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Gender Differences in Education in Mexico

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INTRODUCTION

One of the basic principles behind a just society is the equality of access to opportunities. While defining what consists of equality of opportunities is notoriously difficult, there is general agreement that access to education constitutes one of the most important. Nevertheless, it is obvious that equal access to even basic education is not universal at the worldwide level, and huge differences in educational attainment exist both within and across countries.

The level of education is a fundamental factor in the development of a country. There is ample evidence that a highly educated labor force is one of the key factors in promoting a country's development. Lack of an adequate education has been one of the most important factors contributing to the persistency and increases in poverty in Latin America (Londoño 1996).

Just as important as the overall level of education in a country is the distribution of education between its residents. In most countries, the level of schooling for females is lower than that for males. Evidence demonstrates, furthermore, that the gender gap in education is higher in developing countries than in more developed countries, although as we shall see later, Latin America generally has lower educational differences between men and women than other regions.

Women's education has been demonstrated to have substantial positive external effects apart from its beneficial effects on the women herself. Besides generating private returns from their participation in the labor market, women's education has strong impacts on diverse variables, such as their children's health and mortality, as well as their own fertility and reproductive health. Numerous studies have demonstrated that social returns to investing in women's education outweigh the social returns to investing in male's education (Schultz 1993; King and Hill 1993).

Other studies have shown that it is not only important to invest in the education of men and women, but that it is important to eliminate the gender gap between them as well. There is evidence that gender inequality in education is associated with reductions in GDP per capita (King and Hill 1993). The benefits of increasing female education are therefore more than just an increase in income or in productivity. The implication, therefore, is that if female education levels are not increased to the same education levels as men, social indicators can only be achieved at much higher levels of economic growth.

Within Latin America, gender differences are generally lower than in other developing countries, although this growth rate has been less than in other regions (BID 1996). Furthermore, substantial progress has been made over the last generations in eliminating gender differences in education. Since 1960, there has been a large general expansion in education within the region and sharp falls in gender differences between men and women. Primary school enrollment and completion statistics show no differences by gender in most countries, and to a large extent these trends carry over to secondary education. Those countries which are most likely to still have gender gaps favoring men in education in younger generations are the poorer countries, such as Bolivia, whereas in wealthier countries there are no significant differences between men and women in educational attainment, except in very poor and/or indigenous areas. An interesting corollary of this is that those countries with higher levels of education tend also to be those countries in which there are lower or no differences between men and women in educational attainment (Bustillo 1993).

This paper concentrates on the determinants of education in Mexico, an area in which there has been little empirical investigation. Mexico is an interesting case study for education as it represents a country, which, like much of Latin America, has experienced growth in educational attainments over the last decades. Nevertheless, given its level of GDP, Mexico actually does very poorly in terms of education, with its population having two and one-half years less of education than what it should have (BID 1996). Additionally, Mexico has very high inequality in income and wealth, as well as a large indigenous population, which is difficult to access both due to the diversity of languages spoken and geographical isolation.

The paper has two central goals. The first is to analyze the determinants of the level of education of boys and girls in Mexico. Here we will concentrate on the effects of family background (such as education of parents), economic and poverty status of the family, the effect of place of residence (to measure potential supply effects of schooling), government subsidies which may affect educational attendance, and demographic composition of the family (including number of siblings and birth order).

The second objective is to understand gender differences in education. Mexico also provides an interesting case study for studies of gender inequalities in education as the educational gap has decreased substantially between men and women over the last 50 years. This paper attempts to analyze the factors which affect how families invest in boys' and girls' education.

The analysis will use the National Survey of the Population and Housing Count (*Conteo*). The *Conteo* has two parts. It was carried out in 1995 as a census of the population. However, a more detailed household questionnaire was applied to a subsample of the population at the same time. It includes information on all individuals in the household, including their labor market behavior; educational level and whether they are currently studying; all forms of monetary income, including program transfers; as well as demographic and other useful information, such as disabilities. The *Conteo* is the best available information for the purposes of our study for a number of reasons, including: (i) it has a large sample, which enables us to focus on the roles of rural residence and poverty which are important determinants of educational attainment; (ii) it includes all monetary income sources; (iii) it also includes detailed information on number of years studied, including number of years dedicated to technical careers, as well as whether individuals are currently attending school and, if not, whether they have ever attended.

The paper is organized as follows. We first describe the educational system in Mexico and present trends in educational attainment over the last few generations. We then provide a brief description of the existing theoretical and empirical literature on the determinants of educational investment in children, as well as some evidence that has been found on educational investments between girls and boys. We then present a detailed descriptive analysis of current trends in school attendance and attainment of individuals aged 6 to 29. Next, we turn to the empirical models, where we estimate the determinants of school attendance and the probability of falling behind in school. The regressions focus on child, family, household, as well as community characteristics. After the results section, we conclude with an interpretation of our findings in the context of gender differences in education and the policy implications of our analysis.

SECTION 1. THE EDUCATIONAL SYSTEM IN MEXICO

The Mexican education system consists of mandatory free primary and, as of 1992, secondary education. As might be expected, primary coverage is almost universal in Mexico, but secondary coverage lags substantially behind.¹ At the high school level, (*preparatoria*) students may choose between a curriculum oriented towards preparing them for higher education and a curriculum which is oriented towards technical schools and/or curriculum which prepares them for entering the workforce. Nevertheless, by the high school level, as we will see below, the majority of youth are no longer attending school.

Technical school is an option which is quite popular, particularly among women. Technical school is normally one to three years of school which can be done after primary, secondary, or high school. Generally, technical school involves the training of a particular skill or occupation, such as computing, nursing, secretaries, and electronic technicians.² Almost 15 percent of all women (versus 7.5 percent of men) report that they have attended technical school, and the percentage of female workers with technical school is approximately 21 percent (compared with 8 percent of male workers).

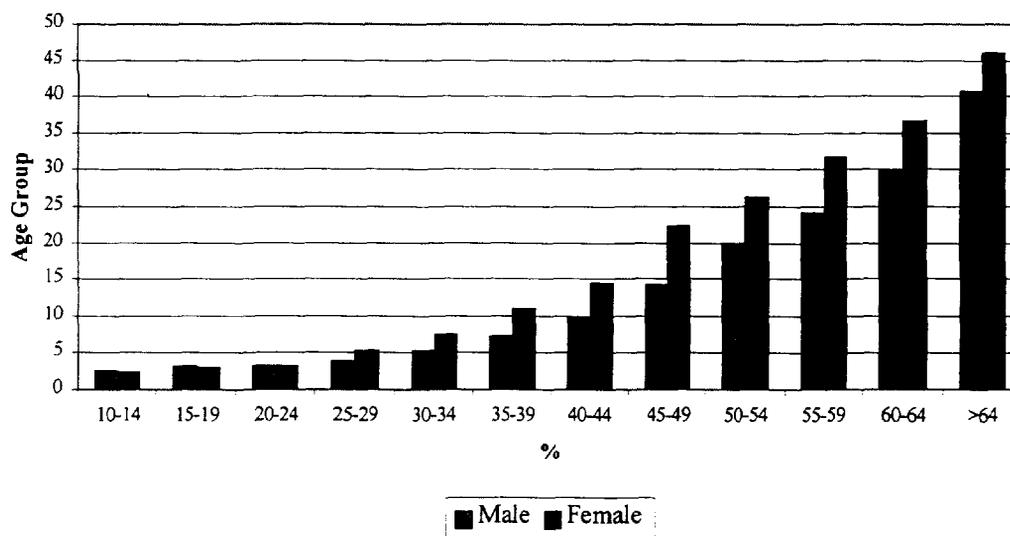
University-level education is attained by only a small fraction of the population. Approximately 15 percent of men aged 25 to 40 and 11 percent of women aged 25 to 40 report having completed at least one year of university-level education.

Overall levels of education have been increasing steadily over the last 50 years, as measured by the percentage of the population never attending school and average years of schooling attained. Figure 1 and Figure 2 demonstrate that the level of education has increased dramatically between the older and younger generations. For instance, whereas the average years of completed schooling for individuals between the ages of 25 and 29 is approximately eight years of schooling, for the population aged 65 and older, this figure is less than three years of schooling. Almost half of the population over age 65 report that they never attended school.

¹ Approximately 10 percent of children attend private primary and secondary schools.

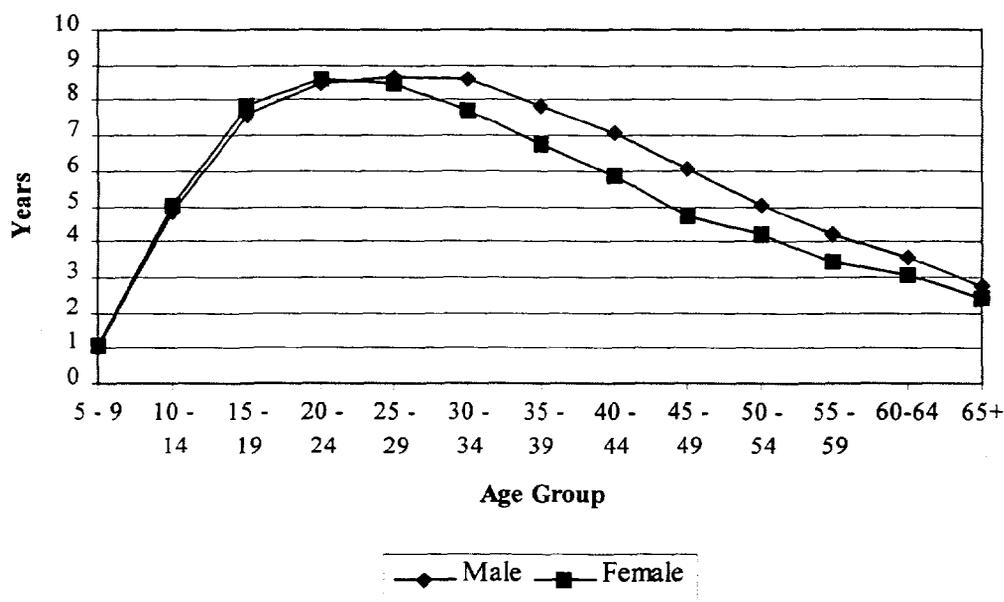
² Previously, studies to be a teacher were part of technical school, but have been changed within the last 10 years to be a college-level program.

Figure 1. Percentage of Population with No School, by Age Group and Sex



Source: Author's calculations from Encuesta del Censo 1995.

Figure 2. Average Years of Completed Schooling, by Age Group and Sex



Source: Authors' calculations from Encuesta del Censo 1995.

In terms of the gender education gap, Figure 1 and Figure 2 demonstrate that the gender gap is generally increasing with age; that is, over time, the gender gap appears to be closing. With respect to number of years of schooling, higher education levels of men than women begin to appear only in the age group 20 to 24 and are increasing thereafter. It is also important to mention that the gender gap appears to be decreasing after age 50. This may be due to a selection

mechanism. That is, women tend to have a longer life span than men, and given that it is probable that individuals who live longer also have higher education levels, a decreasing educational gap by gender could be explained. It may also be the case that for the older generation, there was little access to schools above the primary level when they were of school age, which may limit the extent of the gender gap.

It is important to emphasize the role of technical school in gender differences in education. The *Conteo* is the first data set in Mexico which allows the accurate measurement of number of years spent in technical school. As girls and young women are much more likely to attend technical school than boys and young men, the *Conteo* allows a more accurate measurement of number of school years attained. Without correct accounting for technical school, there would appear to be a larger gap in years of completed schooling than is actually the case. Nevertheless, this raises another issue, which is whether technical schooling should be “counted” in the same manner as other types of schooling. For instance, many technical schools require only primary education as a prerequisite, and it is not obvious that one year of this technical schooling can be considered equivalent to a year of secondary education.³ For the purposes of this article, we will consider technical schooling to be equivalent to one year of schooling.⁴

Table 1 shows that currently, as well as historically, education levels are much lower in rural areas than urban areas.⁵ For the population above age 40, years of completed schooling in rural areas are less than half than those in urban areas. The levels of education in rural areas are particularly low for the higher age groups of individuals in rural areas, where the average level of educational attainment is only 1.5 years for men, and 1.2 years for women.

³ Nor is it obvious how to measure equivalency in this sense, although a likely candidate would be to compare the returns to education from these different types of schooling.

⁴ The Appendix repeats Figure 2, excluding years of technical school from consideration. Compared with Figure 2, the Figure shows some differences in the educational gap between men and women. For instance, for the age group 20 to 24, not considering technical education implies a gap favoring men, whereas considering technical school implies no differences.

⁵ These tables may overstate the differences between rural and urban areas, as presumably a portion of the individuals who currently live in urban areas migrated from rural areas, and individuals who migrate may be likely to have a higher educational level than those who stay.

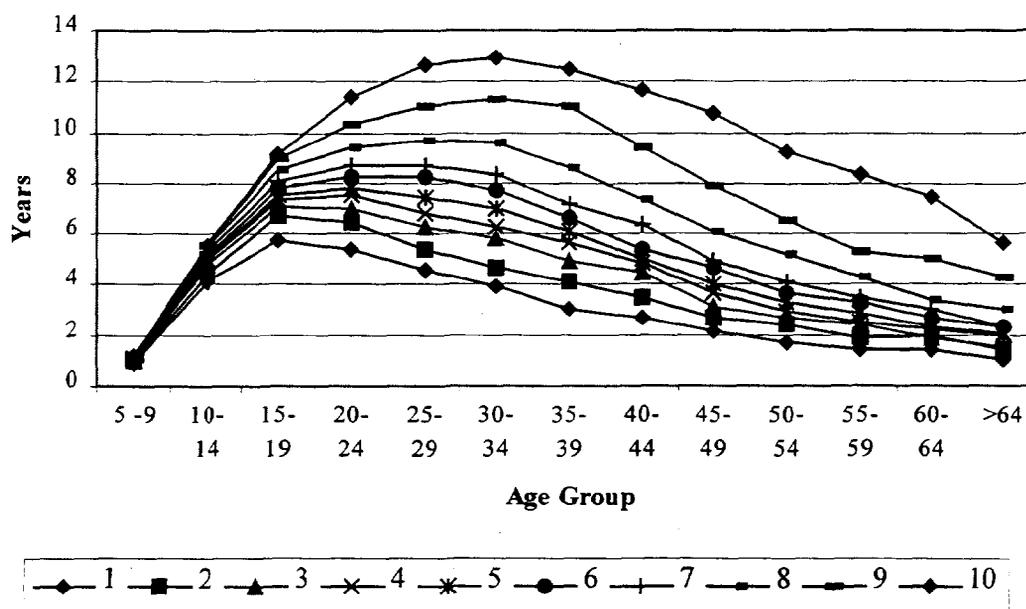
Table 1. Average Years of Completed Schooling, by Age Group, Rural/Urban Residence, and Sex

	Male		Female	
	Urban	Rural	Urban	Rural
5-9	1.33	1.13	1.38	1.21
10-14	5.07	4.39	5.29	4.53
15-19	8.75	6.26	8.39	6.38
20-24	9.13	6.35	9.21	6.25
25-29	9.40	6.13	9.18	5.60
30-34	9.37	5.59	8.34	4.99
35-39	8.78	4.63	7.50	3.87
40-44	8.18	3.88	6.60	3.09
45-49	7.19	3.09	5.56	2.35
50-54	6.05	2.61	5.06	2.07
55-59	5.23	2.17	4.10	1.94
60-64	4.49	1.84	3.64	1.64
65+	3.40	1.50	2.91	1.21
Total	5.83	3.43	5.60	3.31

Source: Authors' calculations from Encuesta del Censo 1995.

Figure 3 and Figure 4 present the distribution between education and per capita household income levels by age group. These graphs help illustrate the mutual interactions between education and income. Whereas for the younger groups, living in a family with low per capita income is associated with low educational achievement; for the higher age groups, who have long since completed their educational level, the trends imply that the low educational attainment is a factor associated in the low level of per capita income.

Figure 3. Average Completed Years of Schooling, by Age Group and Per Capita Income Decile



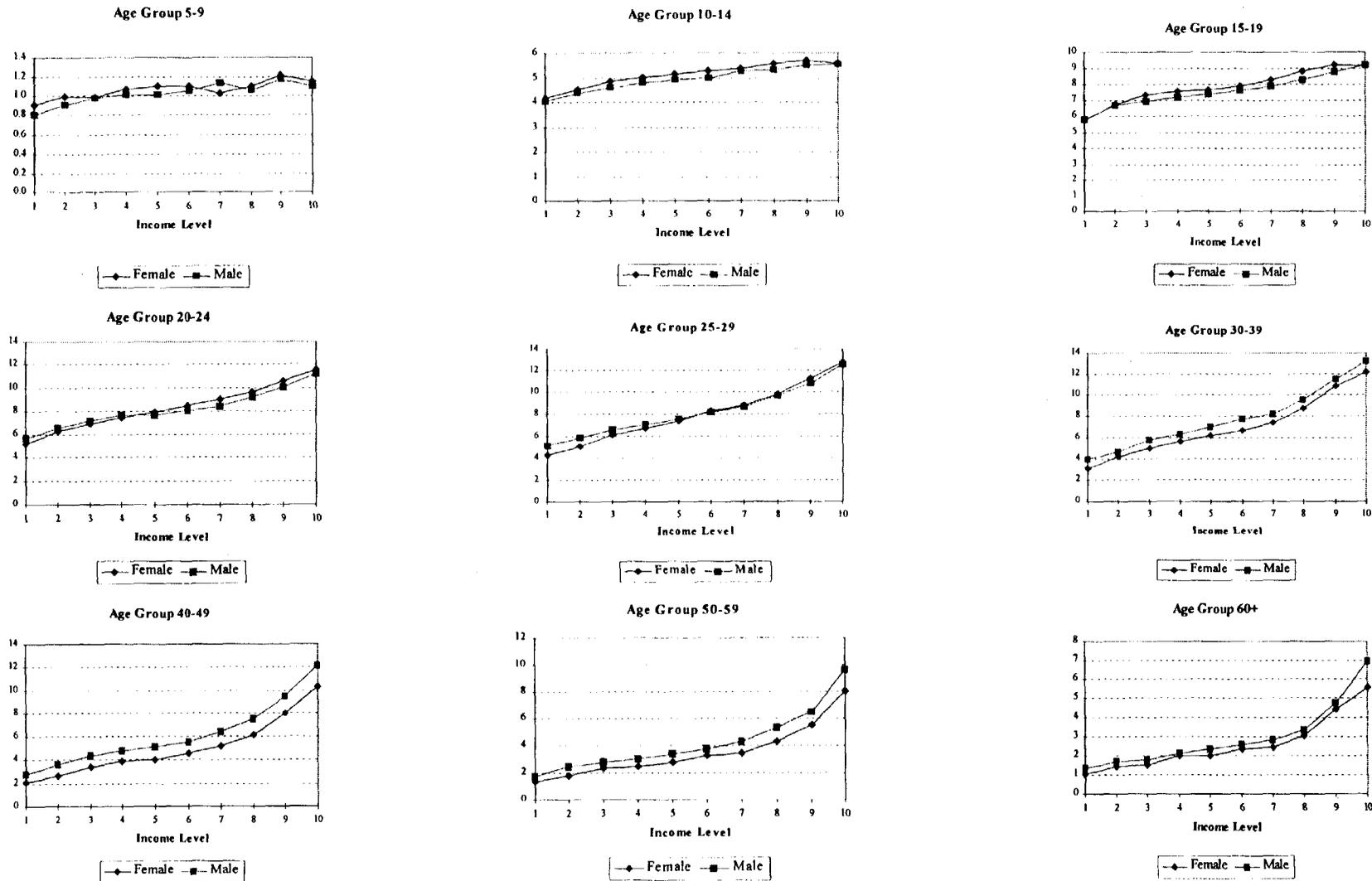
Note: The legend refers to Per Capita Income Decile with 1 being lowest and 10 being highest.

Source: Authors' calculations from Encuesta del Censo 1995.

To summarize, the descriptive evidence presented here shows large increases in education levels of the population over time, as well as evidence that gender gaps in education between men and women have decreased as well. The considerably large falls in the gender gaps are noteworthy and similar to trends in other Latin American countries. While there have been no obvious gender-specific policies in education in Mexico over the last 30 years that would have contributed to the reduction of the gender gap, we mention two factors here that we feel to be important determinants. The first relates to the general expansion in education, which implies additional schools and easier access to these schools. Parents may be more reluctant to send their daughters to schools that are not close by or require substantially more walking than their sons. Through this mechanism, general expansion in education facilities could have a larger impact on girls' school attendance than on boys'.

A second factor likely to help explain the reduction of the gender gap is the increase in women's labor force participation, which has coincided with the period of reduction of the gender gap. The rise in labor force participation of women in Mexico has been the fastest of all countries in Latin America with increases in the participation rate of 256 percent between 1970 and 1990 (Valdez and others 1995). Whereas Mexican female labor force participation was well below the average of the region in 1970, this increase has allowed Mexico to catch up with the rest of the region. Male labor force participation on the other hand has fallen over this period. The implications of increases in labor force participation on education levels are numerous, probably the most important being that increased participation of women implies larger returns to investing

Figure 4. Average Years of Completed Schooling, by Selected Age Groups, Per Capita Income Decile, and Sex



Source: Authors' calculations from Encuesta del Censo 1995.

in education for girls. That is, if parents expect that their daughters are likely to spend more years working in the labor market, they may invest more heavily in their daughter's education.

Finally, what is notable from these descriptive trends are the differences between rural and urban areas as well as the differences by per capita income levels. This descriptive evidence suggests that poverty is an important part of the story behind differences in education levels between these populations.

SECTION 2. THEORETICAL AND EMPIRICAL LITERATURE ON EDUCATIONAL INVESTMENTS IN MALE AND FEMALE CHILDREN

Economic theories on the determinants of investment in education begin with the theory of human capital, whereby individuals choose to invest in education depending on costs and benefits of this investment (Becker 1975). Costs include both direct expenditures associated with schooling as well as indirect costs representing the opportunity cost (usually foregone earnings during the time of studies), whereas benefits refer to the increase in the present value of lifetime earnings associated with education investments. Investments in education are expected to increase with expected returns and decrease with increased costs.

This general theory of human capital is expanded by Becker to include a focus on gender, which is related to the organization of work in households. The division of labor between men and women in the household is based, according to the new household economics, on the specialization of activities which lead to a greater efficiency. According to Becker, either due to biological questions or previous discrimination against women which affect their expected returns to educational investments, women's investment in human capital may be lower than men's.

Closely related to Becker's theories on gender and human capital, Mincer and Polachek (1982) demonstrate that one's perspectives on time use and labor market participation in the future help to determine investments in human capital. Because of their larger responsibilities of household tasks, women anticipate shorter periods and/or interrupted periods of employment, which motivates them to invest differently in human capital than men, both in quantitative and qualitative terms. Women tend to invest in human capital which produces quick returns and depreciates faster because of their frequent absences from the labor market.

An alternative perspective is provided by Francis Vella (1993) who maintains that the attitudes towards female work, which may be constructed independently of the education system, are those which determine investment in human capital. Her results demonstrate that the attitudes of women towards women's work are developed in youth and can lead to substantial reductions in human capital investment, labor supply, and returns to education.

Another reason why gender differences in education may exist can be found in the large percentage of returns to education for women which are social, implying that women receive less of the benefit of their investment. Men, on the other hand, capture a larger fraction of the total returns to education in the labor market (Schultz 1992; King and Hill 1993).

In the case of the human capital decisions of children, these are often viewed as decisions made for them by their parents. Decisions by parents to invest differently in their sons' and daughters' education may be due to differences in the expected net (of costs) returns of boys' and girls' education. Girls may be viewed as having a lower expected return to educational investments, so that it may be more "efficient" and not necessarily openly "discriminatory" to invest more in sons' schooling.

King and Hill focus on various reasons for why the costs and returns to male and female education may differ from the perspective of parents. For instance, if schools are located far away, parents may be more reluctant to allow daughters to travel long distances than sons. The

costs of children attending school also depend on their opportunity costs in terms of work (either market or domestic), and in certain cultural contexts, these opportunity costs may be higher for girls than for boys. With respect to benefits, girls may face lower returns to human capital investments because of labor market discrimination or because of lower time spent in the labor market, thereby reducing the benefits to investing in the education of girls. Parents may also tend to invest in children who will be more likely to economically support them in their old age. If parents' expectations are that their sons will be more likely to finance them in their old age, they may be likely to invest more in sons' education levels.

Parish and Willis (1992) provide an interesting set of alternative hypotheses towards viewing investment in daughters and sons. First, the authors focus on altruism, which implies that aside from their own consumption, parents care about the well-being of their children. This hypothesis, nevertheless, does not assume that parents care equally about the well-being of each child, but is compatible with a larger weight on the well-being of boy children than girl children. Altruistic parents invest more in children with greater opportunities, equaling the well-being of their children through compensatory transfers towards the most "disadvantaged." If there is more altruism towards sons than daughters, sons will receive larger transfers than daughters.

Under the hypothesis of "resource dilution," large families result in lower levels of education for all children. Middle children are those who are most affected. The number of children and the order of birth can affect the education opportunities even in the absence of manipulation in favor of the own interest of the parents. The authors also focus on the potential role of credit restrictions or conditional altruism. The lack of capacity of the individuals to obtain credit against their future income as collateral implies that the current conditions of the family will determine if investments in education are made. Parents are willing to finance only those children who, according to their perception, are in conditions to return the resources. This can explain gender discrimination, according to the authors, as sons may have greater possibilities to pay back investments.

Intrahousehold allocation models provide an alternative focus towards viewing family resource allocation decisions (Thomas 1993; Quisumbing and others 1997). Under these models, heterogeneity of preferences between family members is permitted, such that the outcomes may reflect the level of bargaining power of the different members. These models are interesting in that they allow the income, assets, and educational level of different persons in the household to have different impacts on the outcomes of interest. Numerous studies have found evidence of differential impacts of resources controlled by women versus resources controlled by men. (See Haddad and Hoddinott (1997) for a summary of recent literature.)

Empirical Studies on Schooling

There are a number of empirical studies relevant to our analysis. As we cannot adequately address all of them here, we will concentrate on some of the most recent and most relevant studies in the context of Latin America.

There have been very few studies which empirically analyze the determinants of education in Mexico. One exception is Post and others (1998), who analyze rates of continuation from primary to secondary school in the different states of Mexico, with particular focus on the change to mandatory secondary education implemented in 1992. They argue that community characteristics are important for analyzing gender differentials in education; that is, the more marginated the state, the greater the inequality in girls' education. They also analyze the

determinants of being a full-time student for the age group 13 to 15 in Mexico in 1984 and 1992, finding that family resources had a larger impact on children studying in 1992 than in 1984.

Palafox and others (1994) analyze the determinants of schooling achievement in Mexico, using an interesting database on cognitive achievement scores in math and Spanish of children in primary schools. They find that male students tend to do better both in mathematics and Spanish than female students, even after controlling for socioeconomic characteristics. Parental education levels are positively associated with student achievement as is living in a two parent family.

Singh and Santiago (1997) analyze the impact of schooling on farm earnings as well as the determinants of household demand for children's schooling in rural areas of Mexico. They find that the amount of land farmed is a strong, positive determinant of the average number of years of completed schooling, which they interpret as evidence of an income effect in the demand to education. They also find that mothers' schooling has an important impact on education levels of children but that fathers' schooling has no impact.

Knaul and Parker (1998) jointly consider the relationship between schooling and work participation of urban youth in Mexico, looking at the determinants of beginning a work spell or leaving school in the context of the economic crisis of 1995. They find that income shocks have a positive probability on the probability of working and of leaving school both for boys and for girls.

In the context of other Latin American countries, there are a number of studies which focus on gender differences in educational outcomes. King and Bellew analyze the gender inequality in Peru between 1940 and 1980. They argue that gender inequality in education has decreased substantially. Important determining factors of school enrollment include parent's education level as well as wealth. Their findings suggest that wealthier parents are more likely to send daughters to school. Their findings also show that school inputs (such as availability of textbooks) have a positive impact on enrollment for girls whereas they have little impact on the enrollment of boys, suggesting that school quality may be more important for the enrollment of girls than boys. Also in the case of Peru, Patrinos and Psacharopoulos (1997) found that family size, as well as the interaction of age and gender of siblings with their time allocation, have important impacts on educational progress.

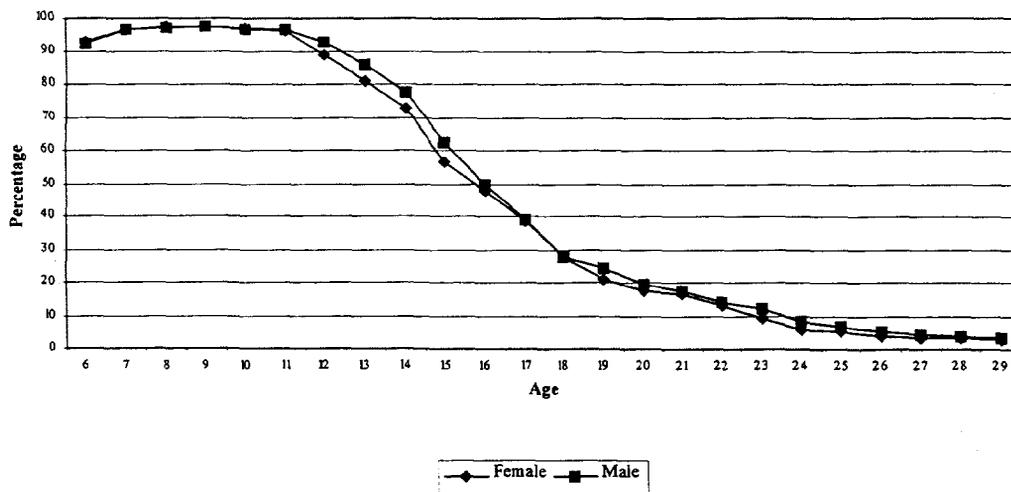
Barros, Fox, and Mendoça (1997) demonstrate the lower probability of school attendance among children living in female-headed families in Brazil. For the case of Brazil, Levison (1991) and Psacharopoulos and Arriagada (1989) show the importance of similar factors as well as education of parents and family income on both labor force participation and school attendance. The importance of parental education levels as determinants of both child work and school attainment are also shown in Lam and Schoeni (1992) and Parish and Willis (1992). Finally, Duryea (1997) uses panel data to estimate the effects of shocks to family income and father's unemployment on educational attainment in Brazil. She finds that unemployment has a small, but significant, negative impact on the probability that both boys and girls aged 10 to 15 advance through school. Family structure and parents' education are also important factors.

SECTION 3. CURRENT TRENDS IN EDUCATION IN MEXICO: ASSISTANCE AND ATTAINMENT OF YOUTH AND YOUNG ADULTS

In this section, we present trends in school assistance and educational attainment of the population of individuals between ages 6 and 29, taking into account a number of variables correlated with school achievement, including income levels and the size of localities. We consider this age group to provide a full picture of educational attainment, given that, even at age 25, over 5 percent of the population still reports to be attending school. We focus primarily here on the differences by gender and how the roles of rural-urban residence and income level are related to these differences.

Figure 5 presents the percentage of the male and female population attending school. The figure shows that by age 8, the percentage of children attending school is over 95 percent. It is interesting to note that school attendance increases from age 6 to age 9, which is evidence of a certain degree of late enrollment, although this late enrollment does not appear to differ by gender. School attendance begins to fall by age 11, with important declines in attendance beginning at age 12, an age which (usually) coincides with the end of primary school. At this age, it is also important to note that a gender gap begins in attendance. For instance, at age 13, 86 percent of boys are attending school versus 81 percent of girls. These trends are suggestive that more girls than boys tend to end their education level at the primary level. Nevertheless, by ages 16 and 17, which normally correspond to the end of secondary level education, boys begin to drop out at the same rate as girls. At age 19, a gap begins once again, presumably resulting from young men entering college at a higher rate than young women. For instance, 24 percent of males aged 19 are attending school whereas 21.1 percent of females of this age are attending school.

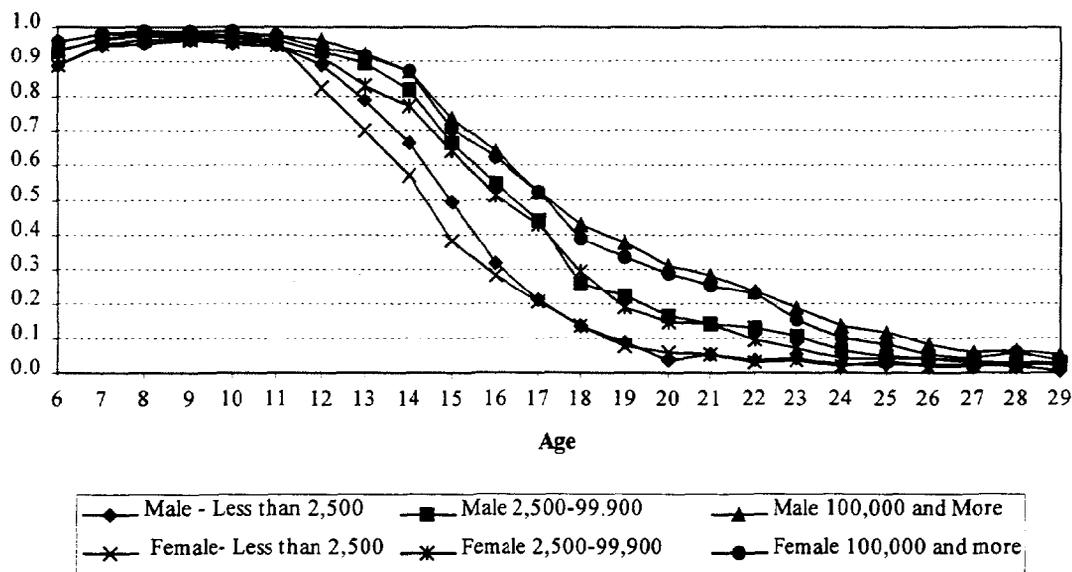
Figure 5. Percentage of Population Attending School, by Age and Sex



Source: Authors' calculations from Encuesta del Censo 1995.

Figure 6 considers these trends by the size of the locality. In Mexico, rural areas are generally defined as localities with less than 2,500 residents. Rural areas tend to have a higher percentage of the population in poverty, lower availability of health and educational services, and a smaller social infrastructure of roads, water systems, telephone services, etc. We consider three groups of localities: the first corresponding to communities with less than 2,500 inhabitants; the second corresponding to communities with between 2,500 and 99,999 inhabitants, and the third corresponding to localities with more than 100,000 individuals.

Figure 6. Percentage of Population Attending School, by Size of Locality, Age, and Sex

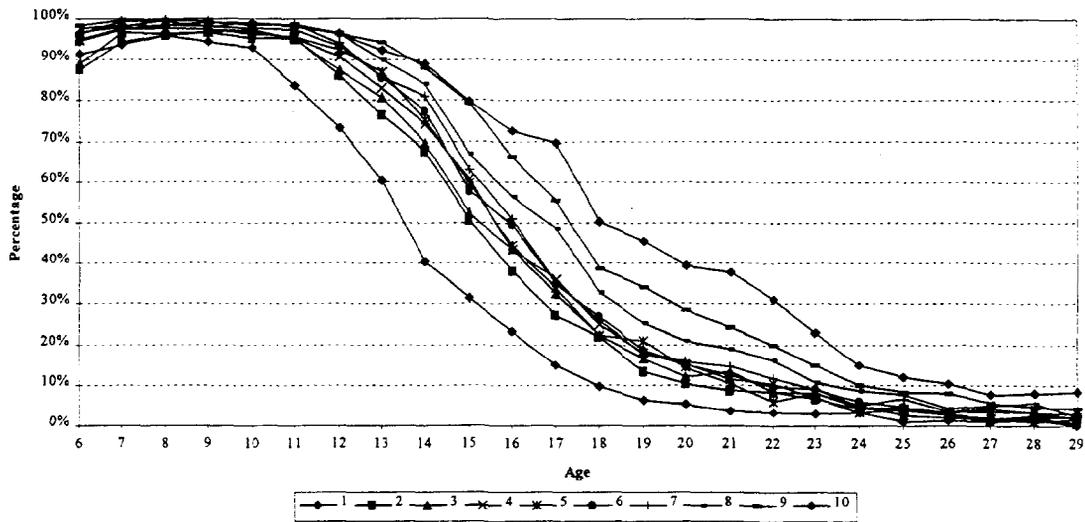


Source: Authors' calculations from Encuesta del Conteo 1995.

Figure 6 shows that the percentage of the population attending school is uniformly lower for rural areas than for urban areas. It also shows that the gender gap in school attendance is larger in the rural areas than in medium- and large-size cities/communities. In the case of large cities, attendance appears to be about the same for boys and girls until age 17, where boys begin to have a higher school attendance than girls. This presumably corresponds to the age at which individuals begin to enter college. In both the medium-sized communities and the rural communities, a gender gap in attendance begins at the age of 11 and is larger in the rural communities. For instance, at age 13, 79.1 percent of boys are attending school in rural communities versus only 70.1 percent of girls. By age 17, there appears to be little difference in school attendance between boys and girls with very low overall attendance rates, particularly in rural areas.

Figure 7 considers the relationship between school attendance and per capita household income level. It is clear that lower levels of per capita are associated with lower school attendance. It is particularly noteworthy that the lower income deciles show evidence of very late entry to school as enrollment increases sharply from ages 6 to 9.

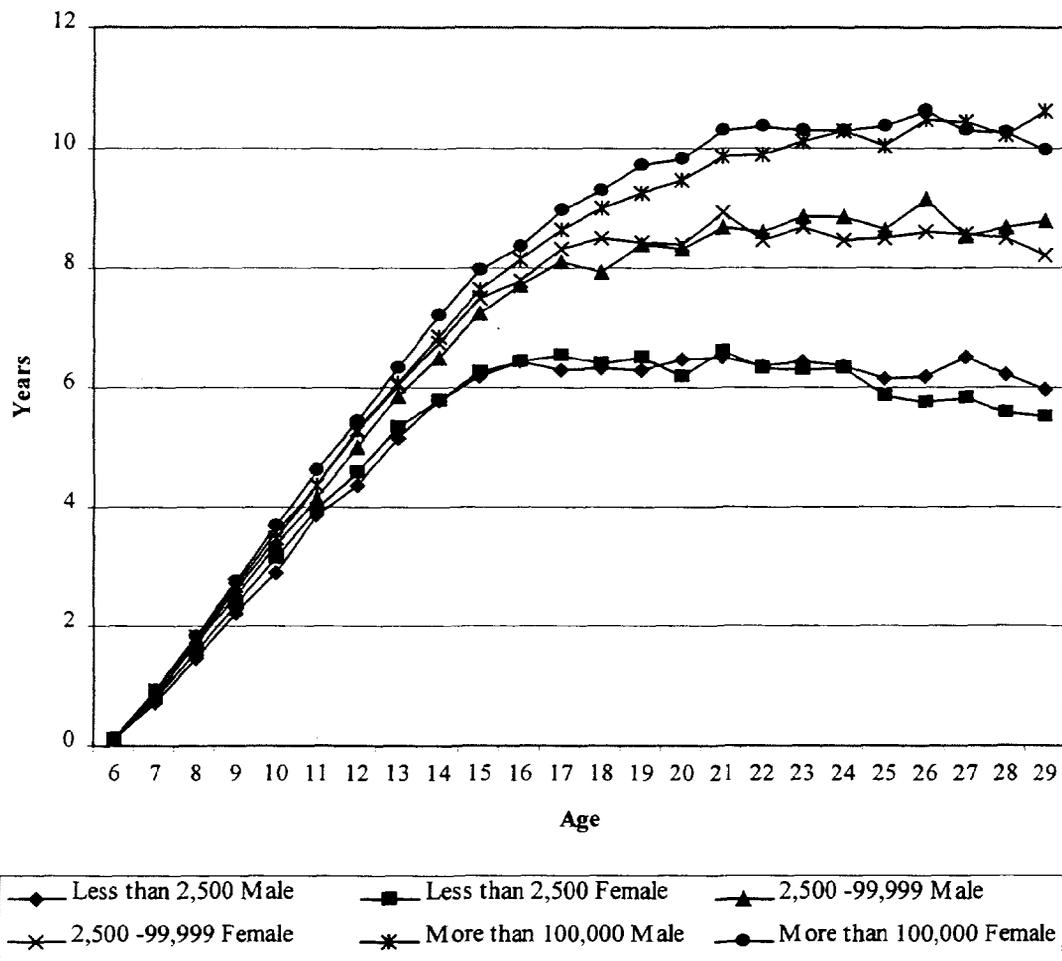
Figure 7. Percentage of Population Attending School, by Age and Per Capita Income Decile



Source: Authors' calculations from Encuesta del Censo 1995.

Figure 8 shows the number of years of completed schooling for individuals aged 6 to 29 by size of locality. The gender gaps evident in school attendance are not obvious in years of completed schooling. Actually, for the medium and larger communities, there is a “reverse” gender gap which favors girls, as girls appear to have a higher number of completed years of schooling than boys until their mid-20s. For the rural communities, the number of years of completed schooling is more or less equal until age 24, where a gap begins with men having a higher number of years of completed schooling than women.

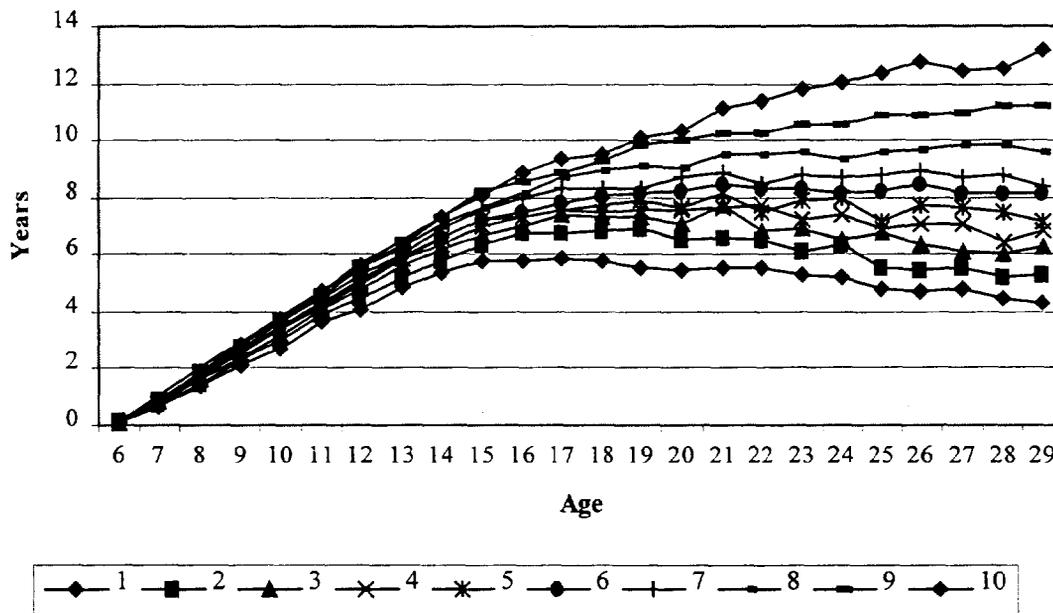
Figure 8. Average Completed Years of Schooling, by Size of Locality, Sex, and Age



Source: Authors' calculations from Encuesta del Conteo 1995.

Figure 9 considers the relationship between years of completed schooling and income levels. It bears out previous findings, that the lower levels of income are more likely to have lower educational attainment.

Figure 9. Average Completed Years of Schooling, by Per Capita Income Decile and Age



Source: Authors' calculations from Encuesta del Censo 1995.

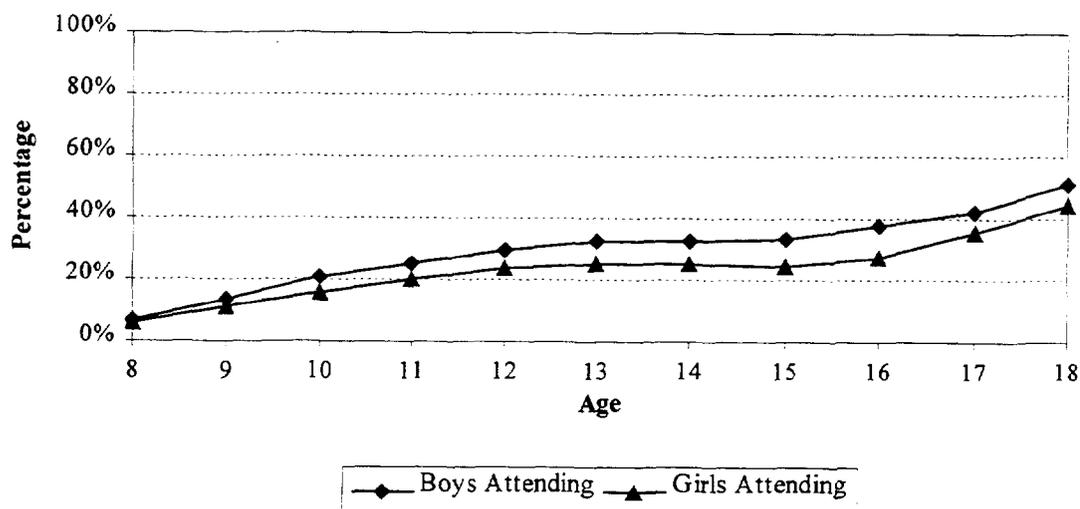
How can the conflicting patterns of school attendance and years of completed schooling be explained? Why does a significant and important gender gap in attendance beginning at the secondary level of schooling not coincide with a reduced number of years of schooling at these ages, even in rural areas where attendance gaps are quite large?

One possible explanation is that while fewer girls attend school, those that do attend school do better in school than boys. That is, they are more likely to complete school levels on time, less likely to fall behind in school, and less likely to repeat grades. While we do not have explicit information on repeated grades, we can look at the percentage of children behind in school, where behind in school is defined as being at least one grade behind where the child should be, taking into account his or her age.⁶ Figure 10 clearly shows that the percentage of boys behind in school begins to become larger than that for girls by age 9.⁷ Figure 11 shows that income plays a strong role not only in school attendance, but also in the probability of falling behind in school.

⁶ More formally, children behind in school are defined to be those children where age-years of completed schooling are less than seven and greater than zero.

⁷ Note that we do not know whether boys and girls who are not attending have dropped out or will return at some point to school.

Figure 10. Percentage of Children Behind in School, by School Attendance, Age, and Sex



Source: Authors' calculations from Encuesta del Censo 1995.

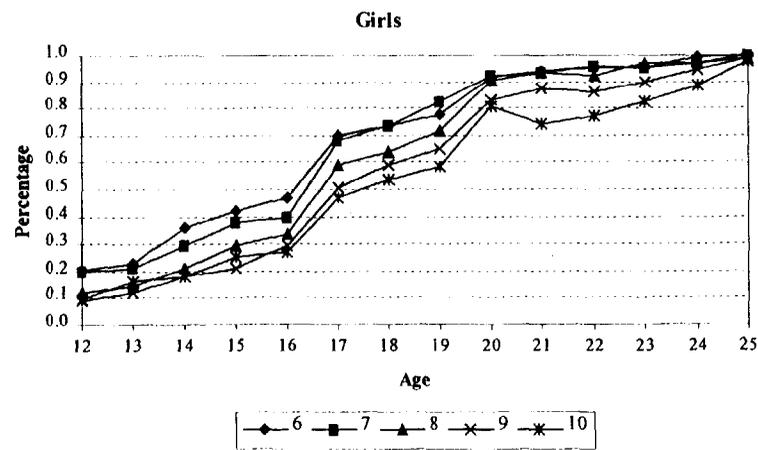
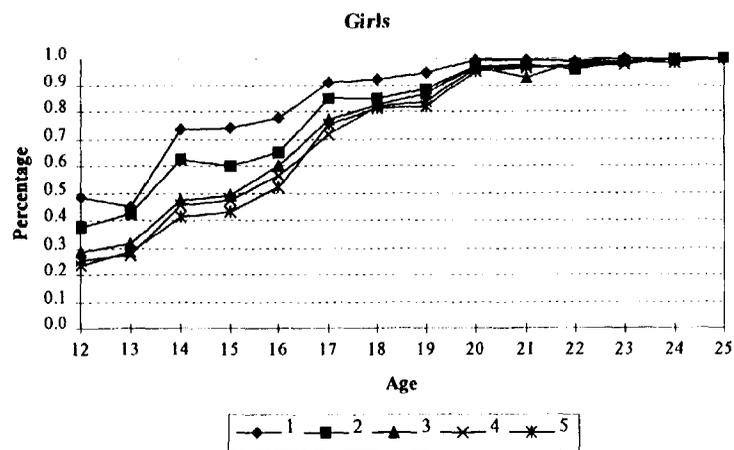
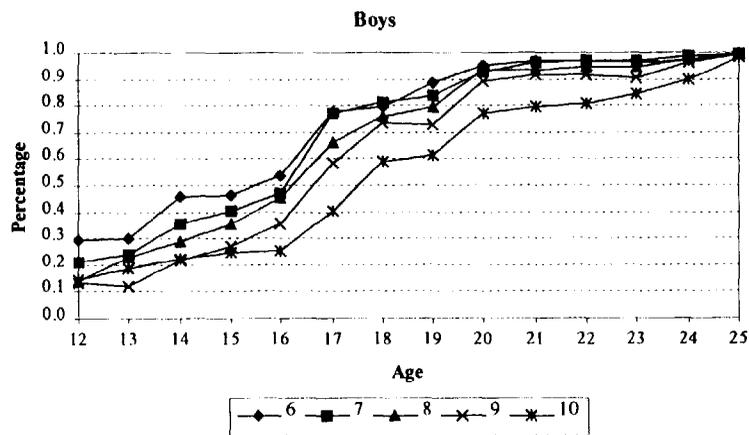
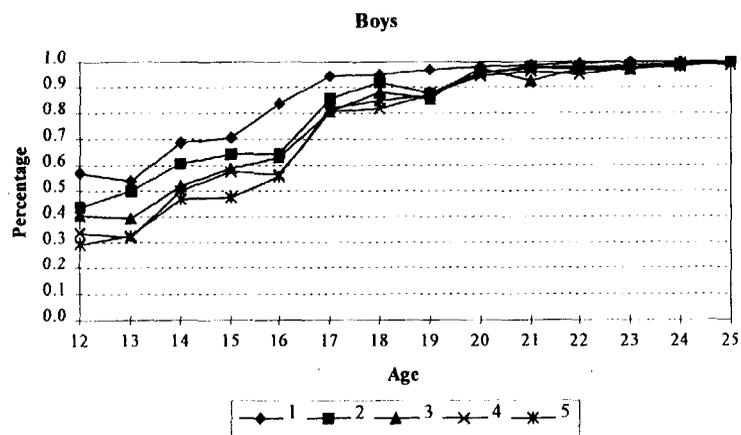
Finally, Table 2 considers the extent to which boys and girls fall behind in school with increased age. The table shows the average number of years behind in school for children attending school from ages 8 to 18, by urban and rural residence. The table demonstrates that at all ages, boys tend to be further behind in school than girls both in rural and urban areas. There are also large differences between urban and rural residence with children living in rural areas being further behind in school at all ages. By age 12, for instance, boys in rural areas, on average, are one and one-half years behind where they should be in school, whereas the corresponding figure in urban areas is 0.72.

Table 2. Average Years Behind in School by Age, Sex, and Urban/Rural Residence

	<i>Children Attending School</i>					
	<i>Rural</i>			<i>Urban</i>		
	<i>Boys</i>	<i>Girls</i>	<i>All</i>	<i>Boys</i>	<i>Girls</i>	<i>All</i>
8	0.48	0.38	0.43	0.21	0.18	0.19
9	0.72	0.59	0.65	0.36	0.29	0.32
10	1.00	0.78	0.89	0.49	0.38	0.44
11	1.08	0.98	1.03	0.69	0.47	0.58
12	1.52	1.29	1.41	0.75	0.54	0.65
13	1.62	1.36	1.50	0.88	0.60	0.74
14	1.68	1.52	1.61	0.97	0.65	0.82
15	1.93	1.78	1.86	0.98	0.64	0.81
16	2.12	1.92	2.03	1.19	0.90	1.05
17	2.52	2.02	2.28	1.28	1.17	1.22
18	3.45	3.24	3.35	1.69	1.39	1.53

Source: Encuesta del Censo 1995; Authors' calculations.

Figure 11. Percentage of Children Behind in School, by Sex, Age, and Per Capita Income Decile



Source: Authors' calculations from Encuesta del Conteo 1995.

To summarize then, in this section we have considered gender differences in education in youth in terms of attendance and attainment. We have found that, with respect to attendance, girls begin to drop out of school at a higher rate than boys beginning at age 12, particularly in small communities and in low-income households. Nevertheless, we have found that these differences in attendance do not necessarily translate into immediately overall higher levels of education for young men, but rather these differences show up in terms of educational attainment after age 20. The reasons for this are that even though boys have higher rates of attendance than girls for at least some age groups, they tend to be more likely to fall behind in school.

The degree to which both boys and girls (particularly boys) fall behind in school is quite an important effect in schooling achievement. The phenomenon of grade repetition, which presumably these trends reflect is an important issue in Mexico and is likely related to labor market participation and domestic work at early ages, which may not initially lead to school dropout, leads to grade repetition and likely subsequent dropout.

This complex picture of educational attainment in the younger generations suggests that both attendance and school performance while in school are important indicators of long-run school attainment. In the next section, we consider the determinants of school attendance and the probability of falling behind in school.

SECTION 4. EMPIRICAL MODEL AND DATA

In this section, we turn to our estimation models of the determinants of educational investments in boys and girls. The estimation methods are based on reduced form models of the demand for education. The (parental) demand for education of children is expected to depend on factors affecting the expected returns from the educational investments, as well as factors affecting direct and indirect costs of schooling. This framework implies the following model of demand for schooling:

$$E_{ij} = B_0 + B_1X_1 + B_2X_{ij} + \delta_iZ + \varepsilon_{ij}$$

where E_{ij} represents the educational investments in child j in household i ; X_i represents the vector of explanatory variables common to all members of the household (within these are community characteristics; and X_{ij} represents the characteristics specific to the child (Parish and Willis 1995). The error term is specified in two parts: one term which is specific to each child and another which is common to all siblings. Because of the common part of the error term to each child in the same family (δ_i), we estimate robust (Huber-White) standard errors.

Consistent with the descriptive data presented above, we consider two separate dependent variables in our model, including the probability of school attendance and the probability of being behind in school. For the case of the probability of being behind in school, we consider only the sample of children currently attending school.⁸ For each model, we conduct our analysis on subsamples by rural/urban residence.

Samples Used in the Analysis

In our analysis, we focus on the group of youth aged 12 to 15. We chose this group for several reasons. First, the descriptive evidence above suggested that a gender gap in attendance begins to appear at age 12 between boys and girls and is particularly high between ages 12 and 15, which are precisely the ages at which children should be attending secondary school. Secondly, the analysis showed that the largest gaps between boys and girls in terms of falling behind in school begin after age 11.

Finally, we are concerned about sample selection issues which occur after age 15, particularly for girls. In our sample, we use only children who are children of the household head and/or spouse of the household head because these are the only children for which we can identify their parents, and henceforth analyze the impact of parent characteristics on child schooling. Nevertheless, this raises sample selection questions as to ^{whether} these children and youngsters are representative of the sample of all children. We are concerned with the biases arising from excluding youngsters who marry at an early age and leave the household to form their own household, an effect which is particularly important for girls.⁹

⁸ This may introduce some sample selection bias into the analysis, so that a type of selection correction model would be appropriate to control for the probability of attending school. Nevertheless, we are unable to find any appropriate identifying variables which would affect the probability of school attendance but not affect whether the child was behind in his/her studies.

⁹ It also excludes children in families where the child's grandfather or grandmother is reported as household head.

Comparing the marital status of girls between ages 16 and 20 demonstrates that girls who are not children of the household head are much more likely to be married (about 10 percent versus 1 percent of those living with parents). That is, they have most likely left the household they grew up in to form another household with their husband. This implies a selection in that the girls who remain living in their original household with their parents are much more likely to continue studying than girls who leave their household to marry. For this additional reason, we exclude the analysis of educational decisions of individuals above age 15.

Independent Variables

We consider several sets of independent variables, including characteristics of the child, characteristics of the parents, household and demographic characteristics, and community-level characteristics, including the supply of secondary schools.

Characteristics of the Child and Siblings

Characteristics of the child included in the model are the age and sex of the child. We also experimented with variables measuring the birth order, including dummy variables measuring whether the child was the oldest or youngest child living in the family.¹⁰ Some recent evidence has found that middle children do worse in terms of household schooling investments (Parish and Willis 1993). Nevertheless, these variables were found to be insignificant in all cases and were left out of the final models.

We also include measures of children aged 0 to 5, children aged 6 to 11, and other siblings aged 12 to 20 in the household. We expect that the presence of younger children may have negative impacts on schooling, due to either additional domestic responsibilities or economic necessities. Other siblings of school age may have negative impacts on education through tradeoffs between quantity and quality, or through the “dilution” of family resources.

Characteristics of the Parents

We are particularly interested in the potential effects of the educational levels of the father and mother. Parental education should have a positive influence on child education through parental influence, a home environment more oriented toward study, the greater ability of parents to help children with homework, etc. It is also likely to pick up economic status of the household, although we include a number of other measures of economic status.¹¹

Some previous literature in other countries has demonstrated that father and mother educational levels have different impacts on the level of education and other outcomes of sons and daughters. In particular, it has been found that mother’s level of education generally has a larger impact on child education outcomes, particularly those of girls.

We also include dummy variables measuring whether the father and mother of the child are present in the household. These variables may pick up both economic and work effects as

¹⁰ Unfortunately, we have no information on children who are no longer living in the household so that the oldest child in the household is not necessarily the oldest child of the parents. Additionally, we do not know if a mother’s fertility has been completed so that the youngest child may not be the last child.

¹¹ In the case where education is missing for parents, we impute the mean value.

well as motivational or psychological aspects associated with schooling. Parents absent from the household may place additional work burdens on children: for instance, if children enter the labor force to replace adult income or if children at home engage in more domestic work to make up for parents. Studies in the context of other countries have found that children of single parents often perform worse in school, even when controls for income status are in place (Garasky 1992). These worse outcomes are often attributed to motivational and psychological factors associated with a parent's separation or divorce. In our case, there are few mothers of children absent from the household, whereas approximately 15 percent of fathers are absent from the household. Almost all of these households are female-headed households.

Characteristics of the Household

The economic status of the household, as demonstrated in the descriptive statistics, should be a fundamental determinant of educational determinants and differences in education between boys and girls. The economic status affects educational investments in children through the ability of the household to pay direct and indirect costs of their child's schooling. Poorer households have fewer resources with which to finance such aspects as transportation and school supplies. Additionally, the opportunity cost of children attending school may be higher for poor households in terms of forfeited income and/or help in domestic chores.¹²

We include a measure of per capita adult (over age 20) income levels. We exclude child and youngster income from the analysis as we consider work decisions of children to be endogenous to their educational decisions, so that it is inappropriate to include their labor income. This, nevertheless, may be inappropriate in a family labor supply model where adult labor decisions are not exogenous to child labor market decisions, and clearly educational and work decisions are related for children.

An important set of variables which may be directly related to the school attendance of children are those measuring whether anyone in the family receives government subsidies. We include three different measures: whether a family member receives free school breakfasts (provided by DIF, National System for Integral Family Development), whether anyone receives scholarships for children's education (these could be in the form of payments for attending school or for purchasing school supplies and likely part of the compensatory programs of the Secretary of Public Education, who provides these transfer in some poor marginated areas), and whether the household receives milk free (through LICONSA, a milk subsidy program). While we do not know exactly whom in the household receives these benefits, we consider that their reciprocity may be important stimulus to the school attendance of all children in these families.

We also include other measures of income and wealth of the household, including whether the floor of the household dwelling is an earth floor. Finally, we include a measure of whether there are any disabled individuals in the household. This variable may be important to the extent to which children substitute for the labor of disabled individuals.

¹² In this paper we do not attempt to analyze the complicated relationship between child work and school attendance. See Knaul and Parker (1997) for an analysis of the inter-relationships between work and school in the context of longitudinal data for Mexico.

Characteristics of the Community

The availability, distance, and accessibility of schools are key variables for measuring the costs of attending school. We use measures of the number of per capita secondary schools, where per capita refers to the secondary school age population (ages 12 to 15) as indicators of the supply of schools in the municipality.¹³ We do not have direct measures of the distances to schools for the children in each community. Rather, we use an (admittedly crude) indicator of altitude in the area as a measure of difficulty of access to schools in rural areas only.

¹³ While we have access to information on the supply of schools at the level of the locality, unfortunately the database of the *Corteo* does not contain information on the locality so that we are unable to match this school information to the locality level. Instead, we use the next level of geographic aggregation, the municipality.

Table 3 provides the means and standard deviations of the variables used in the analysis.

Table 3. Means and Standard Deviations of Variables Used in the Analysis: Youth Aged 12 to 15

	<i>Urban (localities > 2,500)</i>		<i>Rural (localities < 2,500)</i>	
	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>
Child Characteristics				
% of children attending school	87.3 (33.3)	88.1 (32.2)	63.0 (48.3)	71.9 (44.9)
% of children behind in school (of those attending)	.170 (.376)	.237 (.425)	.395 (.489)	.457 (.498)
Age	13.5 (1.12)	13.5 (1.12)	13.5 (1.10)	13.4 (1.10)
Number of kids 0-5	.442 (.723)	.436 (.730)	.842 (1.02)	.816 (1.01)
Number of kids 6-11	.902 (.909)	.879 (.918)	1.37 (1.10)	1.38 (1.10)
Siblings in household aged 12 and over	5.89 (1.97)	5.87 (2.01)	7.03 (2.34)	7.08 (2.43)
Parent Characteristics				
Years of schooling of mother	6.52 (4.19)	6.60 (4.32)	3.02 (2.83)	2.95 (2.74)
Years of schooling of father	7.36 (4.74)	7.55 (4.81)	3.40 (3.01)	3.33 (2.97)
Mother absent from household	.018 (.133)	.023 (.150)	.017 (.127)	.018 (.134)
Father absent from household	.140 (.347)	.123 (.328)	.084 (.277)	.086 (.280)
Household Characteristics				
Per capita adult income	479 (859)	509 (961)	151 (370)	148 (310)
Presence of disabled persons in household	.093 (.290)	.092 (.289)	.132 (.338)	.129 (.335)
School breakfasts received by at least one household member	.034 (.182)	.098 (.298)	.098 (.298)	.091 (.289)
Household receives free milk	.148 (.553)	.087 (.311)	.087 (.310)	.101 (.411)
Educational grants received by at least one household member	.070 (.256)	.174 (.379)	.174 (.380)	.178 (.383)
Dwelling has earth floor	.081 (.273)	.087 (.283)	.387 (.487)	.392 (.488)
Community Characteristics				
Secondary schools per capita	.0001 (.00005)	.0001 (.00005)	.0004 (.0003)	.0004 (.0003)
Altitude	1139 (910)	-0.000009 (-1.12)	1139 (864)	1142 (855)

Note: Standard deviations in parentheses.

Source: Encuesta del Censo 1995.

SECTION 5. REGRESSION RESULTS

Table 4 through 7 contain the main regression results. Beginning with school attendance, the results show important large impacts of parental education on attendance of girls and boys. While the education level of both parents is highly significant, it is interesting to note that for girls, the level of education of the mother has a larger positive impact than the level of education of the father. Nevertheless, the reverse is true for boys, as the education of the father has a larger impact on their school attendance than the mother's.

Table 4. Determinants of the Probability of School Attendance, Youth Aged 12 to 15

	<i>Girls</i>	<i>Boys</i>
Child Characteristics		
Age	-.096* (-26.6)	-.091* (-29.6)
Number of kids 0 to 5	-.027* (-5.57)	-.017* (-4.10)
Number of kids 6 to 11	-.010* (-2.23)	-.010* (-2.67)
Number of siblings aged 12 and over in household	-.010* (-3.78)	-.0017 (-0.75)
Parent Characteristics		
Years of schooling of mother	.020* (13.0)	.011* (8.80)
Years of schooling of father	.015* (10.5)	.014* (11.2)
Mother absent from household	-.149* (-4.47)	-.136* (-5.23)
Father absent from household	-.056* (-4.40)	-.047* (-4.28)
Household Characteristics		
Log of per capita adult income	.0196* (4.52)	.0129* (4.29)
Presence of disabled persons in household	.0004 (0.40)	-.028* (-2.86)
School breakfasts received by at least one household member	.055* (3.64)	.013 (1.00)
Household in free milk program	.005* (0.76)	-.002 (-0.35)
Educational grants received by at least one household member	.054* (4.94)	.042* (4.60)
Dwelling has earth floor	-.051* (-5.27)	-.056* (-6.87)
Community Characteristics		
Secondary schools per capita	3.05* (1.93)	2.15* (1.60)
Locality less than 2,500 residents (rural)	-.120* (-10.0)	-.056* (-5.74)
Locality with 2,500 to 100,000 residents	-.035* (-3.16)	-.019* (-2.02)
N	10,364	10,849
Model statistic	Chi2(17)=2,359	Chi2(17)=2,217

Notes: Marginal effects reported in place of coefficients; t-statistics in parentheses.

Source: Encuesta del Censo 1995.

Table 5. Determinants of the Probability of School Attendance, by Urban and Rural Residence, Youth Aged 12 to 15

	<i>Urban (localities > 2,500)</i>		<i>Rural (localities < 2,500)</i>	
	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>
Child Characteristics				
Age	-.060*	-.064*	-.158*	-.142*
	(-16.8)	(-20.9)	(-20.6)	(-20.5)
Number of kids 0–5	-.030*	-.021*	-.023*	-.010
	(-6.11)	(-5.09)	(-2.40)	(-1.18)
Number of kids 6–11	-.005	-.007*	-.019*	-.011
	(-1.15)	(-1.86)	(-1.91)	(-1.16)
Siblings in household aged 12 and over	-.011*	-.001	-.005	-.0034
	(-4.17)	(-0.83)	(-0.92)	(-0.54)
Parent Characteristics				
Years of schooling of mother	.015*	.007*	.025*	.018*
	(11.0)	(6.53)	(6.90)	(5.64)
Years of schooling of father	.010*	.010*	.020*	.019*
	(8.12)	(9.40)	(5.61)	(5.96)
Mother absent from household	-.089*	-.082*	-.219*	-.215*
	(-2.72)	(-3.40)	(-3.36)	(-3.46)
Father absent from household	-.044*	-.026*	-.057*	-.104*
	(-3.89)	(-2.70)	(-1.83)	(-3.59)
Household Characteristics				
Log per capita adult income	.020*	.010*	.016*	.013*
	(3.73)	(3.25)	(1.90)	(1.93)
Presence of disabled persons in household	.007	-.022*	.024	-.047*
	(0.92)	(-2.25)	(1.05)	(-2.21)
School breakfasts received by at least one household member	.028	.005	.104*	.020
	(1.50)	(0.30)	(3.70)	(0.78)
Household in free milk program	.0007	.0006	.043*	-.013
	(0.12)	(0.11)	(1.60)	(-0.79)
Educational grants received by at least one household member	.029*	.030*	.084*	.063*
	(2.26)	(2.83)	(4.02)	(3.46)
Dwelling has earth floor	-.046*	-.056*	-.073*	-.065*
	(-4.05)	(-5.63)	(-4.14)	(-4.11)
Community Characteristics				
Secondary schools per capita	.807	-2.54	4.43*	7.47*
	(0.34)	(-1.35)	(1.73)	(2.93)
Altitude			-.00005*	-.00003*
			(-5.32)	(-3.90)
N	6,512	6,732	3,852	4,008
Model Statistic	Chi2(15)=1099	Chi2(15)=1160	Chi2(16)=781	Chi2(16)=1099

Note: Standard deviations in parentheses.

Source: Encuesta del Censo 1995.

**Table 6. Determinants of the Probability of Being Behind in School, Youth Aged 12 to 15
(Marginal effects reported in place of coefficients)**

	<i>Girls</i>	<i>Boys</i>
Child Characteristics		
Age	.016* (3.70)	.025* (5.49)
Number of kids 0-5	.017* (2.83)	.004 (0.58)
Number of kids 6-11	.013* (2.38)	.009 (1.47)
Siblings in household ages 12 and over	.015* (4.36)	.027* (7.15)
Parent Characteristics		
Years of schooling of mother	-.021* (-13.1)	-.020* (-11.6)
Years of schooling of father	-.011* (-7.34)	-.014* (-8.77)
Mother absent from household	.208* (4.83)	.209* (5.28)
Father absent from household	.033* (2.25)	.049* (3.01)
Household Characteristics		
Log of per capita adult income	-.012* (-2.29)	-.020* (-3.38)
Presence of disabled persons in household	.004 (0.31)	.055* (3.45)
School breakfasts received by at least one household member	.018 (0.97)	.052* (2.26)
Household in free milk program	-.007 (-0.70)	-.007 (-0.75)
Educational grants received by at least one household member	.037* (2.60)	.057* (3.60)
Dwelling has earth floor	.157* (11.9)	.167* (11.9)
Community Characteristics		
Secondary schools per capita	-3.72* (-1.86)	-3.86* (-1.74)
Locality less than 2,500 residents (rural)	.061* (4.51)	.039* (2.65)
Locality with 2,500-10,000 residents	-.024* (-1.99)	-.016 (-1.25)
N	7,917	8,725
Model Statistic	Chi2(17)=1440	Chi2(17)=1652

Note: T statistics in parentheses.

Source: Encuesta del Conteo 1995.

Table 7. Determinants of the Probability of Being Behind in School, by Urban and Rural Residence, Youth Aged 12 to 15

	<i>Urban (localities > 2,500)</i>		<i>Rural (localities < 2,500)</i>	
	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>
Child Characteristics				
Age	.008* (1.89)	.022* (4.38)	.0381* (3.83)	.030* (3.32)
Number of kids 0–5	.009 (1.36)	-.003 (-0.45)	.037* (2.91)	.014 (1.19)
Number of kids 6–11	.010* (1.84)	.014* (2.09)	.016* (1.30)	-.002 (-0.17)
Siblings in household aged 12 and over	.014* (3.92)	.025* (5.91)	.018* (2.41)	.033* (4.68)
Parent Characteristics				
Years of schooling of mother	-.014* (-9.26)	-.011* (-9.09)	-.042* (-9.69)	-.030* (-7.28)
Years of schooling of father	-.009* (-6.05)	-.016* (-7.07)	-.017* (-3.88)	-.021* (-5.35)
Mother absent from household	.126* (2.94)	.241* (5.59)	.387* (4.30)	.126 (1.55)
Father absent from household	.027* (1.92)	.057* (3.44)	.056 (1.44)	.035 (0.98)
Household Characteristics				
Log per capita adult income	-.002 (-0.27)	-.016* (-1.53)	-.020* (-2.00)	-.023* (-1.70)
Presence of disabled persons in household	.021 (1.41)	.058* (3.16)	-.032 (-1.11)	.049* (1.69)
School breakfasts received by at least one household member	-.001 (-0.08)	.065* (2.02)	.069* (1.98)	.061* (1.77)
Household in free milk program	-.0004 (-0.05)	-.010 (-1.05)	-.043 (-1.34)	.004 (0.22)
Educational grants received by at least one household member	.045* (2.47)	.019 (0.95)	.031 (1.29)	.088* (3.62)
Dwelling has earth floor	.127* (7.67)	.126* (6.75)	.187* (8.23)	.192* (9.08)
Community Characteristics				
Secondary schools per capita	-4.02 (-1.34)	-3.59 (-1.03)	-5.39 (-1.66)	-6.34* (-1.86)
Altitude			.00002* (2.16)	.00003* (3.40)
N	5,471	5,782	2,446	2,943
Model Statistic	Chi2(15)=581	Chi2(16)=781	Chi2(16)=470	Chi2(16)=506

Note: T statistics in parentheses.

Source: Encuesta del Censo 1995.

Mothers and fathers absent from the household have important negative impacts on the probability of their children attending school. In particular, the impact of the mother being absent from the household is very large, reducing the probability of school attendance by 14.9 percent in the case of girls and 13.6 percent in the case of boys. The corresponding effect of the father being absent is to lower the probability of school attendance by 5.6 percent for girls and 4.7 percent for boys.

It is interesting to note that the variables measuring school breakfast receipt and education grants have strong positive impacts on girls' school attendance. For boys, the educational grants variable is the only significant variable of the government subsidy programs. Even so, the effect of this variable is lower for boys than for girls. These results appear to indicate

that at least some of the government's efforts at increasing well-being have a positive impact on school attendance, most importantly in the case of girls.¹⁴

All of the measures of household economic status including per capita income and household dwellings with an earth floor demonstrate that greater economic status results in a higher probability of school attendance.

The presence of disabled individuals is negatively and significantly related to the probability of school attendance only in the case of boys, suggesting that boys may substitute for family disabled workers in the labor force, thereby reducing the probability that they attend school. On the other hand, small children in the family have a much larger negative effect on school attendance for girls than for boys, although it is significant for both. For instance, an additional child in the family aged 0 to 5 reduces the probability of school attendance for girls by 2.7 percent, and only 1.7 percent for boys. This may reflect that older daughters have additional domestic responsibilities associated with younger brothers and sisters, which are incompatible with school attendance, whereas increased younger brothers and sisters may increase the probability of entering the labor force for older brothers. In the case of siblings one's age or older, the evidence indicates that this negatively affects the attendance of girls only, which may indicate that in large families girls are the ones most likely to be excluded from educational investments.

At the level of the community, the supply of secondary schools is positively and significantly related to the probability of school attendance both for boys and girls, with larger impacts for girls. This may indicate that increases in the supply of schools have a larger impact on girls' school attendance, for instance, if parents are more reluctant to send their girls to schools which are further from the community.

Table 5 presents the same regressions disaggregated by rural/urban residence, where rural residence is defined as localities with less than 2,500 persons. Mother and father educational levels continue to be important and significant determinants of school attendance in all of the samples, with particularly large impacts in the rural areas. Again, the pattern is repeated where the impacts of the mother's education are larger for girls, whereas the impacts of father education are larger for boys. In rural areas, the education of the mother and the father have impacts which are twice the size of the impacts in urban areas. Similarly, absent fathers or mothers have much larger negative impacts on the school attendance of rural children than urban children. A mother absent from the household reduces the probability of school attendance by 22 percent for girls, versus 8.9 percent in urban areas. It is also interesting to note that in rural areas, absent fathers have a much larger negative impact on school attendance for boys than for girls, consistent with the explanation that boys may substitute in the work force for their absent fathers in rural areas.

Measures of income status continue to be important both in rural and urban samples of boys and girls. The impacts of economic indicators have generally larger impacts on the school attendance in rural zones, and particularly on the attendance of girls. Again, presence of disabled individuals has negative impacts on school attendance only in the case of boys.

In the case of social programs, the regressions show that these programs have much larger impacts on school attendance in rural areas than in urban areas, and particularly on the school attendance of girls. In rural areas, the variable of school breakfasts increases the probability of attending school by 10.4 percent for girls, whereas the corresponding impact for

¹⁴ This could represent a result of targeting, if some of these programs were more highly targeted to girls rather than boys, for instance in the case of education scholarships.

boys is 2 percent. The variables representing school grants is significant in all four samples; however, the effects are again much larger (more than double) in rural zones and larger for girls than for boys.

The results of other children in the family show mixed results. The number of children aged 0 to 5 continues to have negative and significant effects on all samples except for boys in rural areas. Older siblings have negative effects on school attendance only for girls in urban areas.

In terms of community indicators, the supply of secondary schools is positively related to the probability of school attendance for boys and girls in rural areas only. This is consistent with evidence that secondary school supply is particularly a problem in rural areas. Altitude has a negative and significant effect on the probability of school attendance, which is consistent with a story where higher altitude may measure difficulty of access to schools and thereby negatively affect school attendance.

We now turn to the regressions of the probability of currently attending but being at least one grade behind in school. The results are quite similar to the regressions of the probability of attending school in terms of the variables which are most important. Parental education levels continue to play a fundamental role in the probability of falling behind in school with the education of the mother having a larger impact on both girls and boys. Absent mothers and fathers have strong positive effects on the probability of falling behind in school, with absent mothers having much larger impacts.

Income status of the household is negatively associated with the probability of falling behind in school, but in contrast to the school attendance regressions, the impacts are generally larger for boys than for girls. As with the results for school attendance, the presence of disabled individuals affects only the probability of boys falling behind in school whereas number of younger children in the family have a positive effect of falling behind in school only for girls. Other siblings have a positive effect on falling behind in school for both samples, indicating that size of family is an important aspect for investment in child schooling.

The effects of subsidies are, at first glance, inconsistent with expectations, as the school grants and school breakfasts are positively associated with falling behind in school. Nevertheless, we believe this result may be due to the *return* of students who were previously not attending school to school precisely because of these programs, and these students are, of course, more likely to have been behind in school.

Turning to the disaggregated regressions by urban/rural residence (Table 7), parental education measures are much more important to explaining the probability of falling behind in rural zones than in urban zones, consistent with our findings on school attendance. Here the effects show larger impacts of the mother's education on girls' achievements and larger impacts of father's schooling on boys' achievement. Again, the mother's absence from the household is much more important than the father's absence from the household.

Economic status is important in all four samples, particularly in rural areas where the impacts of income measures are generally much larger than in urban areas. Small children again have a negative impact on the probability of falling behind in school in the case of girls but not in the case of boys. In all four samples, older siblings have positive and strong impacts on the probability of falling behind in school, providing support for the "dilution" of family resources argument.

SECTION 6. CONCLUSIONS AND POLICY IMPLICATIONS

This paper has shown that important progress has been made in improving educational attainment in Mexico over the last decades. The average number of years of schooling achieved has doubled over the last four decades and gender differences in education have been substantially reduced. Nevertheless, Mexico still lags behind other Latin American countries in terms of education, given its level of GDP. Furthermore, large differences in educational attainment between rural and urban areas remain, differences which are clearly related to income and wealth. The analysis of this paper suggests that the most important determinant of educational attainment in Mexico is poverty.

The gender gap in education has fallen substantially over the last 30 years, to the extent that girls and boys below the age of 20 no longer display significant differences in educational attainment, as measured by years of schooling attained. This reduction of the gender gap, a generalized finding in Latin America, may be related to two factors, the first being the general expansion in education levels in Latin America which, while not specifically oriented to increasing girls' education, may have a larger impact on girls' attendance if schools are more easily accessible, and girls are more likely to not attend school if schools are located outside of the community. This paper has shown evidence that the supply of secondary schools is a larger determinant of girls' school attendance than boys'. Another important factor is the increase in women's labor force participation, which has occurred over the same period as the reduction of the gender gap, and clearly has increased the returns to investing in education for women.

The current educational difficulties of boys and girls appear to manifest themselves in different ways. Descriptive analysis of educational attainment of Mexican youth shows that in attendance, girls begin to fall behind boys in secondary school. Nevertheless, these trends in attendance do not show up in worse schooling attainment for girls, as measured by years of schooling completed until past the ages of 20 to 25. The reason for this is that while boys attend school more during these ages, they are more likely to repeat grades and fall behind in school. The policy implication which surges as a result of this analysis is that policies should be aimed at stopping the dropout of girls after primary school and should be aimed at trying to understand why boys who continue attending school are more likely to fall behind in school than girls. It is clearly important to understand why attendance and dropout display such important differences between boys and girls.

The evidence on gender gaps suggests that it is possible that, at the national level, girls and boys currently below 20 years old will become Mexico's first generation in which there is equal educational attainment of men and women. Nevertheless, men are still more likely to enroll in college than women. For the future, an important issue with respect to gender and education will be attendance at the university level and the types of careers and majors which women choose to study. In many Latin American countries, it has been shown that women tend to be concentrated in traditionally female areas, such as education and health (Bustillo 1991).

One important factor which appears to be behind the reduction of the gender gap in education is the effect of parental education levels. We have found evidence that the education of parents is highly important to explaining educational outcomes, even after controlling for a number of other income status variables. In particular, the impacts of the mother's education have a larger impact on girls' education than the father's education, whereas the impacts of the father's

education have a larger impact on boys' education than the mother's education. This finding is consistent with a number of interpretations. Mothers may be likely to be role models for girls, whereas fathers may be more likely to be role models for their sons. A more economic explanation is that education levels of the parents are indicators of bargaining power in the household with mothers concentrating their resources on investment in daughters and fathers doing the same with their sons.

While further research is needed to be able to identify the mechanisms through which parental education affects student achievement, we believe this is an important finding, and while confirming that the mother's education is an important variable for childhood development, our results suggest that in the case of boys, the father's impact is also very important. Efforts to stimulate the educational attainment of both boys and girls should take this into account.

Another interesting set of variables found to be important in the attendance of children are government social programs. Both school breakfast and educational grants programs were found to have strong impacts on attendance, particularly in rural and urban areas. Further research behind the reasons for these impacts is needed. In particular, it would be useful to carry out this analysis with data which specify exactly which children in the family are benefited by government programs.

Progresa, the Education, Health, and Nutrition Program, is an example of a new program (begun in 1997 after the Conteo was carried out) targeted at promoting the educational level of boys and girls in poor, rural contexts. Among its other benefits, the program includes educational grants to children attending school between the third grade of primary and the end of secondary school. To receive the grants, children must be attending school and must successfully complete the school year cycle. Additionally, grants for girls at the secondary school level are slightly higher than for boys. Given the evidence found in this paper that rural areas have much lower educational attainments and that girls begin to drop out at the beginning of secondary, Progresa seems like an appropriate response. The program is expected to have incorporated two million families in marginalized rural areas by the end of 1998.

Secondary school availability was found to be an important factor affecting the educational outcomes of children of secondary school age, so that an important policy implication is to continue the construction of secondary schools, particularly in rural areas.

Our analysis also found evidence of large negative impacts of absent mothers and fathers from the household on children's educational attainment, even after a number of controls for income and wealth status of the household. These findings are also consistent with a number of interpretations. Children, particularly girls, may fill in as "substitute" parents in cases where one (or more) of their parents is absent, making it more difficult to keep up with the demands of schooling. Alternatively, the absence of one of their parents may create emotional distress which negatively affects their schooling, or the lack of supervision may translate into increased absenteeism at school and poor performance.

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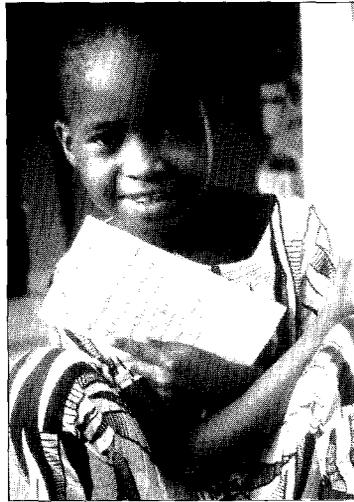
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