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DETERMINANTS OF YEARS OF SCHOOLING IN INDIVIDUALS: A STUDY IN FOUR LATIN AMERICAN CITIES

City University of New York PH.D. 1980

DETERMINANTS OF YEARS OF SCHOOLING IN INDIVIDUALS: A STUDY IN FOUR LATIN AMERICAN CITIES

by

JORGE A. SANGUINETTY

A dissertation submitted to the Graduate Faculty in Economics in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1980

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Abstract

DETERMINANTS OF YEARS OF SCHOOLING IN INDIVIDUALS:

A STUDY IN FOUR LATIN AMERICAN CITIES

by

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Advisers: Professors Elliot Zupnik, Michael Grossman and Daomar Gujarati

Low overall levels of education, as measured by years of formal schooling, in Latin America, are usually attributed to insufficiencies on the supply side. Educational planning policies are focused on allocating resources to offer education with virtually no systematic consideration of demand conditions.

The principal objective of this research is to explain how low overall levels of education may be a result of demand insufficiencies. Regression analysis is applied to four different data samples of families from corresponding Latin American cities. The results show a strong positive relationship between the levels of parental schooling and their childrens' schooling, while the family size, in terms of number of siblings, appears as a negative factor in children's education in the four cities. Family income comes

out as a significant positive factor in children's schooling for only two of the cities examined.

The main thrust of the implication of this research argues that, given the available forms of education, the individuals with little possibilities of success in school due to poor parental education, do not seem to have adequate options to invest in education. Consequently, it is suggested that certain forms of diversification of the school system could be a better means to increase overall levels of education.

PREFACE

This research was partially financed by the Inter-American Development Bank as part of the Education Project of the ECIEL Program. The views expressed here do not necessarily represent those of the Bank. I am especially grateful to Mary Jean Bowman for her innumerable suggestions, to Claudio de Moura Castro for many inspiring ideas and to Philip Musgrove for his valuable advice in the use of the data. I also thank C. Arnold Anderson, Dov Chernichosky, Paulo Vieira da Cunha, Victor Fuchs, Michael Grossman, Daomar Gujarati, Bernado Kugler, Juan Antonio Morales, Robert Willis and Elliot Zupnick for many valuable comments. I remain, naturally, entirely responsible for the content of the research.

The computation has been in the competent hands of Jorge Spencer. The data were gracefully made available by the Paraguayan Center for Economic and Social Development, the Catholic University of Perú, the Central Bank of Venezuela and the University of the Andes in Colombia. The final arrangement and typing were done by Ruth Lake. I finally must acknowledge my wife Mercy's encouragement and patience.

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CHAPTER I

INTRODUCTION

There are extremely few issues in Latin America that gather such unanimous support nowadays as the notion that education is a sine qua non condition to cure all the ills of the countries in the region. The new panacea is defended by any person regardless of socioeconomic, ideological, geographical or ethnic origin. It is a newly discovered philosopher's stone with which touch economies will grow, political systems will become stable of even democratic, and poverty will disappear. Education is the central theme in many political speeches, scholarly discussions and laymen talks. As a result,it has gone beyond a simple rhetorical or academic issue, becoming an instrument for action in public policy despite the challenges or qualifications that could be raised on its real importance and actual effects.

Growing volumes of resources have been systematically allocated to all levels and forms of education in many underdeveloped countries while educational planning has become standard practice around the world.[1] A crucial working hypothesis has been that a more educated population can be generated by simply making educational services more accessible to all strata of a society. This is based

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[1]See for example, World Bank (41, 1974)

on the belief that the current low levels of education in some countries are mainly a result of a certain amount of unsatisfied demand for education and that supply has been somehow rationed quantitatively, in the form of insufficient numbers of schools.

Parallel to the emergence of the above-mentioned role of education, human capital theory was formulated with the increasing awareness that economic growth depends substantially on the ability of human beings to apply knowledge as a factor of production, along with labor and capital viewed in the traditional sense. In attempting to understand and explain how this newly recognized factor of production operates, economists began to study the statistical relationships between levels of earnings and levels of education in individuals. Whether in the form of on-the-job training or as formal schooling, the use of time allocated by persons to these activities has been examined in terms of capital theory. The sum of direct costs and earnings foregone during the period of time taken for education (investment in human capital) can be compared with a discounted trajectory of earnings to estimate a rate of return.

There is an important policy implication of human capital theory and its empirical results for underdeveloped countries (or underpriviledged minorities within developed societies). It is that economic growth can be promoted by increasing the general levels of education of the popu-

lation provided that the aggregate private returns are equivalent to the social net benefits of education.

Observable variations in the amounts of investment in human capital among individuals could be explained by differences in their expectations of future earnings, attributable to that investment and to differences in their financial ability to invest. If expectations on future earnings for each amount of investment, and for each specific form of human capital can be considered constant among the members of a particular economy[2], the principal cause of the variations in individual amounts of education would be the differences in individual ability to invest.

Independently from the possibility that an economy could not create enough demand for increasing numbers of more educated people, human capital theory justifies education as an important variable in any policymaker's recipe for economic development. In fact, we cannot argue against this. Education (perhaps in certain forms) can

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[2]Which is highly plausible. Ex ante, an individual that wishes to become a doctor or an engineer does not have any reason to doubt that he will earn more or less money than any other doctor or engineer. Imperfect labor market information (especially in Latin American countries) helps to develop over-optomistic expectations since expected earnings for a given package of investment in education tend to be determined more strongly by success stories which are usually more visible and consequently tend to introduce an upward bias on those expectations. For a discussion on some of these aspects of supply and demand for education, see Härnqvist (22, 1978, pp. 71-78).

can be assumed to be necessary for economic growth, but it is also desired as such since it is postulated as an indispensable ingredient to build a modern society. In underdeveloped countries where illiteracy reaches levels consistent only with lesser degrees of civilization, the emphasis on education is justifiable. What is debatable is the oversimplified view that the problem can be solved by simply favoring the educational systems with more resources in order to multiply the current scales of operation of the system.

The objective of this research is to study some determining factors of the amounts of education in individuals from the demand side. It is not an objective of this research to establish a link between education and its role in economic development. To increase the overall levels of education in underdeveloped societies is a high-priority goal against which we are not arguing. This research expects to contribute to the understanding of some of the complexities involved that are usually neglected and that must be taken into account for more effective policy designs.

In this research some hypotheses are tested regarding the importance of some family characteristics on an individual's ability to reach certain levels of education measured by his years of attained schooling. The empirical findings will be used to support the notion that economic development objectives that recommend or that are based on

increases of overall levels of schooling cannot simple-mindedly be implemented by policies that only deal with the supply of education, while neglecting the conditions on the demand size. The findings will also be used to argue that the distribution of human capital in one generation has an important influence on the distribution on the next generation, therefore increases in the general levels of education of a society constitute a long term task.

The organization of the study is as follows: Chapter II contains a discussion of the background and a review of the relevant literature. Chapter III is a methodological note on measurement of human capital in education and a description of the data to be used. The models tested, the hypotheses and the results are presented in Chapters IV, V and VI respectively, while Chapter VII offers some conclusions about implications for research and policy.

CHAPTER II

THE BACKGROUND

The main emphasis in the research on human capital has been placed on the effects of education or training. Most of the work has concentrated on estimations of earnings functions and rates of return. Mincer's (3, 1974) work typifies this trend. Education has also been examined as an explanatory variable of family fertility (Willis 40, 1973; and Michael 30, 1974) consumption behavior (Michael, 31, 1975), savings behavior (Solomon, 37, 1974) and labor force participation (Leibowitz, 28, 1974). Less attention has been paid to the "causes" of education or, in other words, to the factors that make possible or determine the attainment of different levels of schooling in individuals. Those factors may have little to do with the individual's willingness or decisions to invest in themselves. Blaug (7, 1976, p. 831) noted "how little attention has actually been devoted to an explanation of the private demand for schooling.... and even now the demand for education remains a curiously neglected subject in the vast empirical literature exemplifying the human capital approach."

Becker,(2, 1967) in his seminal Woytinsky lecture, stated that variations in the demand schedules for education resulted from personal characteristics. He labelled the source of variations "ability" but did not concern

himself with analyzing the factors that could be included in this category. In fact, he defines ability as a "compromise between definitions of ability in terms of scores on IQ, personality or motivation tests." Years later, Hause (24, 1972) included a more concrete notion of ability in his investigations as a factor that could explain variations in earnings, interacting with education. Nevertheless he did not deal with the possible influence on the demand for schooling nor did he enter into a profound conceptualization of ability.

Bowles (10, 1972) and Castro (14, 1973) offered some results that suggest strongly that parental schooling influences children's schooling, establishing an interesting approach to intergenerational determination of schooling.

An interesting and important implication of their findings is that the distribution of human capital among individuals of one generation have some influence in the distribution of the next generations'. Becker came close to this point, when in the Mathematical Appendix of his Wotinsky Lecture, he related the distribution of earnings and human capital to the distribution of ability.

Conlisk (16, 1969) and Masters (29, 1969) conducted research on the determinants of school dropout rates of U.S. students and their findings are also consistent with Becker's notion of individual differences in demand curves.

It is important to realize the existence of different demand curves for education among individuals. If there

is not such a thing as the Becker's "elite approach", and if the unique demand function for education is less than perfectly inelastic (which is a very plausible assumption), then an increase in the overall level of education could basically depend on making formal education more easily available for all families. Notice that this type of policy is not only widely recommended to obtain an increase in the mean level of education but to reduce the inequalities in educational opportunities in a given society.

This same type of policy, however, will have radically different effects in the presence of a whole distribution of demand schedules for education. If, for instance, many individuals lack the necessary "ability" to reach a certain level of education, their demand for education at that level could be highly or perfectly inelastic, and an increment of resources available to education many very well have the sole effect of making education less expensive for the ones with more ability. If they tend to be, as it can be expected, among the richer elements of a society, the goal of a more equitable distribution of education through shifting supply curves to the right will not be achieved.

In Latin American countries, as in many others, the "elite approach" is not easily accepted as a possible fact. For a number of reasons, the universal assumption is that, educationally speaking, any person, if given the educational opportunity, will reach a high level of schooling.

In general, everyone, including policy-makers, seems to believe that, regardless of the existence of variations in individual talent, practically everybody can reach a high level of education, with the exception of very few, perhaps clinical, cases.[3]

In this research, I do not pretend to determine the forms of any distribution of individual demand curves nor of aggregate demand curves for schooling since the data do not permit it. A strong argument, however, will be developed showing the existence of significant variability in individual education that can be explained by factors operating on the demand side. This does not imply that low levels of schooling in many individuals is never due to supply deficiencies. There are many instances in underdeveloped countries in which a simple geographical mapping of schools and population will suggest strong supply insufficiencies. Harbison (21, 1973) , for example that only six percent of the rural schools in Colombia offer five grades of primary education; and also mentions that in East Africa, first level education is usually available on the basis of race or tribe.

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[3]This may sound like an ideological or philosophical issue, but it is not. It is an empirical matter that requires serious investigation to improve the efficiency of resource allocation in educational planning. Equality of opportunities is generally a policy goal and regardless of its validity as such, it is usually badly implemented for lack of awareness of individual variations in ability or demand for education.

In observing, however, the significant decreases in enrollment rates from first grade of primary schools onward, the supply-insufficiency argument cannot be seen as the main cause of low overall levels of schooling, since it is not plausible to assume differentiated supply schedules for each single grade. Tables 1 and 2 illustrate this point. Though data for the specific cities studied in this paper were not available, the figures at the national level serve our purpose. Statistics for the United States are included for comparability. Primary education is compulsory in the five countries shown, but presumably with varying efficiencies in the enforcing mechanisms.

The decrease in enrollment for the Latin American countries included in Table 1 is observable as early as between the first and second grades of primary school. As a general rule, the enrollment in the last grade of primary school is smaller than the enrollment in the first grade. Enrollment rates for secondary education shown in Table 2 tend to be close to the proportion of enrollment in the last grade of primary school with respect to first grade enrollment. This suggests that the relatively low enrollment rates in secondary education are a result of the significant effect of dropping out during primary school, and not necessarily a result of insufficient availability of secondary education.

TABLE I

PERCENTAGE DISTRIBUTION OF FIRST LEVEL ENROLLMENT BY GRADE

FOR 1970 AND LATEST YEAR AVAILABLE

	Year	I	II	III	IV	V	VI	VII	VII
Colombia	1970	39	24	16	12	9			
	1974	36	23	18	13	11			
Paraguay	1970	29	23	18	13	10	7		
	1974	27	22	18	14	11	8		
Perú	1970	28	20	16	14	12	10		
	1976	23	20	17	15	12	10		
Venezuela	1970	22	21	18	16	13	10		
	1974	23	18	17	16	14	12		
U.S.A.	1970	13	12	13	13	12	12	13	12
	1976	16	14	14	14	15	15	6	6

SOURCE: UNESCO, Statistical Yearbook, Paris, 1977

TABLE 2

GROSS ENROLLMENT RATIOS FOR THE FIRST; SECOND AND THIRD LEVELS OF EDUCATION, FOR 1970 AND LATEST YEAR AVAILABLE.

(PERCENTAGES)

	Year	LEVEL I	LEVEL II	LEVEL I&II	LEVEL III
Colombia	1970	100	23	61	4.69
	1976	106	35	69	8.01
Paraguay	1970	109	17	67	4.32
	1974	106	20	67	5.53
Perú	1970	107	30	72	10.79
	1976	112	49	86	...
Venezuela	1970	94	37	71	11.70
	1975	100	44	77	18.96
U.S.A.	1970	...	...	101	49.43
	1975	...	...	87	57.64

SOURCE: UNESCO, Statistical Yearbook, Paris, 1977

NOTE: the gross enrollment ratio is the total enrollment of all ages divided by the population of the specific age groups that correspond to each level. Levels I, II and III, are primary, secondary and higher education, respectively.

CHAPTER III

THE HYPOTHESES

The keystone of human capital theory is that an individual will invest a certain amount of resources with cost C in order to obtain a certain amount of earnings, E, in such a way that there exists a mean rate of return, $\bar{r}$, such that:

$$E = \bar{r} \cdot C$$

assuming that the labor force period is long enough to make $\bar{r} > 0$. This is Becker's (Op. Cit.) simplified formulation to discuss the relative distributions of E and C.

The amount, C, however, is not a result of one single decision. It is in fact a consequence of a string or a trajectory of decisions that are actually produced under the uncertainty an individual faces about the various factors involved. In the first place, the would-be investors in human capital could assume that the cost of one unit of human capital has the same cost for any individual. Then, the would-be investors can also expect that for a given "real" amount of human capital, the expected level of earnings would be the same among individuals, so $\bar{r}$ is constant, (at least, ex ante), for different individuals, though it may be a decreasing function of C.

At very low levels of schooling, the investment choice set facing an individual is practically dichotomous. The formal education system generally offers a unique educational

sequence so an individual's decision centers on whether or not to enter the sequence. The "real" amount of human capital in education is then seen by each investor as the education required to "pass" from one grade to the following. At zero level of schooling, when the individual reaches the age of admission to school, the decision-makers at that point (generally the parents) do not really have solid reasons to believe that the child will not attain each year of schooling, spending one year of time per year of schooling. In other words, the expected cost of one year of schooling tends to be the cost for the individual that fulfills all the minimum requirements, for that year. As a matter of fact, that could be a rational though optimistic expectation about the individual's actual capabilities.

The direct costs of education are usually composed of transportation, clothing, shoes, food and a small amount of money for school supplies. Clothing, shoes and food should be included in these cities, given the existence of extreme levels of poverty. At these levels of poverty, the level of income of the child's family might be an important factor to determine school enrollment of the child; but costs in terms of payments to the school may be very low or near zero, given the fact that in the cities studied in this thesis free public schools are generally available.

With respect to indirect costs of schooling or opportunity costs, we would distinguish two kinds: one pecuniary and another non-pecuniary. The first would be measured by

foregone earnings, which in the case of young children, could be considered negligible or simply zero, especially in urban areas. Again, for extremely poor families, this might not be true, since begging or peddling on the streets could produce some income. The non-pecuniary opportunity cost might be in terms of foregone household chores such as taking care of younger children in large families or in families where the adults participate in the labor market. This cost, of course, has a pecuniary measurement, but in any case is still probably zero for many young children at the age they start in school. However, one should not be surprised at how many very young children take care of babies in extremely poor families.

In general, if income has some importance as a determinant of schooling, it could be at extremely low levels of income, but not necessarily at the lowest levels of schooling. When children are older, and in spite of the high levels of unemployment in Latin America, a significant opportunity cost of education may become an important factor in the decision to continue in school, when the family's income is low enough. Obviously, family size is a factor here, also, that will be discussed further.

Our basic interest is focused here in the possible discrepancy between the expected cost for an individual of completing his or her school requirements in one particular year (or grade), and the cost implied by his actual ability to pass the year successfully. The expectations

of the cost levels of future years of schooling will be revised by the decision-maker in terms of the degree of deviation in the student's academic achievement from prior expectations.

There is ample evidence of the variations among individuals of the effort and time required to attain a given amount of schooling. See for example, Castro, Sanguinetty and Lacerda (13, 1978) working with the ECIEL school survey in five Latin American countries.[4] The following questions arise here : What factors determine those variations? Is income a substitute for other factors that are necessary to achieve successfully a certain level of education?

The immediate causes of the variations of schooling within age groups, at younger ages are : a) starting late in school, b) repetition of grades, c) dropping out and returning to school. Repetition, it must be pointed out, is not a precondition to dropping-out. The dropout might even be an individual that completed a grade successfully, but very little is known about this. We underline repetition because it is a symptom that signals individual inabilities to cope with school requirements. The ECIEL school survey shows that in some countries, up to 50% of first grade students are repeaters.

Several factors are at work when an individual goes

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[4]Argentina, Bolivia, Brazil, Paraguay and Perú

to school and begins accumulating years of schooling. The decisions involved in whether or not to continue are made at least each year the student spends in school. It is important to note, at least during the years of primary education, the student does not have many options in terms of formal investment in education, except the choice on a specific school. Given the constancy of curriculum design and general academic requirements, he faces basically one and only one "technology" to produce education in himself. Thus, the requirement level can be considered approximately fixed for a society, but the ability of the individuals of that society to fulfill those requirements are variable. This mechanism, then, operates for each level of schooling, starting with the first grade of primary school.

In terms of the workings of the theory of human capital, and the assumption discussed in this chapter regarding constant expectation on earnings for a given amount of human capital, there are two basic factors that could determine why any individual stops going to school before reaching the maximum level of possible formal schooling. One is the inability to finance the education costs, the other is intellectual inability. Regardless the possibilities of substitution between income and intellectual ability, we can assume that a minimum of each is usually necessary, especially the latter, to achieve certain levels of education. The role of income is more or less clear in terms of possible influence on individual education. Let

us examine now the role of intellectual ability. In no way do these considerations pretend to be comprehensive or authoritative.

Though we do not have measures of individual ability in this research, this disgression becomes necessary in order to explore some possible lines of causation that underlie the empirical results discussed later. Nevertheless, we must bear in mind that this area is a sort of no-man's land from a strictly disciplinary point of view, or perhaps everyone's land. Psychologists, sociologists, educators, economists and many others should find themselves on grounds of common interest here. It is regrettable, however, that so many thinkers from the different disciplines seem to work ignoring the work of others. Economists tend to be a glaring illustration. This discipline-centrism may be explained by the enormous body of research that any investigator has to digest at any one time, but it is still not an excuse if we need effective scientific work.[5]

With respect to some possible components of ability, we must first point out that there is a tendency among some authors to consider or imply that ability is a unidimensional and an exogenous attribute in the quality of

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[5]Mary Jean Bowman deals very convincingly with these issues. (9, 1965)

an individual, as a worker or as an investor in human capital. We can find examples of this in Juster (27, 1974,p.2), Becker (op. cit.) and Wachtel (39,1974, pp. 149-164), while inTaubman and Wales (38, 1974), Hause (op. cit.) and Beaton (1, 1974), much more detailed considerations are developed.

Taubman and Wale's treatment of ability is probably the broadest and most comprehensive usually seen in human capital research. Yet it is basically constrained to cognitive aspects of ability, and is studied with reference to individuals with some amount of schooling. Our concern with ability here is primarily focused on the capacity of an individual to go through school successfully from the very beginning of his or her educational history. In general we are interested in the initial conditions with which a person is endowed at the point of zero formal schooling and how those initial conditions determine or restrict a trajectory of investment decisions in human capital.[6]

The widely known Coleman Report (13, 1966) showed that children start their first year of school with large differences in verbal and mathematical competence. Before a child starts in school, he receives a significant amount of non-formal education, mainly in what sociologists call the "socialization process of the family", but also in other environments. The child may have been born with certain innate "ability" such as forms of intelligence, hereditary

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[6]The notion of control theory here has a heuristic purpose only, but it is definitely helpful.

or not.

The family educational process and its many aspects has been discussed by various investigators. Berstein (6, 1961) for instance, explains the conditions under which linguistic development of individuals depends strongly on the social and cultural environment to which they are exposed Deutsch (18, 1967), Bettelheim (5, 1967) and Hess (26, 1967) argue about the importance of the family environment and its influence on early childhood development. Hartman (23, 1972) offers a fascinating discussion of the transmission of linguistic postulates from parents to children and how this affects learning patterns of Aymara-speaking children in a Spanish-oriented classroom.

In terms of Bloom's taxonomy of educational objectives (see Bloom, et. al. (8, 1956 and 9, 1964), we can distinguish a cognitive domain and a non-cognitive domain. Cognitive objectives include items such as the acquisition of specific knowledge, the ability to understand instructions and to apply knowledge to practical problems. They also include the ability to analyze and synthesize as well as the capacity to judge in terms of evidence. Non-cognitive or affective characteristics deal with attitudes such as perception of individual or social needs, acceptance of rules for social behavior, and disposition to adopt values like a sense or responsibility, willingness to listen and to participate in dialogues.

Some of these objectives become educational objectives

in the design of a formal education system, but many of them can be assumed to already exist in certain stages of development in each child when he or she enters school. The family and other socialization processes can be suspected to be strong determinants of the individual differences. The physiological development of the child and his general level of health, as basically determined by his nutritional history, must also be considered as a important determinant of the "ability" to go through school successfully.

Here we are not concerned about the "pure" or innate ability versus ability derived from education, even if they were separable. The focus, instead, is on the differences between individuals capabilities evident in the child from the first moment that he enters school and which could be crucial determinants of future scholastic achievement. This achievement could be measured in terms of the actual level of knowledge and other educational yardsticks, or the simple capacity to reach a certain amount of schooling, regardless of the actual knowledge. Years of schooling can be considered a proxy for a minimum of education, in spite of the fact that high achievers at one level of education are supposed to have better probabilities of going further in accumulating years of schooling than low achievers.

In synthesis, what is intended here is to isolate conceptually those elements in the family background of individuals that seem to exert a dominant influence in each in-

dividual's initial capacity to invest in human capital. Notice that those family factors operate before the child begins school as well as afterwards. Additionally, those events which occur in the school environment interact with the family environment. Notice also that the effective demand for education, especially at very low levels, is not necessarily a result of family or individual tastes. It might be better rationalized as a derived demand generated by the propensity to maximize future earnings through schooling, which might imply that individuals tend to behave as schooling maximizers (up to a college education) when they are young enough.[7]

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[7]This approach differs from the more usually applied in more highly developed countries as the United States, where opportunities for employment are more readily available and higher education is regularly financed by the investor in human capital himself. In this type of case, a cost-benefit kind of consideration usually makes an individual reach a certain amount of schooling and stop there. The approach in this paper is focused on the possibility that the same cost-benefit analysis by the investor in a society where education is free and unemployment is high leads him to maximize schooling, but he stops at a point when the school system fails him.

CHAPTER IV

MEASURING EDUCATION AND THE SOURCES OF DATA UTILIZED

In this research, education levels are measured as years of formal schooling completed by a person, as is traditionally done for lack of a better procedure. Many caveats can be raised on this point, but we must take one into consideration. This is the lack of commensurability between years of schooling of individuals from different cohorts. We know very little about how the quality of real educational content of one year of schooling has changed in the periods covered by the data. This lack of commensurability affects also years of schooling of individuals within the same cohort but coming from different schools. Yet this second observation is less serious than the first one. In any case, these limitations in our measurements force us to use years of schooling as a proxy for education.

Traditionally, human capital theory takes years of schooling as the amount of time invested in education. The relative variable in that approach is time and not so much the "amount" of education, as we cannot measure it. Nevertheless, different individuals need varying amounts of time to attain a given level of education measured in years of schooling.

In Latin American countries, for example, where automatic promotion is not the rule in primary or secondary education, significant amounts of students must repeat grades.

The phenomenon of individual repetition can take place once or more in any of the grades, and is generally regarded as a predictor of dropping out.

Our concern here is with years of schooling as a proxy for educational attainment, regardless of the quality of education, but the distinction between years of schooling and actual time spent in school becomes necessary on two grounds. Firstly, as it will be discussed in this chapter, it has theoretical implications regarding individual variations in education and time spent in school. Secondly, in order to understand the reasons why, for a given age cohort, there is so much variation in individual schooling even at low levels of education.

The data are from samples of household surveys taken in the cities of Asunción (Paraguay), Barranquilla (Colombia), Lima (Perú) and Maracaibo (Venezuela). The surveys were conducted during the late nineteen sixties and early nineteen seventies, as part of the ECIEL Program Project on consumption behavior in Latin America. The objective of that research was to investigate income and spending of families in several Latin American cities, consequently the sets of data on education do not lend themselves to some desireable tests.

Each household member's education was reported in terms of years of schooling completed, but in the case of young members, it was not reported whether they were attending school or not during the same time period of the survey. Expen-

ditures listed in the data are total for the family. Children of the family who are not living at home do not appear in the sample.

As our research design endeavors to study the correspondence between parental education and that of their children, it was decided to break down the family files into sub-files with the child as the unit of observation. This was done in order to eliminate the trivial effect of age of individuals in age groups capable of still going back to school. Thus, variations in individual's years of schooling could be effectively controlled by age. However, each age group did not appear with a sufficient number of cases, so as a compromise, the statistical analysis was conducted with groups of several adjacent ages, as it will be shown in Chapter VI. To use the data pooled across ages, it would be necessary to develop an index based on deviations of schooling from an expected value, given age and perhaps sex, such as Chernichovsky (17, 1975) does. He regressed years of schooling of individuals on age and sex, including an interactive term between both variables and used the residuals as a measurement of age- and sex-specific expected years of schooling. Nevertheless, in partitioning the data matrix by age group, preoccupations about the heteroscedasticity can be reduced since, for this data set, the dispersion of years of schooling increases with age, but not necessarily with any of the explanatory variables chosen in Chapter V.

All children between six and twenty-three years of age, and having both parents present were included. Higher age groups were excluded due to insufficient number of observations.

The fact that only children with both parents present are considered here excludes an important segment of the population. Presumably, poor families will be underrepresented in the final sample if they are the ones in which broken homes appear more frequently. This is an important limitation if income is a significant variable at very low levels of income, since the families in that income range are very few in the sample or almost non-existent.

CHAPTER V

THE MODELS

The first model to be tested for each age group, and for each sex, assumes that the explanatory variables have an additive influence on children's years of schooling. The model is the following:

$$S_h = b_o + b_1 E_x + b_2 S_m + b_3 N_s + b_4 A_h + u \quad (1)$$

where:

S_h : child's completed years of schooling

E_x : total family's monthly expenditures

S_m : mother's completed years of schooling

N_s : number of children present in the family

A_g : child's age (each age group includes four consecutive age cohorts)

u : stochastic term

Though the data on family's income were available, total family's expenditures E_x is used as a proxy for income for several reasons. The first reason is that expenditures were more faithfully reported by the interviewed families than income. The second reason is that expenditures constitute a much better approximation to permanent income, which would be a more reliable variable to measure family's financial ability to invest in their children's education.[8]

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[8]Notice that current income is a flow variable that cannot be tested against a child's accumulated years of schooling, which is a stock varialbe. Here a variable such as family's level of expenditures though still a flow variable, is a better proxy for current ability to pay as well as past ability to pay, in line with the permanent income hypothesis.

The importance of expenditures as a proxy of family's ability to pay for children's education is due to the lack of capital markets that could provide borrowed funds for the poorer families. At the same time, different effects of E_x can be expected on the dependent variable at different levels of E_x. At very low levels of schooling, it is not reasonable to expect that wide variations of E_x may have a significant impact on schooling, since other variables such as parental schooling may be more important. Nevertheless, a minimum level of E_x (or perhaps the family per capita expenditure E_x/N_s) may be more relevant if a threshold effect exists. As we do not have such fine measurements of expenditures and extremely poor families can be assumed to be underrepresented in our final samples, no effect of E_x is expected for low age groups. In any case, E_x must tend to appear significant at higher levels of schooling, when children's income forgone can be considered important by the family, and when schooling becomes increasingly more expensive.

Mothers' education is singled out as the variable that best characterizes what some authors like to call the "educenogenic family."[9] Its inclusion in model (1) was justified in earlier chapters. Even though it may tend to have a certain degree of colinearity with family's expenditure (income), the significance of its separate effect on children's education can be expected to be noticeable.

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[9]See for example Floud (18, 1961)

A separate test for fathers' education is not conducted here for its high colinearity with E_x and with mothers' education.[10] In any event, if parental level of education is important in children's education, the mothers' education should have a stronger influence according to the fact that they spend more time with the children, especially before they start school. On the other hand, more educated mothers are less likely to participate in the labor market while their children are very young. Leibowitz (27, 1975) has shown this with 1960 U.S. census data.

Nevertheless, in Latin American societies, the result may not hold. A Brazilian study in progress shows that mothers' education is positively correlated with childrens' probabilities to pass college entrance examinations in the state of Espiritu Santo, Brazil [11]; but those probabilities decrease when mothers have a college education. In societies where maids are relatively cheap, young children are not an obstacle for mothers' participation in the labor force, which is likely for highly educated women. Then children spend relatively more time with lesser educated maids which would have an apparent effect on their future educa-

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[10] Mother's education is generally highly correlated with fathers' education since people tend to marry approximately equally educated mates.

[11] Working with a sample of over six thousand applicants in 1975.

tion achievement. Bowman and Anderson (11, 1978, p. 99) also report another Brazilian study in which "children of university-educated women, who are under day-care do more poorly in school than children of 'middle-class' mothers". However, in our samples, highly educated mothers are not numerous so this possible effect could not be tested with confidence. This is why only the results of testing the model with a continous specification of S_m are presented. In fact, regressions were run with dummy variables for different levels of mothers' schooling, but the results turn out not to be significant. Besides the influence of the mother's level of education during the child's pre-school years, one can expect that once the child has started school, the better educated mother is better prepared to help the child through school by direct attention to the study and understanding of the subject matter; by creating an adequate place or atmosphere to study at home; by paying attention to the child's performance and being able to interact with the teacher when the child is not in good standing; and by stimulating the child to follow the example of one or both parents and communicating more skillfully the advantages of having an education. Another mechanism through which the influence of mothers' education on children's schooling operates is in terms of the child's health and nutrition level. Children with poor health tend to miss classes more frequently, affecting their total number of years of schooling. Nutritional levels are also of-

ten singled out as an important determinant on scholastic performance. In a sample of 5 year old children from the city of Aracajú, in the Brazilian northeast, Nabuco (34, 1977) finds that children with lower nutritional status (measured by anthropometric features) come from mothers with lower schooling, and have lower scores in cognitive development as measured by Piagetian tests. Retarded cognitive development can be expected to have a detrimental influence on the child's performance in school according to psychologists of education. On the other hand, research like that done by Edwards and Grossman (18, 1978) in a sample of American children aged 6 to 11 years in the period 1963-1965, show that parents' schooling is an important determinant of their children's health; while income is not necessarily influential. These results are relevant to Latin American countries except with respect to income, in which case this variable may be more important.

The number of children in the family N_s is a variable that can be expected to have a negative influence on children's schooling because of the notion that the more the children the less time a mother will allocate to each of them. Besides, if the eudcational power of the family's environment is a composite of all its members' education, more children are supposed to lower the educational mean of the family. Nisbet (35, 1953) reports that large families constitute a handicap to verbal development of their children for that reason. Edwards and Grossman (op. cit.)

also find that family size has some influence, though small, on children's nutritional status.

As discussed earlier, the price of one year of schooling in urban areas in Latin America can be considered negligible in terms of direct costs. In any case, whatever the price for any cohort, the price would be constant and and inclusion in the model would be impossible. It is necessary to keep in mind that the empirical tests are conducted to relate shifts of a demand curve for education at a zero price level of the demand curve. As the regression analysis is applied to age groups that include four consecutive ages per group, in order to run each regression with a large number of observations, the child's age is included as an independent variable for obvious reasons.

The regressions are run separately for each sex in order to determine whether the explanatory variables operate differently in each case. Family size can be expected to have a more negative effect on the schooling of girls in terms of the socially assigned roles in societies with strong leanings to traditional values. No a-priori hypotheses are posed with respect to sex-specific effects of income of mothers' education.

A second model is also tested assuming that mother's and father's education interact and influence the child's education. The model is the following:

$$S_h = b_o + b_1 S_p \cdot S_m + b_2 E_x + b_3 N_s + b_4 A_g + u \quad (2)$$

where S_p is the father's years of schooling. A more appro-

priate specification should include a test for separate mother's and father's schooling which was in fact done, but the extremely high multicolinearity between those variables and their interaction prevents its usefulness. The rationale for the presence of this interaction variable can be stated in terms of the richness of the vocabulary employed at home, the logical consistency of simple but frequent argumentation and the ability to behave in accordance with the education received. All these elements result in the continous exchanges between parents in the children's presence and their combined influence on them during the preschool years and later on. Model (2) is equally estimated by the same age groups and sexes as model (1).

CHAPTER VI

ANALYSIS OF THE DATA AND INTERPRETATION OF THE RESULTS

The analysis of the data is conducted in two stages. First a brief descriptive picture of the four cities where the basic data on schooling was gathered is presented, in order to better understand the rest of the analysis. Then ordinary least squares regressions are applied to estimate the two models, for the four city samples, and for each age group within each city.

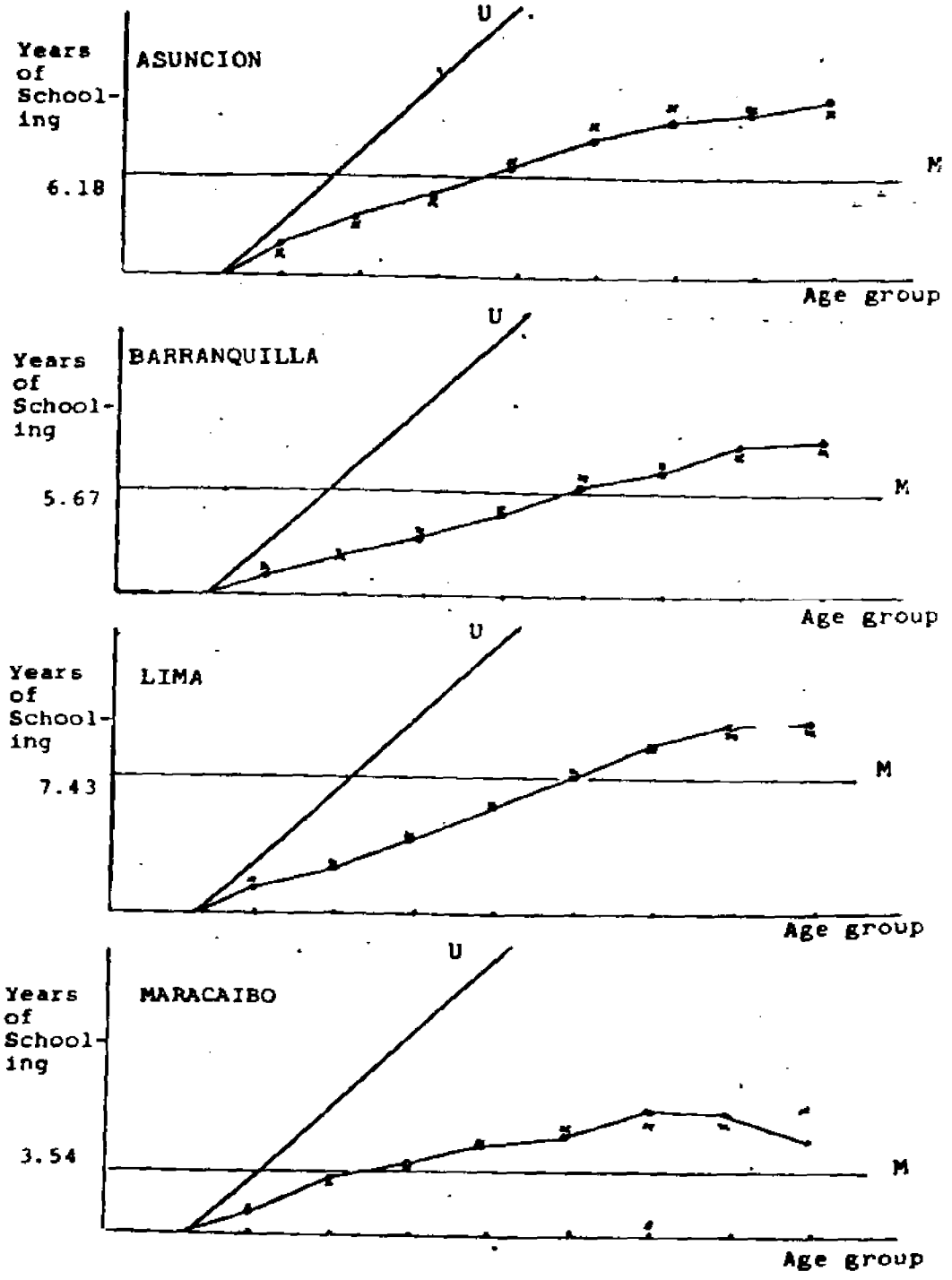
Let us bear in mind that while the main point of interest of this research is on explaining variations of years of schooling in individuals, the individuals in our samples have not necessarily stopped accumulated years of schooling. In fact, we have all kinds of cases in the samples, from dropouts to individuals that have the maximum number of years of schooling that their age allows. Then, rigorously statistical significance in the variables of the regression equations by themselves cannot be interpreted as a generalized proof of determination of overall variations in total schooling in adults, since the results would hold equally true for retardation in schooling. In other words, the fact that an individual may be overaged for a given amount of schooling does not necessarily imply that he will not attain the maximum level of schooling at a later-than-normal age.

As mentioned earlier in this study, for each age group

there is a whole variation of years of schooling, with the distribution becoming wider as the age increases. For example, seven year old children only appear with zero or one year of schooling, while eight year old children can have zero, one or two years of schooling, and so on. It can be assumed that retardation in age-specific years of schooling is a symptom of future lower education with respect to the individuals in the same age group that is not over-aged. Figure 1 is shown to support that assumption, which is crucial in terms of the theoretical validity of the empirical results discussed afterwards. The segment U in each graph represents the upper limit of years of schooling that an individual can reach at any age, and it starts at six years of age (zero schooling). It excludes, of course, exceptionally brilliant children. The dots represent the means of the years of schooling for the children in the same samples used in the regressions. The small circles represent boy's names while the x's represent the girl's. The value represented on the vertical axis is the overall mean of the years of schooling of the corresponding mothers. Line M corresponds to that mean and is utilized to compare the trajectory of children's schooling by age.

The children's means follow initially an upward trend (approximately linear) while they are below the mothers' mean, and then they follow a smaller slope, finally approaching a horizontal line though this effect is not present in the Asunción sample for the highest age-groups

FIGURE 1


U
Years of Schooling
ASUNCION
6.18
M
Age group
U
Years of Schooling
BARRANQUILLA
5.67
M
Age group
U
Years of Schooling
LIMA
7.43
M
Age group
U
Years of Schooling
MARACAIBO
3.54
M
Age group

considered. The horizontal trend suggests that individual retardation in years of schooling ends up in a lower level of schooling. The trajectories shown in Figure 1 can be assumed to be biassed downwards if the youngest cohorts have stronger motivations (or perhaps better chances) of achieving a final point above the point above the point shown in the graphs, which in fact represent the oldest cohort, and therefore, the age group that can be assumed did not value education or did not enjoy educational opportunities as much as the youngest.[12] On the other hand, it is a fact that the children's means end up at a higher level than the mothers' means that the average number of years of schooling increase over time, regardless of whether that amount of schooling represents a higher level of real education or is simply a result of relaxed academic standards.[13] I am not aware of any longitudional studies that can support either of these possibilities, but based on my own personal observations and many educators in Latin America (especially regarding higher education) the later possibility is suspected of

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[12]The emphasis on universal education during the post war years and the generalized acceptance of the notion that education is the only vehicle of upward mobility for the large majorities, have preceeded the expansion of the educational systems. All these factors account for an increasing trend in the overall levels of schooling.

[13]Less demanding academic standards, or systems of automatic promotion from one school grade to another tend to help the student to stay longer in school and consequently appearing with "more" education.

being more likely.[14]

Mean retardation values are represented in Figure 1 by the distance between U and the dots (for males, and crosses for females) on the curves. It is interesting to observe that the retardation rate appears as a constant for each country, but that, at the same time seems to decrease between countries when the mean years of another's schooling is relatively higher. This is a causal confirmation of the hypotheses tested here.

The results of the regressions for model (1) are presented in Tables 3 to 6 while Tables 7 to 10 show the results for model (2). The regressions are run for each age group. Though they could have been run for each age from seven to twenty five years of age, to control effectively for the trivial effects of age on schooling, it was preferred to arrange the indicated groups, since the sample size for each age is not large enough. Even pooling the data the include both sexes and running the regressions with an additive and interactive dummy variable for sex, would not have been enough to get a sufficient number of observations for each age. One advantage of this form of presentation is to allow the analysis of the evolution of the regression coefficients as age increases, so the dy-

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[14]Once again, this is an area of disciplinary crossroads where knowledge on the state of the arts is even less accessible by the great geographical dispersion and isolation to the centers (official and private) where the relevant information may exist.

namics of the separate influence of the explanatory variables can be better understood. Mothers' schooling, for instance, can be expected to have a stronger influence on children's schooling the younger the children, while income effects can be expected to increase with age.

Before interpreting the results, it is important to point out that the tables show the effects of regressions run with the truncated samples for the lower age groups. The dependent variable is constrained by age while the independent variables are not. This implies that the estimates for the regression coefficients will be more biassed downwards the lower the age group.[15] From this standpoint, the coefficients of determination could also be lower for those groups and they would gradually tend to increase with age. This is observable in the Appendix tables A-5 through A-8 which show the regression results without age as an independent variable. Also, it must be noticed that the absolute values of the regression coefficients that appear more frequently as statistically significant, tend to increase with age. This results from the natural fact that the mean value of the dependent variable increases with age.

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[15]For a discussion of truncated samples, see, for instance, Hausman and Wise (25, 1976)

TABLE 3

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESIS, ASUNCION)

AGE GROUP	SEX	S_x	E_x	N_s	A	E_c	N	F	R^2 (adj.)
6-9	M	.11***	-.04	.02	.90***	-5.9[illegible]***	66	20.53***	.6[illegible]
		(3.31)	(-.39)	(.30)	(8.28)	(-6.47)			
	F	.08***	.11	-.03	.80***	-5.08***	79	27.35***	.6[illegible]
		(2.92)	(1.08)	(-.43)	(10.12)	(-7.85)			
10-11	M	.13***	-.16	-.15**	.75***	-4.25***	70	11.66***	.4[illegible]
		(3.47)	(-1.43)	(-1.41)	(6.87)	(-3.9[illegible]			
	F	.12***	.42***	-.15**	.82***	-5.47***	69	19.37***	.5[illegible]
		(2.56)	(2.71)	(-1.65)	(7.43)	(-4.6[illegible]			
10-13	M	.15***	.02	-.13	.79***	-4.83**	70	5.95***	.27
		(2.45)	(.24)	(-1.21)	(4.32)	(-2.17)			
	F	.10**	.26*	-.19	.65***	-3.17	64	12.[illegible]***	.4[illegible]
		(1.78)	(1.55)	(-2.00)	(4.84)	(-1.84)			
12-15	M	.25***	.13	-.10	.56***	-2.70	63	5.[illegible]***	.2[illegible]
		(3.24)	(1.22)	(-.65)	(2.55)	(-.93			
	F	.17***	.14	-.22**	1.10***	-8.69***	78	19.[illegible]***	.5[illegible]
		(3.24)	(1.82)	(-1.92)	(7.95)	(-4.5[illegible]			
14-17	M	.24**	.41**	-.15	.51**	-1.91	65	5.[illegible]***	.[illegible]
		(2.36)	(1.97)	(-1.03)	(2.24	(-.6[illegible]			
	F	.21***	.36**	-.24**	.66***	-1.[illegible]	83	5.[illegible]***	.[illegible]
		(3.31)	(1.79)	(-1.79)	(3.64)	(-.4[illegible]			
16-19	M	.38***	.65***	-.28*	.3[illegible]*	-.6[illegible]	69	[illegible].[illegible]***	.[illegible]
		(4.2[illegible]	(2.3[illegible]	(-1.6[illegible]	(1.61	(-.[illegible]			
	F	.31***	.58**	-.5[illegible]**	.14	5.9[illegible]	74	8.14***	.[illegible]
		(4.14)	(1.89)	(-2.12)	(.5[illegible]	(1.2[illegible]			
18-21	M	.40***	.26	-.34*	-.6[illegible]	8.27*	54	6.6[illegible]***	.3[illegible]
		(3.9[illegible]	(.78)	(-1.54)	(-.13)	(1.34)			
	F	.42***	-.01	-.18	-.39	14.75***	69	4.8[illegible]***	.2[illegible]
		(4.44)	(-.29)	(-.95)	(-1.28)	(2.52)			
20-23	M	.41***	-.10	-.34	.92**	-10.[illegible]	45	2.5[illegible]**	.2[illegible]
		(3.18)	(-1.59)	(-.94)	(1.97)	(-1.02)			
	F	.46***	-.03	-.35*	.76*	-8.31	44	3.64***	.27
		(2.50)	(-.46)	(-1.47)	(1.55)	(-.84)			

NOTE: The coefficients and standard errors of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 4

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESES)
BARRANQUILLA

AGE GROUP	SEX	S_m	E_x	N_B	A	E_c	N	F	R^2
6-9	M	.21***	.010***	.13***	.44***	-2.67***	89	21.47***	.51
		(3.55)	(2.57)	(-3.51)	(6.02)	(-4.42)			
	F	.06**	.015***	-.03	.40***	-2.66***	133	22.70***	.43
		(2.03)	(3.83)	(-.76)	(6.16)	(-5.19)			
8-11	M	.26***	.018***	-.15***	.50***	-4.08***	102	45.22***	.69
		(7.00)	(3.41)	(-2.90)	(5.62)	(-4.62)			
	F	.21***	.018***	.06	.73***	-6.37***	129	30.41***	.5
		(5.64)	(3.34)	(-1.16)	(8.43)	(-6.62)			
10-13	M	.33***	.027***	-.12**	.82***	-8.25***	119	64.15***	.6
		(7.62)	(3.53)	(-1.99)	(7.84)	(-6.45)			
	F	.32***	.03***	-.27***	.61***	-5.14***	124	77.28***	.7
		(7.06)	(4.90)	(-4.92)	(6.25)	(-4.9)			
12-15	M	.33***	.045***	-.22***	.77***	-8.0 ***	119	35.7 ***	.5
		(5.23)	(4.49)	(-2.79)	(5.32)	(-4.2)			
	F	.4 ***	.024***	-.35***	.7 ***	-6.27***	114	5 .7 ***	.6
		(7.43)	(2.79)	(-4.60)	(5.99)	(-3.77)			
14-17	M	.3 ***	.056***	-.27***	.76***	-8.09***	93	28.54***	.5
		(4.29)	(4.54)	(-2.86)	(4.23)	(-2.82)			
	F	.41***	.03 ***	-.29**	.79***	-8.1 ***	9	3 .0 ***	.5
		(5.76)	(3.0)	(-2.3)	(4.30)	(-2.66)			
16-19	M	.3 ***	.067***	-.09	.54**	-5.5	65	12.02***	.4
		(3.3)	(3.31)	(-.67)	(1.91)	(-1.1)			
	F	.33***	.05 ***	-.31**	.56**	-4.3	57	17.41***	.57
		(3.25)	(4.8)	(-2.27)	(1.9)	(-.6)			
18-21	M	.44***	.059**	-.03	.02	3.4	42	5.34***	.3
		(2.6)	(2.24)	(-.13)	(.0)	(.43)			
	F	.56***	.071***	-.34**	-.3	11.51*	34	17.33***	.7
		(3.45)	(4.13)	(-2.1)	(-.95)	(1.51)			
20-23	M	.52**	.53**	-.78**	.027	6.26	24	7.67***	.6
		(2.19)	(2.14)	(-2.48)	(.04)	(.39)			
	F	.41**	.57**	-.29*	.43	-3.61	28	5.58***	.4
		(1.8)	(2.19)	(-1.33)	(.92)	(-.3)			

NOTE: The constant term is represented by b_c. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 5

REGRESSION COEFFICIENTS AND T- VALUES (IN PARENTHESES)

LIMA

AGE GROUP	SEX	S_m	E_z	N_s	A	E_c	N	F	R^2 (adj.)
6-9	M	.05**	-.11	-.07**	.73**	-4.35**	201	38.63***	.44
		(2.30)	(-.63)	(-1.87)	(12.42)	(-8.90)			
	F	.05***	.03	-.00	.65***	-4.31***	180	32.86***	.43
		(2.57)	(.23)	(-.01)	(11.16)	(-8.49)			
8-11	M	.08***	-.00	-.11***	.76***	-4.69***	205	30.62***	.39
		(3.45)	(-.00)	(-2.48)	(10.01)	(-6.35)			
	F	.07***	.22*	-.04	.78***	-5.26***	182	22.85***	.34
		(3.19)	(1.31)	(-.78)	(9.19)	(-6.61)			
10-13	M	.12***	.16	-.12***	.91***	-6.77***	209	49.11***	.54
		(4.79)	(1.06)	(-2.68)	(12.01)	(-7.32)			
	F	.10***	.47**	-.08*	.91***	-6.96***	175	38.55***	.53
		(3.42)	(2.23)	(-1.36)	(9.08)	(-5.67)			
12-15	M	.13***	.14	-.22***	.85***	-6.17***	183	34.61***	.51
		(4.05)	(.65)	(-3.35)	(8.87)	(-4.29)			
	F	.14***	.17	-.12**	.72***	-5.62***	165	25.29***	.43
		(4.43)	(.86)	(-2.19)	(7.63)	(-2.82)			
14-17	M	.15***	.35**	-.16**	.74***	-4.47***	151	23.01***	.39
		(4.21)	(1.53)	(-2.22)	(7.07)	(-2.65)			
	F	.22***	-.15	-.30***	.96***	-7.13***	177	33.74***	.44
		(5.93)	(-.69)	(-3.82)	(7.86)	(-3.71)			
16-19	M	.20***	.15**	-.09	.85***	-6.69***	149	20.85***	.37
		(5.92)	(2.08)	-1.21	(6.13)	(-2.65)			
	F	.30***	-.01	-.33***	.49***	-.17	169	23.85***	.37
		(6.78)	(-.05)	(-3.62)	(3.25)	(-.06)			
18-21	M	.24***	.12	-.34***	.13	7.22**	144	10.11***	.25
		(4.65)	(1.22)	(-2.99)	.74	(2.01)			
	F	.22***	.15**	-.43***	.21	5.86*	139	12.32***	.27
		(3.93)	(1.40)	(-3.81)	(1.01)	(1.45)			
20-23	M	.24***	1.10***	-.41***	.13	6.74	120	12.90***	.31
		(3.26)	(2.64)	(-2.83)	(.52)	(1.21)			
	F	.24***	.18**	-.48***	.29	3.98	105	6.95***	.22
		(3.13)	(1.47)	(-3.11)	(1.04)	.66			

NOTE: The coefficients and standard errors of E_z were multiplied by 10^4. The constant term is represented by b_0. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 6

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESIS) FOR MARRIAGE

AGE GROUP	SEX	S_m	E_x	N_x	A	E_c	N	F^2	R^2
6-9	M	.07***	26.66**	-.07	.71***	-4.44***	128	17.21***	.4
		(2.66)	(2.30)	(-.94)	(12.14)	(-7.42)			
	F	.09***	4.74	-.14*	.74***	-3.44***	21	42.21***	.4
		(3.25)	(.73)	(-1.39)	(11.76)	(-5.2)			
9-11	M	.13***	14.37	-.24***	.92***	-5.34***	126	44.34***	.4
		(3.93)	(1.00)	(-3.14)	(11.35)	-6.79			
	F	.15***	26.07***	-.10	.99***	-6.4***	203	47.93***	.4
		(4.35)	(2.62)	(-1.21)	(11.66)	(-5.2)			
10-13	M	.14***	29.44***	-.25***	.51***	-1.17	226	22.41***	.2
		(4.46)	(2.96)	(-3.13)	(6.29)	(-1.2			
	F	.19***	46.97***	-.09	.55***	-3.2***	162	22.78***	.3
		(4.54)	(3.14)	(-1.00)	(6.8	(-2.4			
12-15	M	.22***	36.40***	-.24***	.64***	-.8	20	20.7***	.2
		(5.77)	(3.22)	(-2.75)	(5.4	(-.			
	F	.17***	26.3***	-.09	.5 ***	-2.6*	181	22.8 ***	.2
		(4.31)	(1.64)	(-.99)	(5.2	(-2.6			
14-17	M	.28***	26.28	-.36***	.31**	1.99	169	19.93***	.2
		(5.17)	(1.14)	(-3.46)	(2.2	(.7			
	F	.15***	43.6***	-.22**	.33	2.7***	170	8.5***	.1
		(3.82)	(3.17)	(-2.27)	(3.2	(1.8			
16-19	M	.25***	46.48***	-.33***	.51***	-1.76	199	14.13***	.2
		(4.48)	(2.99)	(-2.82)	(3.65	(-.75)			
	F	.12*	60.34***	-.22*	.30**	1.19	142	4.65***	.1
		(1.59)	(3.82)	(-1.55)	(1.64)	(.37)			
18-21	M	.44***	75.30***	-.42***	-.75	20.91***	127	22.66***	.4
		(5.20)	(4.46)	(-2.56)	(-4.13)	(5.76)			
	F	.11	167.01***	.29*	-.19	6.73*	107	5.85***	.1
		(1.06)	(5.01)	(1.37)	(-.73)	(1.32)			
20-23	M	.34***	125.55***	-.56**	-.32	12.07	92	6.0***	.4
		(2.04)	(3.42)	(-1.76)	-.65	(1.21)			
	F	.21	361.09***	.45	.05	-1.67	66	11.11***	.4
		(1.26)	(6.55)	(1.55)	(.17)	-.23			

NOTE: The coefficients and standard errors of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 7

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESES) ASSOCIATED

AGE GROUP	SEX	S_m, S_f	E_x	N_s	A	E_c	N	F	R^2
6-9	M	.08*** (3.71)	-.12 (-1.02)	.03 (.42)	.85*** (8.16)	-5.47*** (-6.15)	67	23.97***	.61
	F	.03** (2.05)	.12 (1.07)	-.05 (-.79)	.83*** (10.11)	-4.56*** (-7.38)	75	24.88***	.65
8-11	M	.10*** (3.72)	-.25** (-2.06)	-.10 (-1.27)	.79*** (7.05)	-4.32*** (-3.69)	70	12.33***	.49
	F	.05* (1.41)	.44** (2.37)	-.18** (-2.26)	.81*** (7.12)	-4.74*** (-4.23)	65	17.01***	.55
10-13	M	.12*** (2.59)	-.01 (-.06)	-.11 (-.96)	.81*** (4.46)	-4.77** (-2.16)	70	6.11***	.27
	F	.05* (1.45)	.26* (1.43)	-.22** (-2.31)	.61*** (4.59)	-2.32* (-1.43)	64	10.71***	.44
12-15	M	.21*** (3.76)	.06 (.59)	-.06 (-.40)	.51** (2.32)	-1.62 (-.57)	69	7.01***	.33
	F	.11*** (3.21)	.11 (.62)	-.21** (-1.96)	1.09*** (7.83)	-8.35*** (-4.26)	76	19.63***	.63
14-17	M	.13** (2.04)	.42** (1.86)	-.15 (-1.04)	.47** (2.09)	-.55 (-.14)	65	5.45***	.27
	F	.15*** (3.10)	.26 (1.24)	-.22* (-1.63)	.55*** (3.12)	-1.19 (-.41)	81	9.01***	.42
16-19	M	.22*** (3.38)	.71** (2.36)	-.29** (-1.71)	.31 (1.21)	2.27 (.50)	67	5.74***	.37
	F	.21*** (3.63)	.25** (1.32)	-.33** (-2.14)	.23 (.90)	4.95 (1.11)	74	6.93***	.42
18-21	M	.25*** (3.35)	.26 (.69)	-.29 (-1.23)	.05 (.16)	7.27 (1.14)	54	5.46***	.37
	F	.25*** (4.25)	-.03 (-.64)	-.19 (-1.04)	-.25 (-.93)	13.97** (2.35)	69	4.43***	.23
20-23	M	.32*** (2.95)	-.11** (-1.75)	-.18 (-.47)	.97** (2.03)	-11.52 (-1.07)	43	2.21**	.19
	F	.37*** (3.69)	-.05 (-.85)	-.24 (-1.04)	.55 (1.22)	-3.72 (-.40)		5.62***	.37

NOTE: Coefficients and standard errors S_m, S_f are multiplied by 10. Coefficients and standard errors of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 6

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESIS)

BARRANQUILLA

Age Group	Sex	$S_m.S_f$	E_x	N_s	A	E_o	N	F	R^2	d.f.
6-7	M	.10*** (4.75)	.004 (.89)	-.10*** (-2.78)	.44*** (6.33)	-2.50*** (-4.46)	89	24.46***	.55	
	F	.04** (1.92)	.014*** (3.03)	-.03 (-.73)	.41*** (6.27)	-2.52*** (-5.02)	133	22.54***	.41	
8-11	M	.24*** (8.35)	.005 (.50)	-.11** (-2.24)	.43*** (5.07)	-2.61*** (-3.35)	102	55.09***	.6	
	F	.12*** (3.81)	.016*** (2.59)	-.06 (-1.14)	.70*** (7.83)	-5.30*** (-5.85)	129	25.96***	.49	
12-13	M	.26*** (6.96)	0.14* (1.46)	-.09* (-1.49)	.68*** (8.10)	-8.11*** (-6.26)	119	59.2-***	6	
	F	.21*** (5.95)	.02*** (3.38)	-.24*** (-4.06)	.57*** (5.55)	-3.75*** (-3.2-)	171	67.61***	.6-	
14-15	M	.23*** (4.43)	.03*** (3.26)	-.21*** (-2.57)	.63*** (5.55)	-7.65*** (-3.9-)	111	38.71***	.5-	
	F	.25*** (4.97)	.022** (1.75)	-.35*** (-4.5-)	.72*** (5.43)	-4.9-*** (-2.7-)	114	30.-.***	.5-	
16-17	M	.16*** (2.52)	.059*** (3.97)	-.29*** (-2.85)	.79*** (4.10)	-7.26*** (-2.34)	93	2-.13***	.4-	
	F	.24*** (-.1-)	.017 (1.27)	-.26*** (-2.35)	.85*** (4.26)	-7.5-** (-2.29)	93	24.5-***	.5-	
18-1	M	.21** (2.29)	.066*** (2.63)	-.13 (-.92)	.45* (1.55)	-2.85 (-.56)	65	9.77***	.35	
	F	.16* (1.66)	.056*** (3.85)	-.35** (-2.21)	.44* (1.40)	-2.20 (-.22)	57	13.6-***	.51	
1-11	M	.31*** (2.45)	.045* (1.49)	-.11 (-.47)	.07 (.18)	4.17 .52	42	5.24***	.36	
	F	.2-** (2.09)	.074*** (3.44)	-.39** -2.29	-.19 (-.43)	9.54 (1.12)	34	12.6-***	.64	
20-23	M	.3-*** (2.52)	.03- (1.25)	-.87*** (-3.05)	-.10 (-.14)	10.-? (.73)	24	8.50***	.6-	
	F	.22* (1.46)	.04- (1.27)	-.29 (-1.29)	.53 (1.08)	-3.97 (-.40)	2-	4.97***	.4-	

NOTE: Coefficient of $S_m.S_f$ is multiplied by 10. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 9

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESES

LIMA

AGE GROUP	SEX	S_m, S_f	E_a	N_a	A	E_c	R^2	F	F'	D-W
6-9	M	.01	.01	-.6**	.7***	-4.07***	22%	39.7***		
		(.8)	(.6)	(-2.2)	(11.2)	(-5.1)				
	F	.02**	.01	-.01	.6	-4.2*	18%	31.3***		
		(2.4)	(.44)	(-.04)	(11.0)	(-5.2)				
6-11	M	.03***	.07	-.11***	.7***	-4.4***	22%	17.7***		
		(2.05)	(.40)	(-2.66)	(9.9)	(-5.9)				
	F	.04***	.19	-.04	.78***	-5.12***	15%	22.45***		
		(3.0)	(1.09)	(-.75)	(9.20)	(-5.69)				
10-13	M	.08***	.06	-.11**	.94***	-6.66***	20%	45.5***		
		(4.6)	(.44)	(-2.27)	(12.29)	(-7.21)				
	F	.06***	.43**	-.06**	.92***	-6.55***	17%	27.5***		
		(3.14)	(1.96)	(-1.29)	(8.91)	(-5.41)				
12-15	M	.08***	.07	-.19***	.88***	-5.66***	24%	33.5***		
		(3.7)	(.29)	(-3.0)	(8.6)	(-4.0)				
	F	.07***	.36	-.14**	.79***	-3.9***	16%	22.3***		
		(3.4)	(1.7)	(-1.9)	(7.1)	(-3.0)				
14-17	M	.09***	.29	-.14***	.7***	-4.1***	19%	24.5***		
		(4.3)	(1.14)	(-2.0)	(7.4)	(-2.5)				
	F	.1***	-.25	-.23***	.9***	-6.2***	17%	34.3***		
		(5.0)	(-1.5)	(-3.6)	(7.7)	(-3.5)				
16-19	M	.11***	.15**	-.06	.9***	-7.2***	14%	23.5***		
		(6.6)	(2.12)	(-.79)	(8.6)	(-2.9)				
	F	.15***	-.17	-.34***	.14***	1.0	16%	23.9***		
		(6.8)	(-.6)	(-3.7)	(3.1)	(.39)				
18-21	M	.13***	.14*	-.35***	.15	7.5**	14%	9.4***		
		(4.39)	(1.36)	(-2.66)	(.83)	(2.1)				
	F	.15***	.14*	-.41***	.27*	6.0*	13%	13.03***		
		(4.22)	(1.31)	(-3.58)	(1.30)	(2.2)				
20-25	M	.12**	1.07***	-.44***	.15	7.41*	12%	11.7***		
		(2.6)	(2.38)	(-3.01)	(.56)	(1.32)				
	F	.18***	.16*	-.43***	.27	4.5*	11%	9.11***		
		(4.15)	(1.31)	(-2.91)	(.99)	(.79)				

NOTE: Coefficients and standard errors S_m, S_f are multiplied by 10. The coefficients and standard errors of E_a were multiplied by 10^4. The constant term is represented by t_c. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 10

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESES)

MARACAIBO

AGE GROUP	SEX	S_m, S_f	E_x	N_s	A	E_c	N	F	R^2
6-9	M	.12***	23.79**	-.07	.76***	-4.36***	155	35.65***	[illegible]
		(3.40)	(2.06)	(-.90)	(11.95)	(-7.82)			
	F	.10***	3.05	-.05	.77***	-4.21***	217	42.48***	.44
		(3.32)	(.46)	(-1.26)	(12.50)	(-5.29)			
8-11	M	.16***	7.12	-.22***	.89***	-4.59***	214	47.24***	.47
		(4.71)	(.49)	(-2.87)	(11.18)	(-5.59)			
	F	.15***	19.64**	.00	.98***	-6.71***	209	47.26***	.49
		(4.15)	(1.75)	(.00)	(11.40)	(-6.25)			
10-13	M	.19***	21.93**	-.16**	.53***	-1.54**	226	23.35***	.37
		(5.11)	(2.16)	(-2.04)	(6.73)	(-1.67)			
	F	.19***	52.45***	-.01	.61***	-3.38***	169	20.28***	.34
		(3.60)	(3.26)	(-.14)	(6.94)	(-3.07)			
12-15	M	.25***	27.25**	-.14**	.43***	-.67	[illegible]	19.57***	.2[illegible]
		(5.52)	(2.30)	(-1.51)	(5.2[illegible])	(-.66)			
	F	.14***	35.65**	-.05	.54***	-2.11*	[illegible]	10.79***	.27
		(3.30)	(2.05)	(-.45)	(4.64)	(-1.34)			
14-17	M	.29***	23.07	-.30***	.27**	2.30	165	12.52***	.24
		(4.87)	(.57)	(-2.92)	(1.91)	(1.07)			
	F	.13***	46.79***	-.24**	.18**	3.76**	176	6.37***	.13
		(2.41)	(3.32)	(-1.95)	(1.35)	(1.79)			
16-19	M	.31***	47.33***	-.30***	.56***	-2.54	155	13.15***	.28
		(4.16)	(3.05)	(-2.55)	(3.92)	(-1.03)			
	F	.08	61.72***	-.25**	.23**	1.65	140	4.3[illegible]***	.11
		(.77)	(3.87)	(-1.75)	(1.55)	(.54)			
18-21	M	.59***	76.73***	-.41***	-.76	21.81***	127	21.00***	.43
		(4.73)	(4.47)	(-2.42)	(-4.15)	(5.93)			
	F	.24**	162.59***	.32	-.27	7.95*	107	6.75***	.21
		(2.05)	(4.94)	(1.59)	(-1.02)	(1.56)			
20-23	M	.96***	111.94***	-.27	-.91	5.77	53	12.59***	.51
		(4.01)	(3.36)	(-.95)	(-.21)	(.64)			
	F	.44***	318.26***	.64**	.16	-4.64	66	13.55***	.47
		(2.71)	(5.70)	(2.26)	(.53)	(-.66)			

NOTE: Coefficients and standard errors S_m, S_f are multiplied by 10. The coefficients and standard errors of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE 11

INTER-CITY COMPARISON OF REGRESSION COEFFICEINTS OF TABLES 1 - 4 FOR AGE GROUPS 20 - 23

	Males		Females	
	S_m	N_s	S_m	N_s
Asuncion	.41*** (3.18)	-.34 (-.94)	.46*** (2.50)	-.35* (-1.47)
Baranquilla	.52** (2.19)	-.78** (-2.48)	.41** (1.88)	-.29* (-1.33)
Lima	.24*** (3.26)	-.41*** (-2.83)	.24*** (3.13)	-.48*** (-3.11)
Maracaibo	.34*** (2.04)	-.56 (-1.76)	.21 (1.26)	.45 (1.55)

* Significant at 10% or less

** Significant at 5% or less

*** Significant at 1% or less

In Tables 3 through 6, the results appear closely similiar in terms of the structure of the statistical significance of the coefficients. In the four cities, the mother's education comes out as a strong explanatory variable as expected, reading almost always levels of sifnificance of one per cent. No systematic differences appear by sex except in Maracaibo,in Table 6, in which mothers' education does not result significant for girls in the three highest age groups. Maracaibo is the city with the lowest mean value of years of schooling (for children as well as for parents) but there are not strong differences in schooling between sexes as Table A1 shows, nor in its variance, as it could be suspected.

Family's expenditure, which is used here to test for income effects, do not appear generally significant in Asunción or Lima, while in Barranquilla they become strongly and systematically significant for each sex and age group. Something similiar happens with the Maracaibo sample though not as regularly or as strongly as in Barranquilla. These results are rather puzzling. Maracaibo and Barranquilla have the lowest means of years of schooling of the four cities. If at very low levels of mother's schooling, this variable ceases to have any influence, income effects could be expected to play a role as a substitute for education. However, mother's education in Maracaibo and Barranquilla is as strongly significant a variable as it is in Asunción or Lima. On the other hand, there is no evidence

that public schools are not as available in Maracaibo or Baranquilla as they are in the other two cities. One possible explanation is that as Maracaibo and Baranquilla are not capital cities as Asunción and Lima are, wealthy families prefer to send their children to better schools in Caracas (Venezuela) or Bogotá (Colombia). Though universities are generally free in these countries (with some exceptions) expenditures of living out of the household cannot be afforded by everyone.

Regarding differences in income effects by sex, they are not significant in Barranquilla, but appear generally stronger for females in Maracaibo, especially for the top age groups in which the corresponding coefficient for females is almost three times as high as the coefficient for males. This could be a result of a preference of females to return to Maracaibo after they complete a certain level of schooling in Caracas, while the males do not return and consequently are not captured in the samples. Those males that never leave Maracaibo for higher levels of schooling seem to invest less in education. This notion is supported by the fact that, as represented in Figure 1, the mean schooling of females is higher than for males for the top age group.

Number of children in the family always results with the expected negative sign though with somewhat erratic significance due to collinearity with mother's education, since more educated mothers tend to have smaller families.

In any event, N_s offers some consistent but also puzzling results. On the one hand, it comes out generally more negative for girls than for boys in Asunción and Barranquilla for age groups 10-13 and older; while in Lima this does not begin to happen until age group 14-17. For the lower age groups in Asunción no differences appear between sexes, while in Baranquilla and Lima it is the boys' younger age groups who are more negatively affected by N_s with the only exception of the youngest age group. In general the results of family size are consistent with Birdsall's (4, 1979) and with a number of hypotheses and explanations, besides Nisbet's (op. cit.) line of reasoning. With family income fixed, an increase in family size lowers per capita income within the family and resources available for each child. On the other hand, following Becker and Tomes, (3, 1972) an increase in family size raises the shadow price of child quality of which the most important input is time allocated by the parents, which at the same time is consistent with this work's assumption that that input is an important determinant of a child's ability to cope with the academic standards of the school system.

Before going into the discussion of the results of the second model, it is worth pointing out that the regressions do not show any strong changes of the explanatory structure of the model as one moves from lower age groups to the highest ones. Yet there are some necessary qualifications. Mothers' schooling seems to loose signifi-

cance at the top age groups in Baranquilla and for Maracaibo females. Income effects, though generally not significant in Asunción and Lima, tend to appear significant on this upper half of the age spectrum. Family size tends to loose significance at the upper age levels also. In synthesis, the results very slightly suggest that the importance of income effects increases with age while the influence of other family characteristics (more closely related with the family's ability to prepare children to be successful in school) decreases with children's age.

The results that correspond to model 2 are presented in Tables 7 through 10. They are essentially consistent with the results of model 1 in terms of the structure of statistical significance of the regression coefficients, as well as according to F values and R squares; not providing any possibilities for a different interpretation.

As mentioned earlier, a more appropriate specification should have included a test for the additive effects of S_m and S_p separately. That test was actually performed with a different grouping of the ages, but the great level of correlation between those two variables produced specific estimates that were highly unstable, and are not reported here. Yet possibilities of substitution between fathers' and mothers education could be an interesting area to be investigated, but that would also require information about time spent at home by each parent, which is not available

in these samples.[16]

In summary, the value of the regression results found for four different samples lies more in the consistency with which the estimates and the significance of the variables appear. By replicating the same tests with different samples, the conclusions are less subject to the vagaries of sampling error. Nevertheless, it is interesting to compare the regression coefficients between cities and observe their variations. Table 11 presents a summary of the results shown on Table 3 through 6 for the age group 20-23. The variable E_x is ommited due to its high instability by age group and for the fact that it is measured in different currencies that are not easily reduced to a common unit of comparison.

The most obvious difference between coefficients appears with regard to mother's schooling. The highest coefficients correspond to Asunción and Baranquilla, reaching values twice as high as the corresponding coefficients for Lima and Maracaibo, regardless sex. No apparent factors can be applied to explain these variations. Both Asunción and Baranquilla produced contradictory results regarding significance of income effects. On the other hand, family size measured by the number of siblings is seen to have very

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[16]Notice as a curiosity that $S_h = f(S_m \cdot S_f)$ is a valid proposition, with each $f' > 0$, a society maximizes the education (or perhaps only years of schooling) of the next generation when marriages occur between educationally compatible persons, since (in the two-couple case): $(ab + cd) > (ad + cb)$ when $a > c$ and $b > d$, and $a < c$ and $b < d$.

stable mean values as shown in Table A1 and A4 and though slightly lower for Asunción and Maracaibo, it does not leave possibilities to speculate about a stronger mothers' influence in the presence of smaller families. It would fit Asunción, but not Baranquilla. In any case, the formulation of ad hoc theories based on empirical observation is usually a risky exercise. The coefficients that correspond to number of siblings do not show more than discussed previously.

CHAPTER VII

CONCLUSION

In general, the findings support the notion that sociological factors that operate within the family affect the amount of education of the children by constraining the family's decision-making process regarding investment in education. If, in the presence of free schooling, individuals behave as maximizers of education, variations in the levels of education by individuals do not result necessarily from family decisions. Income (approximated by family expenditures) seem to play a role in Baranquilla and Maracaibo[17], and in this respect we can confirm the implication of human capital theory in the sense that individual differences in education can be explained by variations in ability to pay for education.

At this point, we must take into consideration that ability to pay for education could only be an effective "constraint" in the absence of capital markets. Otherwise borrowing could overcome any income constraint. But in the Latin American case, capital markets available to finance individual education are practically non-existent,

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[17]Curiously, the income variable does not appear significant in the Asunción and Lima samples, where the R squares are relatively lower than in the other two cities. This could be a result of a great deal of noise in the expenditures data, so this variable might have not really had an opportunity to be tested, This possibility is consistent with reports that in the Asunción survey, the data were not collected carefully enough. However, in the Lima sample, it is understood that the field work and data processing were conducted with a high degree of competence.

especially when we are talking about low level education.[18] In any case, income could play the role of a necessary condition to attain a certain level of education but it is not a sufficient condition. The importance of the variables representing the sociological element of schooling determination (parental schooling) appears systematically, and can lead us to think that, in the process of individual accumulation of years of schooling, there are phenomena that take place out of the awareness of the actors. The lower the educational attainment of the parents, the narrower the choice set in terms of investment behavior in human capital involving the children.

It must be emphasized that this mechanism of schooling determination could be stronger than the regression results indicate. The proportion of the variance explained by the models ranges from 19 to 70 percent, in the two highest age groups.[19] The tendency of the R squares to be around 0.50 can be considered remarkable given the roughness of the variables used in a cross section sample. We

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[18]Let us not forget that financing individual's investment in higher education would not solve the problem of low overall levels of schooling, if income were "the" constraint, since the incapacity to reach more schooling begins to appear at very early ages.

[19]The R squares for the younget groups are inflated by the significance of the variable age, which is trivial. For the two oldest groups, however, that variable is not significant and therefore the R square becomes a "cleaner" indicator of determination.

only have years of schooling of the individuals and his parents. We know nothing about the effective or real education behind those measurements. We do not know either the actual influences of other "socialization" processes (school, neighborhoods, relatives.)

We cannot, however, exaggerate that influence and much less, do so by speculative considerations. Parental education may also influence their children's educational achievement through a more careful choice of school. Even though we stated here earlier that any country's formal education system may be considered uniform in terms of curriculum design (that could be incompatible with the educability of a large segment of the school-age population), some schools might be more efficient than others after all in their ability to retain children in the educational system. In an ECIEL study by Castro, Sanguinetty and Lacerda (op. cit.), achievement scores are higher in private schools than in public schools, and in urban with respect to rural schools. One must also note that the urban and private schools have a greater representation of children from more highly educated parents than there are represented in public schools, urban and rural. The fact is that there is no clear understanding about the separate contribution of the school to the children's education vis-a-vis the family's influence.

Underlying all this is the absence of a theory of learning which is not necessarily missed in a developed

society,[20] where there is more variety in the forms of educational opportunities on the supply side, satisfying therefore a large proportion of the population. Thus, the demand for education can be more easily explained as an investment process, where the school and the family can be considered, if ever, as black boxes.

In underdeveloped societies, where educational institutions and systems seem to be a result of imitation from the more advanced countries, demand for education does not find enough possibilities of materialization, since the inflexibility of the availabile forms of education do not seem to suit the majority of the population. In this case, the options of an investment process do not appear as clear as elsewhere, regardless the instance in which it does operate.

If, in any event, the low effective demand for schooling can be explained by family educational deficiencies, two important implications might be worth mentioning here, regarding a long run policy to raise general levels of education. One is that the uniformity or uniqueness of the school curriculum at low levels of education should be replaced by a diversified system. In this fashion, students with different capabilities could be given feasible options to invest in education. This, of course, assumes that the necessary technological solutions exist (which is debatable)

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[20] If we forget about the poorest strata in those societies. Otherwise the relevance may become apparent.

from the educational or pedagogical point of view.[21] Basically, those technological solutions consist in the ability of the school system to compensate for the lack of the necessary education of the students' parents. The current school system in Latin America is designed for the better endowed intellectually and in this way seems to produce an unacceptably (according to policy desires or targets) high proportion of dropouts or "deserters" as they are called in Spanish.[22]

As an illustration, we should consider that in Bolivia and Perú, some experiments are presently being carried out to adapt Aymara or Quechua speaking children to the school by trying to teach them in their mother tongue and by using values of their culture. The objective does not necessarily constitute a departure from the dominant Spanish culture, but it is expected to create a transitional stage, which would soften the cultural trauma of a child

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[21]Any investment process supposes the existence of the capacity of an economy to produce the investment good. Without that production, no investment is possible, and education is no exception.

[22]That characterization may actually be inaccurate, since it implies that the dropout leaves the school by his own will and even doing something morally wrong. Tacitly it rejects the possibility that it is the school system which determines who will invest in human capital by means of requirements arbitrarily established, without considering the actual needs and capabilities of the society. Paradoxically, by trying to be egalitarian in doctrine, the schools seem to be non-egalitarian in their praxis.

who lives his first years in one kind of environment and suffers a drastic change to another. This example is an extreme case of the lack of compatibility between the environments of the home and of the school. There are other incompatibilities between home and school which are less dramatic or visible but probably are as effective in producing school dropouts.

The second implication involves influencing the family behavior and though it could be considered far-fetched here, I see no reason why it should not be mentioned with all customary warning.

Individual's tastes, attitudes and values can change. The question is how and in how much time. Information about the existence of germs, for instance, long ago modified many household practices. Publicity about the effects of cigarrette smoking is having an impact. The advantages of exercising and having certain diets are becoming better known and are also succeeding in changing consumer's preferences. New equilibrium positions in the consumer's behavior can result from much more than mere changes in income levels and relative prices.

Parents, on the other hand, improvise in the art of child rearing. In some schools, they might have learned how to cook or how to do a number of household chores, including changing diapers, but they are not taught how to educate their children, especially how to make them efficient investors in human capital. Historically established

cultural values and a great deal of improvisation play their roles through routine in some aspects and at random in others.

The fact is that more seems to be known about child's psychology and family education processes than parents are aware of, even educated parents. Is it then reasonable to think that social efforts to educate families on childrens' education could pay off?

These possible implications, needless to say, must be taken cautiously. Much more thought and (as usual) more research is necessary. In any event, the relevance of the subject in relation to the level of efficiency in which resources are allocated in underdeveloped countries is becoming apparent.

TABLE A1

MEANS AND STANDARD ERRORS (IN PARENTHESES) IN VARIABLES

ASUNCION

Age Group	Sex	S_h	S_m	E_x	N_s	N
6 - 9	M	1.77 (1.37)	7.20 (3.78)	13079 (11152)	3.57 (1.56)	60
	F	1.45 (1.22)	6.70 (3.76)	12911 (9902)	3.28 (1.49)	75
10- 13	M	4.60 (1.85)	5.63 (3.37)	13960 (22498)	3.67 (1.85)	70
	F	4.54 (1.51)	6.11 (3.31)	12943 (10553)	3.56 (1.62)	64
14 - 17	M	7.66 (2.30)	6.32 (3.13)	15614 (14515)	3.74 (1.85)	65
	F	8.11 (2.17)	5.35 (3.28)	11692 (9815)	3.71 (1.64)	82
18 - 21	M	9.09 (3.07)	6.17 (3.89)	13490 (10352)	3.50 (1.60)	54
	F	9.23 (2.98)	6.49 (3.54)	23315 (66530)	3.74 (1.81)	65

TABLE A2

MEANS AND STANDARD ERRORS (IN PARENTHESES) IN VARIABLES

BARANQUILLA

Age Group	Sex	S_h	S_m	E_x	N_s	N
6 - 9	M	.95 (.97)	5.22 (3.12)	29.83 (21.92)	4.40 (1.97)	89
	F	1.06 (1.42)	6.18 (3.19)	31.13 (21.77)	3.99 (1.96)	133
10 - 13	M	3.36 (2.20)	5.73 (3.48)	30.26 (19.57)	4.21 (1.98)	119
	F	3.60 (3.17)	5.54 (3.23)	30.45 (21.50)	4.16 (1.98)	126
14 - 17	M	5.88 (2.89)	5.87 (3.23)	29.62 (19.51)	4.56 (2.25)	93
	F	6.23 (4.02)	5.40 (3.20)	29.32 (22.55)	4.21 (1.92)	93
18 - 21	M	8.26 (3.72)	5.83 (3.40)	32.90 (22.18)	3.95 (2.15)	42
	F	8.06 (5.43)	4.91 (3.18)	36.03 (27.43)	4.03 (2.50)	34

TABLE A3

MEANS AND STANDARD ERRORS (IN PARENTHESES) IN VARIABLES

LIMA

Age Group	Sex	S_h	S_m	E_x	N_s	N
6 - 9	M	1.13 (1.25)	6.84 (3.88)	4306 (4432)	3.99 (1.86)	201
	F	1.17 (1.76)	7.46 (4.52)	5772 (6416)	4.09 (2.02)	180
10 - 13	M	4.23 (2.36)	7.23 (3.90)	5365 (5553)	4.22 (1.95)	208
	F	4.33 (2.53)	7.06 (4.39)	5421 (5685)	4.04 (1.94)	175
14 - 17	M	7.74 (2.78)	7.46 (4.29)	6439 (6200)	3.98 (1.89)	181
	F	8.08 (3.12)	7.90 (3.94)	6704 (6567)	3.71 (1.74)	177
18 - 21	M	10.44 (3.83)	7.86 (4.10)	8037 (20974)	3.94 (1.82)	144
	F	9.94 (4.11)	7.55 (4.31)	8479 (22005)	4.09 (2.10)	139

TABLE A4

MEANS AND STANDARD ERRORS (IN PARENTHESES) IN VARIABLES

MARACAIBO

Age Group	Sex	S_h	S_m	E_x	N_e	N
6 - 9	M	1.60 (1.33)	3.73 (3.06)	106.95 (69.04)	3.62 (1.03)	185
	F	1.63 (1.93)	3.87 (2.49)	120.67 (115.87)	3.39 (1.02)	217
10 - 13	M	4.58 (2.30)	3.57 (2.81)	116.00 (90.67)	3.55 (1.11)	226
	F	4.56 (2.29)	3.84 (2.76)	120.64 (72.17)	3.77 (1.15)	169
14 - 17	M	6.27 (2.69)	3.50 (2.80)	112.74 (65.04)	3.61 (1.38)	168
	F	6.40 (2.97)	3.34 (2.99)	122.85 (107.63)	3.77 (1.31)	176
18 - 21	M	7.16 (3.90)	2.98 (2.70)	144.97 (127.64)	4.24 (1.34)	127
	F	6.66 (4.39)	3.64 (2.98)	123.12 (83.66)	4.04 (1.42)	107

TABLE A5

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESES

ASUMCION

AGE GROUP	Sex	S_m	E_x	N_E	B_C	N	F	R^2 adj.
6 - 9	M	.15*** (3.12)	-.16 (-.9	-.04 (-.5	1.06*** (2.04	6	2.44	.1
	F	.10 * (2.24)	.03 (.18)	.03 (1.35)	.84 (1.3	75	1.3	.
9 - 12	M	.06* (1.33)	-.1 (-.69	-.11 (-1.11)	3.30*** (5.96	7	2.4	.
	F	.11** (1.68)	.46*** (2.12)	-.11 (-.97)	2.16*** (3.34)	65	4.32***	.1
12 - 15	M	.13** (2.0	.0 (.34	-.16* (-1.34	4.42*** (6.2	7	1.71	.
	F	.04 (.65)	.41* (2.13)	-.28*** (-2.61	4.76*** (7.9	64	5.69***	.1
15 - 18	M	.29*** (3.67)	.14 (1.26)	-.04 (-.3	4.4*** (4.9	63	5.7***	.2
	F	.2*** (3.4	-.04 (-.3	-.16 (-1.4	6.0*** (7.2	76	3.22**	.1
18 - 21	M	.22** (2.16)	.3 (1.55)	-.16 (-1.07	6.3*** (6.59	69	6.2***	.1
	F	.21*** (3.05)	.34 (1.4	-.16 (-1.16	7.1*** (9.53	82	4.21***	.14
21 - 24	M	.3*** (4.06)	.70*** (2.43)	-.25** (-1.81	6.55*** (6.96	67	15.83***	.62
	F	.3*** (4.33)	.4** (2.09)	-.3** (-2.18	8.0*** (9.96	74	11.3***	.3
24 - 27	M	.4*** (3.96	.26 (1.76	-.3* (-1.59	7.4*** (6.52	54	9.5***	.3
	F	.4*** (4.31)	-.03 (-.53)	-.2 (-1.17)	7.4*** (7.12)	65	6.3***	.24
27 - 30	M	.34*** (2.66)	-.0 (-1.06)	-.5** (-1.38)	9.75*** (6.21)	43	2.29	.15
	F	.58*** (3.44)	-.03 (-.42)	-.36* (-1.48)	6.86*** (4.0	44	4.35***	.25

NOTE: The coefficeints and standard error of E_x were multiplied by 10^4. The constant term is represented by b_0. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE A6

REGRESSION COEFFICIENTS AND T-VALUES (IN PARENTHESES)

BARRANQUILLA

AGE GROUP	Sex	S_m	E_x	N_a	B_o	N	F	R^2 adj.
6 - 9	M	.07**	.01***	-.13	.69***	89	12.16***.3	
		(2.12)	(3.33)	(-2.84)	(2.51)			
	F	.06**	.02***	-.01	.17	133	14.12***.2	
		(2.07)	(3.93)	(-.30)	(.64)			
8 -11	M	.31***	.01**	-.13**	.54*	102	36.67***.54	
		(7.56)	(2.15)	(-2.15)	(1.50)			
	F	.13***	.02***	-.06	1.00***	129	11.24***.2	
		(2.55)	(4.64)	(-.93)	(2.46)			
10 -13	M	.30***	.03***	-.18***	1.39***	119	43.40***.5	
		(5.74)	(3.52)	(-2.51)	(-2.51)			
	F	.32***	.04**	-.25***	1.70***	126	69.19***.6	
		(6.20)	(4.97)	(-3.85)	(4.34)			
12 -15	M	.34***	.05***	-.14**	1.87***	115	34.52***.4	
		(4.93)	(4.11)	(-1.68	(3.35			
	F	.40***	.02**	-.29***	3.22***	114	43.25*** .5	
		(6.16	(2.0	(-3.3	...			
14 -17	M	.35***	.05***	-.29***	.71***	93	25.41***.4	
		(4.23)	(3.72)	(-2.85	(5.17)			
	F	.41***	.03***	-.30***	4.73***	93	31.20***.5	
		(5.27)	(2.66)	(-3.32)	(6.77)			
16 -19	M	.29***	.07***	-.14	3.97***	65	14.77***.4	
		(2.90)	(3.71)	(-1.05)	(4.65)			
	F	.26***	.06***	-.29**	5.13***	57	21.66***.5	
		(2.70)	(5.43)	(-2.07)	(5.76)			
18 -21	M	.44***	.06**	-.03	3.89***	42	7.85***.3	
		(2.63)	(2.32)	(-.13)	(2.89)			
	F	.50***	.07**	-.33**	4.33	34	24.02***.71	
		(3.34)	(4.20)	(-2.13)	(4.30)			
20 -23	M	.52**	.05**	-.78***	6.62***	24	11.69***.6	
		(2.26)	(2.24)	(-2.55)	(3.01)			
	F	.42**	.06**	-.22	5.09***	28	7.86***.4	
		(1.95)	(2.19)	(-1.07)	(3.54)			

NOTE: The coefficients and standard error of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE A7

REGRESSION COEFFICEINTS AND T-VALUES (IN PARENTHESES)

LIMA

AGE GROUP	Sex	S_n	E_x	N_e	B_o	N	F	R^2 (adj.)
6 - 9	M	.04***	.03	-.05	1.06***	201	.52	.01
		(1.36)	(.11)	(-.94)	(3.56)			
	F	.04**	.16	-.01	.79**	180	1.71	.03
		(1.76)	(1.14)	(-.14)	(2.73)			
8 -11	M	.09***	-.01	-.08*	2.25***	205	5.26***	.07
		(3.34)	(.03)	(-1.36)	(6.79)			
	F	.05**	.22	-.07	2.55***	180	1.95	.03
		(1.70)	(-1.06)	(1.08)	(6.67)			
1 -13	M	.13***	.14	-.15***	3.83***	208	10.54**	.13
		(4.11)	(.60)	(-2.57)	(10.25)			
	F	.08***	.60***	-.06	3.73***	175	5.76***	.09
14 -15	M	.13***	.30	-.26***	5.88***	203	14.78***	.18
		(3.56)	(1.21)	(-3.68	(13.63)			
	F	.15***	.25	-.16**	5.51***	165	13.41***	.20
		(4.33)	(1.10)	(-2.20)	(12.70)			
16 -17	M	.15***	.32	-.15**	7.00***	181	11.37***	.16
		(3.66)	(1.15)	(-1.91)	(15.41)			
	F	.23***	-0.08	-.33***	7.52***	177	16.50***	.24
		(5.38)	(-3.63)	(-3.63)	(13.77)			
18 -19	M	.19***	.16**	-.13*	6.32***	148	12.65***	.21
		(5.14)	(1.96)	(-1.43)	(16.32)			
	F	.31***	-.01	-.30***	8.22***	169	27.15***	.33
		(6.68)	(-.03)	(-3.22)	(13.86)			
18 -21	M	.24***	.11	-.34***	9.61***	144	13.78***	.23
		(4.71)	(1.15)	(-3.05)	(14.29)			
	F	.23***	.15	-.43***	9.87***	139	16.54***	.27
20 -23	M	.24***	1.15***	-.41***	9.58***	120	17.70***	.31
		(3.23)	(2.82)	(-2.83)	(10.24)			
	F	.24***	.16*	-.47***	10.11***	105	9.32***	.22
		(3.15)	(1.35)	(-3.10)	(10.04)			

NOTE: The coefficeints and standard error of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

TABLE A8

REGRESSION COEFFICEINTS AND T-VALUES (IN PARENTHESES)

MARACAIBO

AGE GROUP	Sex	S_m	E_x	N_s	B_o	N	F	R^2 (adj.)
6 - 9	M	.03	22.33*	.04	1.10**	185	.62	.01
		(1.10)	(1.44)	(.36)	(2.42)			
	F	.16***	-1.24	.13	.60*	217	6.62***	.08
		(4.61)	(-.15)	(1.43)	(1.57)			
8 -11	M	.14***	11.42	-.38***	4.11***	214	10.42***	.13
		(3.40)	(.63)	(-3.97)	(9.27)			
	F	.22***	14.02	.08	3.70***	208	11.58***	.14
		(5.15)	(1.06)	(.73)	(3.59)			
10 -13	M	.16***	30.45***	-.24***	4.50***	226	13.48***	.15
		(4.62)	(2.82)	(-2.79)	(12.71)			
	F	.17***	54.47***	-.07	3.53***	169	11.78***	.16
		(3.62)	(3.09)	(-.70)	(7.40)			
12 -15	M	.21***	34.41***	-.27***	5.30***	207	16.16***	.19
		(5.14)	(2.85)	(-2.87)	(13.26)			
	F	.16***	30.92*	-.09	5.22***	180	7.42***	.11
		(3.80)	(3.14)	(-2.33)	(11.61)			
14 -17	M	.28***	27.99	-.32***	6.13***	168	16.29***	.23
		(5.12)	(1.20)	(-3.14)	(12.66)			
	F	.19***	43.50***	-.27**	6.23***	176	11.63***	.17
		(3.80)	(3.14)	(-2.33)	(11.61)			
16 -19	M	.23***	57.13***	-.25**	6.78***	155	13.62***	.21
		(4.00)	(3.64)	(-2.07)	(11.69)			
	F	.12*	56.36***	-.16	6.17***	142	5.65***	.11
		(1.64)	(3.59)	(-1.28)	(9.88)			
18 -21	M	.42***	76.39***	-.39**	6.46***	127	22.32***	.35
		(4.72)	(4.26)	(-2.23)	(7.16)			
	F	.10	16.40***	.29*	3.11***	107	8.07***	.19
		(.92)	(4.97)	(1.39)	(2.71)			
20 -23	M	.32*	12.61***	-.62**	5.69***	53	11.24***	.41
		(1.95)	(3.46)	(-2.04)	(3.26)			
	F	.2	36.32***	.45*	-.45	66	15.64***	.43
		(1.26)	(6.82)	(1.58)	(-.25)			

NOTE: The coefficients and standard errors of E_x were multiplied by 10^4. The constant term is represented by b_o. N is the number of children. R^2 is adjusted for degrees of freedom. Tests are one-tailed.

* Significant at 10% or less
** Significant at 5% or less
*** Significant at 1% or less

BIBLIOGRAPHY

1. Beaton, Albert E., "The Influence of Education and Ability on Salary and Attitudes" in Education, Income and Human Behavior, edited by F. Thomas Juster, National Bureau of Economic Research, New York: McGraw Hill Company, 1975

2. Becker, Gary S., Human Capital and the Personal Distribution of Income, W.S. Wotinsky Lecture Nº 1, The University of Michigan, 1967

3. Becker, Gary S., and Tomes, Nigel, "Child Endowments and the Quantity and Quality of Children", Journal of Political Economy, Vol. 84, Nº 4, Part II, August 1976

4. Birdsall, Nancy M., Siblings and Schooling in Rural Colombia, unpublished Ph.D. dissertation, Yale University, 1979

5. Bernstein, Basil, "Social Class and Linguistic Development : A Theory of Social Learning", in Education, Economy and Society, edited by A.H. Halsey, Jean Floud and C. Arnold Anderson, New York: The Free Press, 1961

6. Bettelheim, B.,"How Much Can Man Change?" in Profile of the School Dropout, edited by D. Schriebner, New York: Random House, 1967

7. Blaug, Mark, "The Empirical Status of Human Capital Theory : A Slightly Jaundiced Survey", in The Journal of Economic Literature, Vol. 14, Nº 3, September, 1976

8. Bloom, Benjamin S., Engelhart, Mas D., Furst, Edward J., Hill, Walker H., Krathwohl, David R., Taxonomy of Educational Objectives : Cognitive Domain, New York: David McKay Co., Inc., 1956

9. Bloom, Benjamin S., Krathwohl, David R., Masia, Bertran M., Taxonomy of Educational Objectives : Affective Domain, New York: David McKay Co., Inc., 1964

10. Bowles, Samuel, "Schooling and Inequality from Generation to Generation", Journal of Political Economy, Volume 80, May/June 1972

11. Bowman, Mary Jean, "By Art as Well as By Nature" in Education and Economic Development, edited by Arnold Anderson and Mary Jean Bowman, Aldine Publishing Co., Chicago, 1965

12. Bowman, Mary Jean and Anderson, Arnold C., The Participatior of Women in the Third World, The Ford Foundation, 1978

13. Castro, Claudio de M., Sanguinetty, Jorge and Lacerda, Eloy R., Os Determinantes de Escolaridade e do Rendimiento, Programa ECIEL, Rio de Janeiro, 1978

14. Castro, Claudio de M., Investimento em Educaçao no Brasil : Um Estudo de Duas Comunidades Industrias, Rio de Janeiro, Instituto de Planejamento Econômico e Social/Instituto de Pesquisas, 1973

15. Coleman, James S. et al, Equality of Educational Opportunity, Washington, D.C., U.S. Government Printing Office

16. Conlisk, John, "Determinants of School Enrollment and School Performance", The Journal of Human Resources, Vol. 4, Nº 2, Spring 1969

17. Chernichovsky, Dov, Fertility Behavior in Developing Countries : An Investment Approach, Unpublished Ph.D. dissertation, City University of New York, 1975

18. Deutsch, M., "Early Social Development" in Profile of the School Dropout, edited by D. Schrieber, New York : Random House, 1967

19. Edwards, Linda N. and Grossman, Michael, Children's Health and the Family, Working Paper, National Bureau of Economic Research, New York, 1978

20. Floud, Jean, "Social Class Factors in Ability and Educational Opportunity, edited by A.H. Halsey, Paris; O.E.C.D., 1961

21. Harrison, Frederick H., Human Resources as the Wealth of Nations, New York : Oxford University Press, 1973

22. Harnqvist, Kjell, Individual Demand for Education, O.E.C.D., Paris, 1978

23. Hartman, Martha, "Postulados Lingüisticos del Idioma Aymara" in El Reto del Multilingüismo en Perú, edited by Alberto Escobar, Lima, Instituto de Estudios Peruanos, 1972

24. Hause, John C., "Earnings Profile : Ability and Schooling", Journal of Political Economy, Volume 80, Nº 3, Part II, May/June 1972

25. Hauseman, Jerry A., and Wise, David A., "The Evaluation of Results from Truncated Samples : The New Jersey Income Maintenance Experiment" in Annals of Economic and Social Measurement, Volume 5, Nº 4, 1976

26. Hess, R., "Maternal Teaching Styles and Educational Retardation" in Profile of the School Dropout, edited by D. Schreiber, New York: Ran-Dom House, 1967

27. Juster, Thomas F., Chapter 1, Introduction and Summary in Education, Income and Human Behavior, edited by F. Thomas Juster, National Bureau of Economic Research, New York: McGraw Hill Co., 1975

28. Liebowitz, Arleen, "Education and the Allocation of Women's Time, in Education, Income and Human Behavior, edited by F. Thomas Juster, National Bureau of Economic Research, New York: McGraw Hill Co. , 1975

29. Masters, Stanley H., "The Effect of Family Income on Children's Education : Some Findings on Inequality of Opportunity', The Journal of Human Resources, Vol. 4, Nº 2, Spring, 1969

30. Michael, Robert T., "Education and Fertility" in Education, Income and Human Behavior, Edited by F. Thomas Juster, National Bureau of Economic Research, New York : McGraw Hill Co., 1974

31. Michael, Robert T., "Education and Fertility" in Education, Income and Human Behavior, edited by F. Thomas Juster, National Bureau of Economic Research, New York : McGraw Hill Co. 1975

32. Mince, Jacob, Schooling, Experience and Earnings, New York : National Bureau of Economic Research, distributed by Colombia University Press, 1974

33. Musgrove, Phillip, "Determinants of Urban Household Consumption in Latin America", Economic Development and Cultural Change, Vol. 26, April, 1879

34. Musgrove, Phillip, Consumer Behavior in Latin America, Washington, D.C. : The Brookings Institution, 1978

35. Nabuco, E., Nutriçao e Desenvolvimento de Pré-Escolares de Ajacujá, Programa ECIEL, (Mimeo), Rio de Janeiro : ECIEL, 1975

36. Nisbet, John, "Family Environment and Intelligence, in Education, Economy and Society, edited by A.H. Halsey, Jean Floud and C. Arnold Anderson, New York : The Free Press, 1961

37. Solomon, Lewis C., "The Relation Between Schooling and Savings Behavior : An Example of the Indirect Effects of Education" in Education, Income and Human Behavior, edited by F. Thomas Juster, New York : National Bureau of Economic Research, McGraw Hill Book Co., 1975

38. Taubman, Paul and Wales, Terrence, "Mental Ability and Higher Educational Attainment in the Twentieth Century" in Education, Income and Human Behavior, edited by F. Thomas Juster, New York: National Bureau of Economic Research, McGraw Hill Company, 1975

39. Wachtel, Paul, "The Returns to Investment in Higher Education : Another View", in Education, Income and Human Behavior, edited by F. Thomas Juster, New York : National Bureau of Economic Research, McGraw Hill Company, 1975

40. Willis, Robert, "A New Approach to the Theory of Fertility Behavior', Journal of Political Economy, Vol. 81, Part II, March/April, 1973

41. World Bank, Education Sector Working Paper, 1974