equity in the provision of education, it may also turn out to be socially and economically divisive in the future.

Another way to introduce more equity in the financing of education is to increase the progressivity of the tax system. In a country like Colombia, a special tax earmarked for the financing of secondary and higher education would contribute to remove the adverse effects of the public subsidization of those levels of education on the distribution of income, provided that the progressivity of such a tax be stronger than that of the existing tax system.[1] The objective of such a tax would be to make sure that the rich will be at least paying for the subsidies which they receive. Of course, the tax rates corresponding to the various income groups could be manipulated in order to achieve any degree of income redistribution. Their gradual decrease could be geared to the gradual equalization of education subsidies across income groups as low-income groups gain access to the higher levels of education, without altering the rest of the tax system.

A more progressive taxation would remove the most blatant income transfers from poor to rich resulting from the public subsidization of education. By maintaining a certain level of subsidization for the rich, it would contribute to keep them in the system. Of course, nothing would preclude the introduction of a progressive element in the structure of subsidies at the lower end of the income scale. Providing the poor with additional financial incentives - that is, "going further" than tuition-free education - to enroll in the higher levels of the education system would, in the long run, contribute to alter the distribution of education subsidies in the right direction.

1/ Jallade, Jean-Pierre, ibid, page 70.

4. The Long-Term Impact of Public Investment in Education on Income Distribution

It was shown in the preceding section that investment in education may have an equalizing effect on the distribution of income provided public involvement in the provision of education is designed in such a way that access to this form of investment is made easier for the poor than for the rich. Another way to redistribute incomes positively in the long run is to make sure that the private rate of return to education is lower for the rich than for the poor. This can be achieved by taxing the returns to education in a progressive manner.

Taxes levied on the returns to education may be interpreted as a way for the government to get back (part of) the money spent in subsidizing access to educational investment. In other words, the "net" taxpayers outlays for education are equal to the total public subsidy received to reach a level of educational attainment minus the taxes paid on the returns to this education by the educated people during their entire lifetime. From the viewpoint of income distribution, it is essential to assess how the various socio-economic groups in a given society fare with regard to both the subsidization of educational investment and the taxation of the returns to this investment.

In spite of the interest of human capitalists for the issue of income distribution, there is nothing in the existing literature to illustrate this approach. In this respect, traditional rates-of-return calculations suffer from two shortcomings: first, they are usually carried out at an aggregate level in order to compare average rates-of-return across education cycles. As a result, the differences recorded between the private and social rates-of-return - which, according to the definitions currently accepted by human capitalists, reflect the "net" subsidization of educational services - are averages too and fail to provide any clue about the resulting impact on income inequality. What is needed from this last viewpoint is a disaggregate approach in order to compare the subsidies accruing to and the taxes paid by the various socio-economic groups for each level of education.

A second - and perhaps more basic - shortcoming of rate-of-return calculation has to do with the fact that they focus exclusively on the persons who invest in education, thus neglecting those who are out of the educational system. In other words, it is an "allocative" approach which concentrates on the costs incurred by and the returns accruing to educated individuals, while what is needed is a "redistributive" approach focussing on the relative positions of the various socio-economic groups as a whole - including both those who invest and those who do not invest in education - vis-a-vis public subsidization and taxation of education investment.

An example of the contradictory results yielded by the two approaches is given by a comparison of the situation of males and females vis-a-vis investment in education. As female education entails roughly the same public subsidies as male education and females receive lower earnings and, therefore, pay lower taxes than males, the "net" public outlay for each educated woman

is thus higher than for each educated man. This is a rather baffling conclusion which implies that government involvement in the financing of education is a vehicle for discriminating against men and possibly, that less taxpayers money should go for support of female education.

On the contrary, the "redistributive" approach advocated in this paper may lead to an opposite conclusion whereby the total "net" subsidies reaped by males as a group are equal or higher than those which accrue to females as the number of educated males is usually higher than the number of educated females. To be sure, the impact of government involvement in the financing and taxing of education on the distribution of income ought to be assessed by relating the per capita "net" subsidy reaped by each educated individual to the ratio of educated people over the eligible population within each group.

Such an analysis can be carried out with any socio-economic groupings. In developing countries, the most significant breakdowns may be according to sex, place of residence (urban/rural), duration of residence (migrants/non-migrants), ethnics, social status (manual/non-manual) and the like. Any combination of these criteria would lead to a number of socio-economic groups whose investment in education is subsidized and taxed by the government in a different way, thus resulting in different impacts on incomes.

As already mentioned, the size of the "net" per capita subsidy is a function of the subsidy received to reach a given level of education and of the taxes paid on the returns to this investment. As the former has already been discussed in the previous section, only the latter will be discussed here. Obviously, since the purpose of a tax on the incomes of educated individuals is to alter the returns to education of the various socio-economic groups in order to affect the distribution of income among them, the amount of tax payments has to be in some way positively related to the amount of per capita subsidy received to reach a given level of education and/or to the enrollment ratios in each group. The degree of progressivity in tax payments may, of course, vary according to the amount of income redistribution sought for.

Progressive taxation of the returns to education could be mostly simply achieved by adding or removing a few percentage points to the existing income tax rates of educated individuals in each socio-economic group. Admittedly, this is not a conceptually perfect solution as the tax base would be absolute incomes instead of, as it should be, that particular fraction of additional incomes which is due to additional schooling. However, the advantages of coupling the "education tax" with the income tax would be important from the operational viewpoint. In addition to administrative simplicity, such a tax would probably be more easily accepted if it takes the form of a few additional points in the income tax rate structure without a change in the tax base than that of a new set of necessarily substantial tax rates applied to a small tax base, namely, additional incomes due to additional schooling. No overhauling of the existing tax system would be necessary and the new rates would be kept flexible in order to take into account changes in the subsidies received by each group.

5. Conclusions

The argument presented in this paper can be summed up in a set of three straightforward propositions. First, contrary to the often expressed belief of many social reformers, there is no reason why education *per se* should be viewed as an equalizing force in our societies. To put it another way, investment in education should be considered just like any other form of investment. In a context of income inequality, access to this form of investment is positively associated with family income, thus resulting in an adverse effect on the distribution of income.

Second, investment in education differs from other forms of investment in the way it is financed. Public involvement in the provision of educational services is - or should be - used as a vehicle to counter the disequalizing force resulting from existing income inequality. A policy of direct, progressive pricing according to which the level of subsidization decreases as income rises may be more equitable in the short-term but is likely to foster life-long income inequalities in the future. The only way to bring more equity on the provision of education while avoiding the harmful effects of its gradual "privatization", is to accentuate the progressive character of the tax system.

Third, education will contribute to promote greater income equality if the returns to education investment accruing to educated individuals are taxed in a progressive manner. One way of achieving this is to make sure that the "net" public subsidies accruing to the various income groups - as assessed by the *per capita* subsidy received to reach a given level of education, the taxes paid on the returns to this education and the enrollment ratio - are inversely related to incomes.

Nothing has so far been said about the political feasibility of these proposals. Apart from the pretty obvious statement that such feasibility will vary greatly across countries and, perhaps, across levels of education within a single country, a possibly good test of the government willingness to proceed with these proposals and of their likely acceptance by the public is provided by the financing of other public goods in the country. If the financing of such goods as health care, public transportation, subsidized housing, is designed in such a way that its impact on the distribution of income goes in the right direction, the case for a progressive system of education finance should be easy to make. If the opposite situation prevails, the chances of education being singled out among other semi-public goods to receive a distinctive treatment are weak.