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Education and Poverty in Guatemala

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Introduction

The objectives of this paper are: (i) to describe and quantify the role that education plays in determining poverty and (ii) to provide concrete policy recommendations for the government about how best to improve education for the poor in Guatemala.

Current statistics show Guatemala is

- *Poor*. The World Bank's World Development Report (2000/2001) reported that 39.8 percent of Guatemala's population of about 11 million live on less than US$1.00 per day while 64.3 percent live on less than US$2.00 per day.

- *Multi-ethnic***.** The most recent census data classify 42 percent of the population as belonging to one of nearly 30 ethnic groups that do not speak Spanish. Each of the ethnic groups speaks a language that is unintelligible to the others.

- *Overwhelmingly rural*. The fact that so many ethnicities and languages have evolved and survived in a country of only 109,000 square kilometers is testimony to its rich and complex history, to its overwhelmingly rural nature (61 percent of the population live in rural areas), and to its diverse landscape.

These qualities do not make Guatemala unique among developing countries. In fact, it does not even distinguish it from other countries in its region–many Latin American countries are rural, poor, and have more than one ethnic group. However, Guatemala does stand out for the *magnitude* of these characteristics. This has implications for the efficiency and productivity of public investments and ultimately for the equality or otherwise of these investments.

I: Analysis and Themes

The process that we refer to as "education" combines inputs that are provided through schools, with other inputs provided privately in students' homes. This simple representation characterizes the framework that holds together the various parts this study. It follows that discrepancies in educational outcomes can be explained by differences in school, individual, and parental characteristics.[1] Thus, public policy is able to affect educational outcomes only slowly. First, the character of schooling provided to the young must be changed. The full impact will come only much later when the home environment has also been changed. This will happen when the educated young of today have their own families and start to educate their children in a home of their own.

When attempting to understand the links between education and current poverty, it follows analogously that the parents of some students are poor partly because of their own educational background. Their scant education and, consequently, low household income prevent poor parents from providing their children with home tutoring or buying them private educational inputs.

[1] A similar framework is developed in Edwards et al. (1997).

It is an empirical fact that–as a group–poor children enroll in school at a later age and drop out at a younger age than the average. They also tend to do less well academically while they are in school. Thus, poverty in the home–at least partly due to the low educational attainment of the parents–often means that the children of the home also remain uneducated, and thus pass on their poverty to a third generation. The more thoroughly policymakers understand the educational constraints faced by poor families, the more likely they will be able to craft education policies aimed at preventing the intergenerational transmission of poverty.

The major objective of this study is to describe and quantify the role that education plays in perpetuating poverty in Guatemala. First, we describe the association between the adult poor (the parents of today) and their past education. Second, we turn our attention to the students of today who may well be the poor parents of tomorrow. Following a general overview of the sector and types of education programs in Guatemala, we will concentrate on six major themes:

- The educational attainment of the adult population (the education stock)
- The extent to which the school system covers the school age population
- The link between the distribution of the education stock and the distribution of income, and poverty
- Internal efficiency (to the extent possible with ENCOVI data)
- The determinants of current enrollment and educational attainment
- The out-of-pocket costs of going to school.

Our analytical framework involves three steps:

- Establishing education levels
- Linking the levels to poverty
- Estimating the determinants of poverty-inducing behavior.

We then examine two other issues, namely how public spending on education is distributed and the implications of this distribution for equity and the role of education in the disappearance of the Mayan cultural identity.

II: Sector Overview

The Ministry of Education recognizes six formal education levels and corresponding target ages:

- Early childhood education (from birth to the age of 6)
- Pre-Primary (for ages 5 and 6)
- Primary (for ages 7 to 12)
- Secondary (for ages 13 to 20)
- University.[2]

Primary education and the levels below it have no educational pre-requisites, whereas secondary and university education are both open only to students who have completed the previous level. Secondary education is divided into two sub-programs. Basic Secondary (grades 7 to 9) follows primary school and is similarly characterized by a common curriculum that must be taken by all students. Diversified Secondary (grades 10 to 13) has four tracks: General (seen as preparation for university), teacher, technical, and commercial. There is a great deal of variation across programs in this overwhelmingly private-sector level, with "tracks" lasting anywhere from two to four years.

III: Data

The information analyzed in this study is mainly primary data from the ENCOVI 2000 household survey (part of the World Bank's Living Standards Measurement Study). Macroeconomic data and information for international statistical comparisons was gleaned from a number of international sources, mainly the World Bank's "World Development Report" and the World Bank education statistics database "EdStats" as well as from UNESCO and IADB publications and websites. Wherever relevant and possible, we cross-checked our findings from our primary analysis with publications from the Guatemalan Ministry of Education and with the Guatemalan Census. We bolstered our qualitative findings with cost and fiscal information from a recently completed Public Expenditure Review (Anderson, 2001), with findings from the Qualitative Survey (QPES) carried out in Guatemala in coordination with the ENCOVI, and with numerous historical documents from the Latin American Collection of the Howard Tilton Memorial Library at Tulane University.

IV: The Education Stock

This section gives an impression of the amount of education attained by Guatemalans. It also raises questions of equity pertaining to education. We provide descriptive statistics that highlight the current mean levels of attainment in the standard fashion, but we also examine closely the *distribution* of education among adults.

[2] A thorough summary of both formal and non-formal education modalities can be found in Anderson (2001).

We begin with: (i) statistics on literacy in the Latin America region, followed by (ii) current statistics on mean adult (ages 21 to 65) educational attainment in Guatemala, and (iii) historical trends in coverage and attainment for Guatemalans born between 1935 and 1980.

Table 1:
Latin America and the Caribbean:
Illiterate Population age 15 and older

	Both Sexes			Men			Women		
Year	**1980**	**1990**	**2000**	**1980**	**1990**	**2000**	**1980**	**1990**	**2000**
Argentina	6.0	4.2	3.1	5.7	4.1	3.1	6.4	4.4	3.1
Bolivia	30.9	21.6	14.4	19.9	12.9	7.9	41.3	29.9	20.6
Brazil	25.4	18.3	14.7	23.7	17.9	14.9	27.2	18.8	14.6
Chile	8.5	6.0	4.3	7.9	5.6	4.1	9.1	6.4	4.5
Colombia	15.6	11.3	8.2	14.7	10.9	8.2	16.4	11.6	8.2
Ecuador	18.1	11.6	8.1	14.4	9.5	6.4	21.8	13.8	9.8
México	17.0	12.3	9.0	13.8	9.6	6.9	20.2	15.0	10.9
Paraguay	14.1	9.7	6.7	10.6	7.7	5.6	17.5	11.7	7.8
Perú	20.2	14.3	10.1	11.7	7.9	5.3	28.8	20.6	14.6
Uruguay	5.3	3.4	2.2	5.7	3.9	2.6	4.8	3.0	1.8
Venezuela	15.1	9.9	7.0	13.3	9.1	6.7	16.9	10.8	7.3
South Am. Average	**16.0**	**11.1**	**8.0**	**12.9**	**9.0**	**6.5**	**19.1**	**13.3**	**9.4**
Costa Rica	8.3	6.1	4.4	8.1	6.1	4.5	8.4	6.1	4.3
El Salvador	33.8	27.4	21.3	29.1	23.7	18.4	38.4	30.7	23.9
Guatemala	*46.2*	*38.5*	*31.3*	*38.1*	*30.7*	*23.8*	*54.3*	*46.3*	*38.9*
Honduras	39.0	33.0	27.8	37.2	32.0	27.5	40.8	34.0	28.0
Nicaragua	41.8	38.7	35.7	41.5	38.6	35.8	42.1	38.8	35.6
Panamá	14.3	11.2	8.1	13.7	10.7	7.4	15.1	11.8	8.7
Cent. Am. Average	**30.6**	**25.8**	**21.4**	**28.0**	**23.6**	**19.6**	**33.2**	**28.0**	**23.2**
Lat. Am. Average	**21.2**	**16.3**	**12.7**	**18.2**	**14.2**	**11.1**	**24.1**	**18.5**	**14.3**
Bahamas	6.6	5	3.9	7.2	5.7	4.6	6.1	4.3	3.2
Cuba	7.9	5.2	3.6	8.1	5.2	3.5	7.8	5.2	3.6
Dominican Rep.	26.2	20.5	16.2	25.2	20	16	27.3	21	16.3
Guyana	5.4	2.8	1.5	3.7	2	1	7	3.7	1.9
Haití	69.1	60.7	51.4	65.5	57.6	49	72.3	63.5	53.5
Jamaica	22.5	17.3	13.3	26.8	21.7	17.5	18.5	13.1	9.3
Suriname	12.4	8.2	5.8	8.4	5.7	4.1	16.1	10.7	7.4
Trinidad & Tabago	5	3.2	1.8	3.5	2	1	6.6	4.4	2.5

Source: United Nations (2001) Indicators of Economic and Social Development in Latin America and the Caribbean,

Table 1 shows United Nations' estimates of LAC illiteracy rates for the years 1980, 1990, and 2000 (United Nations, 2001). Not surprisingly, the highest proportion of people who can read and write are found in those countries with the highest incomes. In South America, illiteracy is lowest in Uruguay (2.2 percent) and in Central America, it is lowest in Costa Rica (4.4 percent). Guatemalan literacy is not just below average in Latin

America–it is *far below* average. In 1980 and 1990, Guatemala ranked last in Latin America, with illiteracy rates of 46.2 percent and 38.5 percent respectively. Within the LAC region, only Haiti performed worse. Projections for the year 2000 show that overall adult illiteracy is a bit worse in Nicaragua but that Guatemala remains last in the rankings for female illiteracy rates. Progress in teaching women to read and write lags about 20 years behind what has been achieved for males.

ENCOVI literacy estimates for the population aged 15 and above are very similar to the United Nations' forecasts, though the gender difference appears to be somewhat higher. The survey-weighted mean rate of illiteracy is 31.8 percent for both men and women versus 21.8 for men and 39.8 for women taken separately.

For the remainder of the paper, the term "adult" will refer to people between 21 and 65 years of age. According to the ENCOVI data, there are approximately 4.5 million "adults" in Guatemala. Altogether they have 19.2 million years of education or an average of 4.28 years per person. Two-thirds of these people consider themselves to be literate. Just over a half are "functionally literate" having completed at least three years of schooling. Although at least this many people enrolled in school, only 36 percent completed the primary level, 12 percent completed high school, and 4 percent completed at least four years of university.

It is of significant interest to know not only the current stock of education but also how it has changed over time, particularly whether it has been growing and, if so, how fast. A good sense of the history of Guatemala's educational system can be obtained from ENCOVI cross-sectional data by splitting up the mean adult attainment data into 15 three-year cohorts. Accordingly, the oldest cohort consists of people aged 63, 64, and 65, while the youngest includes people aged 21, 22, and 23. The oldest cohort would on average have been born in 1936 and would have turned 7 in 1943. The youngest cohort can likewise be identified by their average birth year or–more conveniently for our purposes–by the year in which they turned age 7 and ought to have enrolled in first grade (1985). For the remainder of the paper, we will refer to these three-year cohorts by the average year when they were meant to enroll in school.

Table 2: The Current Stock of Education

Cohort	Av. Age	Target Initial Enrollment Year	Number of Persons	Total Yrs. Of Schooling	Average years of Schooling	Self-Reported Literate (%)	3 or More years of School (%)
1	64	1943	126,269	282,201	2.23	41%	28%
2	61	1946	138,504	291,810	2.11	43%	28%
3	58	1949	141,367	320,298	2.27	48%	29%
4	55	1952	193,748	451,543	2.33	46%	28%
5	52	1955	213,416	630,396	2.95	50%	36%
6	49	1958	255,500	737,688	2.89	51%	36%
7	46	1961	270,943	1,037,828	3.83	62%	47%
8	43	1964	290,651	1,261,404	4.34	68%	51%
9	40	1967	349,230	1,528,480	4.38	66%	53%
10	37	1970	337,742	1,555,968	4.61	68%	52%
11	34	1973	360,408	1,656,915	4.60	69%	55%
12	31	1976	365,477	1,742,923	4.77	73%	59%
13	28	1979	419,100	2,119,934	5.06	76%	65%
14	25	1982	474,974	2,497,276	5.26	78%	66%
15	22	1985	543,010	3,061,395	5.64	79%	71%
Total	37.8	1968	4,480,339	19,176,059	4.28	66%	53%

Table 2 provides a 15-cohort breakdown of educational attainment by Guatemalan adults. It shows that mean attainment more than doubled over the last half of the 20th century, from 2.2 for the 1943 cohort to 5.6 for the 1985 cohort. Over the same period, functional literacy increased from 28 percent to 71 percent, while self-reported literacy nearly doubled from 41 percent to 79 percent. This change signifies that there are very large differences in the distribution of educational attainment among cohorts. For instance, the 1943 cohort accounts for about 3 percent of people aged 21-65 but for barely 1 percent of the total number of years of schooling. In contrast, the youngest (1985) cohort, makes up 12 percent of the population but possesses 16 percent of the education. Therefore, one of the most salient reasons for this unequal distribution across the population is the historical pattern of improvement in educational attainment**.** Increased coverage and attainment over time also builds significant momentum into the system. To illustrate, suppose that average attainment does not continue to grow and instead remains at 5.6 years as future generations of Guatemalans leave school. Then in 42 years, when today's 23-year-olds turn 65, the average attainment for *all* Guatemalan adults would be 5.6 years. Thus even without any further increase in coverage, the country's education stock would rise by 33 percent.

Of course in reality, the educational attainment of future cohorts will continue to grow. How fast it grows will depend on how much of the current school-age population is covered by Guatemala's schools. This is the subject of the next section.

V: Coverage of the Current School-age Population

Guatemalan School Coverage in the International Context

The net primary school enrollment rate is the most widely cited measure of educational standing in the development literature. It shows the fraction of school-aged children (the primary school "target" group) that are actually enrolled at the primary level. According to this gauge, Guatemala has taken large strides towards universal access to primary education. In the early 1970s, Guatemala's primary schools enrolled just over half of the target population. Net enrollment rates increased dramatically in only one generation to reach 74 percent by the late 1990s.

Notwithstanding this commendable progress, much more remains to be done. Primary school coverage is still low by both regional and world standards. The most recent aggregates place the average primary enrollment rate for lower-middle income countries (like Guatemala) at 94 percent. Indeed, this is also the average for all of Latin American, meaning that Guatemala lags 20 percentage points behind the region as a whole.

It is tempting to ascribe this to poverty and to Guatemala's prolonged civil conflict, but these do not appear to be the only sources of the problem. Within Latin America, Central America provides a close comparative context that belies such simple explanations. World Bank data presented in Table 3 shows that Guatemala ranks last in Central America too, even though it is neither the poorest country on the continent nor the only one to have recently suffered from a prolonged and violent conflict.

Table 3: Central America Social Indicators

	Guatemala			Costa Rica			El Salvador			Honduras			Nicaragua			REGION		
	Latest single year			**Latest single year**			**Latest single year**			**Latest single year**			**Latest single year**			**Latest single year**		
	1970-5	**1980-5**	**1993-8**	**1970-5**	**1980-5**	**1993-8**	**1970-5**	**1980-5**	**1993-8**	**1970-5**	**1980-5**	**1993-8**	**1970-5**	**1980-5**	**1993-8**	**1970-5**	**1980-5**	**1993-8**
POPULATION																		
Total (million)	6.0	7.7	10.8	2.0	2.6	3.5	4.1	4.8	6.1	3.0	4.2	6.2	2.5	3.4	4.8	3.5	4.5	6.3
Growth (%)	2.8	2.5	2.2	2.5	2.9	1.6	2.7	0.8	1.9	3.0	3.2	2.4	3.3	3.1	2.3	2.9	2.5	2.1
% Urban	36.7	37.8	39.3	41.3	44.7	47.4	40.4	42.7	46.0	32.1	37.7	50.6	48.9	51.7	55.5	39.9	42.9	47.7
GNP per cap.	620	1,190	1,640	1,030	1,270	2,770	490	750	1,850	400	790	740	630	740	370	634	948	1,474
													6.8	5.5	3.7	1.4	1.1	0.7
Public expenditure																		
(% of GNP)																		
Health	..	..	1.5	..	..	6.9	..	..	2.6	..	..	2.7	..	..	4.4	..	..	3.6
Education	1.6	1.6	1.7	6.9	4.4	5.4	3.3	3.1	2.5	3.7	4.2	3.6	2.5	5.9	3.9	3.6	3.8	3.4
Social sec.	0.9	..	..	5.1	3.2	6.2	..	..	..	1.2	..	..	..	..	4.8	..	..	..
Net primary school coverage																		
(% of age group)																		
Total	53	65	74	92	84	89	66	69	89	..	92	88	63	73	79	..	76.6	83.6
Male	57	69	77	92	83	89	66	68	89	..	91	86	..	71	77	..	76.5	83.7
Female	49	61	70	93	84	89	65	69	89	..	94	89	..	76	80	..	76.6	83.5

Source: World Development Indicators 2000 CD-ROM. World Bank

El Salvador and Nicaragua have also recently emerged from prolonged civil strife, yet they are doing significantly better, with net primary enrollment rates of 79 percent and 89 percent respectively. In fact, the average Central American country attained 84 percent net primary enrollment by the late 1990s. This was nearly 10 percentage points more than Guatemala, despite the fact that income per capita in Guatemala (US$1,640) is slightly above the Central American average (US$1,474).

A more likely obstacle is the low level of spending on education in Guatemala. Over the past quarter-century, expenditures on education in Central America have remained remarkably constant at roughly 3.5 percent of GNP. Guatemalan expenditures as a percent of GNP have also remained very constant at about *half* this average. By the late 1990s, Guatemala's educational expenditures amounted to only 1.7 percent of GNP, compared to 3.6 percent for Latin America and 4.6 percent for lower-middle income countries.

ENCOVI 2000 Coverage Data

Table 4 summarizes coverage estimates for Guatemala obtained from the ENCOVI 2000 data. According to these data, approximately 5.4 million potential students comprise the "target population" of Guatemala's preschool through university system. Of these, 20 percent are in the preschool age range (4 to 6), 36 percent are in the primary range (7 to 12), 30 percent are in the secondary school age range (13 to 18), and 14 percent are of target university age (19 to 22).

The distribution of actual students is quite different from the distribution of potential students. About 11 percent (compared to the 20 percent target) of Guatemala's students actually attend preschools, and more than 68 percent (compared to the 36 percent target) attend primary school. At the higher levels, only 18 percent attend secondary school (compared to the 30 percent target), and barely 3 percent (compared to the 14 percent target) go beyond that to university.

If this cross-sectional snapshot continues over the next decade, the majority of Guatemala's children will never attain more than a primary school education. These data reveal that there is a substantial divergence between the targeting of Guatemala's educational system by age and its actual impact. Of the 5.4 million children in the target population, only 2.2 million (42 percent) are enrolled in the educational level appropriate for their age. The net enrollment rate for primary school is 79 percent (Table 4), up about 5 percentage points from the figure derived from the data available before ENCOVI 2000 but still significantly below the regional average (see Table 3). Policymakers' emphasis on expanding primary enrollment is evident in the fact that enrollment of the target group is highest at this level, with dramatically lower net coverage rates for other schooling levels. Preschools enroll only 23 percent of their target population, while secondary schools reach only 25 percent and universities barely 9 percent of theirs respectively.

Table 4:
School Coverage and Poverty in Guatemala

School Level	TOTAL	Non-poor	Poor
	Total Target Population		
-Kindergarten	1,071,793	343,814	727,979
-Primary	1,941,788	708,301	1,233,487
-Secondary	1,622,409	704,879	917,530
-University	763,458	389,316	374,142
	Net Enrollment Ratios		
-Kindergarten	23%	39%	16%
-Primary	79%	90%	72%
-Secondary	25%	44%	10%
-University	9%	16%	1%
	Gross Enrollment Ratios		
-Kindergarten	26%	42%	18%
-Primary	99%	110%	93%
-Secondary	31%	54%	14%
-University	20%	38%	2%

As distinct from net statistics, the gross enrollment ratio expresses the number of students of *all ages* as a percentage of the target population for each level. This is a measure of who *is* in school rather than who *should* be in school. Table 4 shows that the gross enrollment rate at the preschool level is not significantly different from net enrollment. This means that nearly all children who enroll in preschools enroll in primary schools at the appropriate age.[3]

Gross enrollments can also be contrasted with net enrollment statistics to draw conclusions about internal efficiency.[4] The relation between target, net, and gross enrollments is illustrated in Figure 1. The data in Table 4 show that students who are older (or occasionally younger) than the appropriate age for their current grade account for about one-fifth of primary and secondary students and for nearly three-fifths of tertiary students. The main reasons for students being older than the norm tend to be that they enrolled late in primary school in the first place and/or that they have had to repeat a grade or grades throughout the schooling cycle.

[3] We must be careful not to conclude that primary enrollment at the appropriate age is a consequence of attending preschool. It may be that preschool students come from higher income families and from families that are generally careful about the education of their offspring. Such children might have enrolled in primary school at the right age, even if no preschool program had been available. The study of causality is best left to multivariate analysis.

[4] If net and gross enrollments are identical, then *all* of the students enrolled in that level are of the age intended by the school system. For instance, this is approximately true at the preschool level.

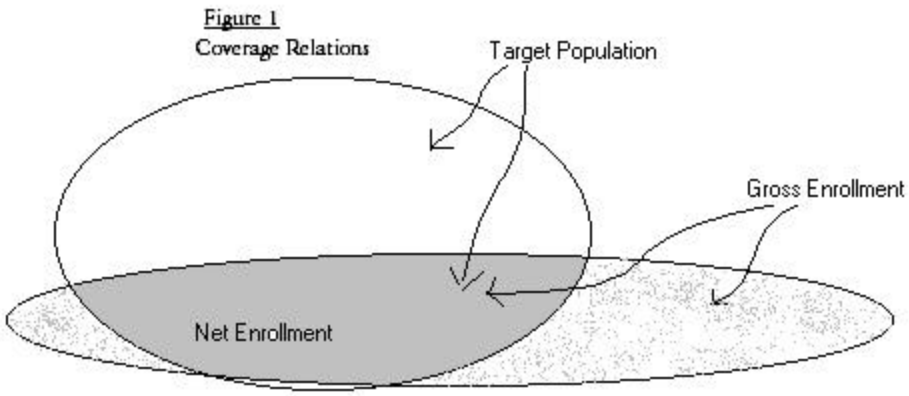


Figure 2 illustrates deviations from "design ideal" patterns in the Guatemalan case. Roughly speaking, an educational system is functioning according to its design ideal if net enrollment ratios are 100 percent and if gross enrollment is equal to net enrollment. This would mean that everyone is enrolled in the level designed for his or her age group. For instance, according to Guatemalan law and educational policy, 100 percent of all Guatemalan children between the ages of 7 and 12 should be in primary school. Similarly, all children aged 6 should be in preschool.

Figure 2 shows that educational policy is distorted by educational practice in a number of ways. For instance, 8 percent of 6-year-olds are already in primary school, while only 43 percent are in preschool. Also, only 60 percent of 7-year-olds are in primary school. School enrollment rises to 79 percent for 8-year-olds and to 86 percent for children aged 9 and 10. After this it declines, so that, for children of 12, it is back down to only 80 percent.

In summary, not all Guatemalan children go to school. The design ideal of 100 percent coverage is not reached at any age or any schooling level. This indicates that some supply-side issues of access probably still need to be addressed. It is also clear that compulsory school attendance laws are only weakly enforced even when students obviously have a school to go to. Among about 30 percent of those students who do enroll in school, their initial enrollment is often delayed by at least one year beyond the official entry age.[5] This delay–together with grade repetition–results in the over-age enrollment that constitutes the difference between net and gross enrollment rates of Table 4 and that is pictured in the furthest right section of the primary enrollment curve in Figure 2. The problem of a lack of age-appropriate education is epitomized by the fact that 19 percent of all 15-year olds are still in primary school. We analyze the determinants of grade-for-age in a separate section below.

[5] Figure 2 shows enrollment at 60 percent and 79 percent for ages 7 and 8 respectively. Children are supposed to enroll at the age of 7, but the survey was conducted in midyear, meaning that some 7-year-olds were too young at the beginning of the school year. We have used the average of the enrollment levels at ages 7 and 8 (69.5 percent) as an estimate of actual age-appropriate enrollment, meaning that about 30 percent enrolled late.

FIGURE 2

Guatemala 2000
School Coverage, by Age

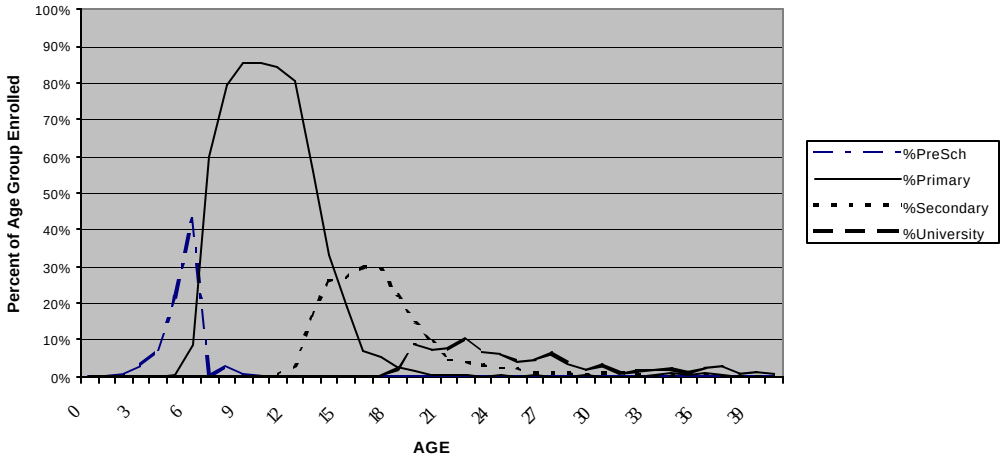


Figure 2 also vividly illustrates the point that secondary and post-secondary coverage drops off drastically and that these sub-sectors suffer similar over-age deviations from their ideal design. We examine schooling delays more thoroughly in a separate section below. For now, it is sufficient to note that over-age enrollment imposes a significant cost on students because, for any given level of attainment, it delays their entry into the labor market and because it is also associated with lower grade attainment. In addition, grade repetition can impose a heavy burden on the school system.

VI: Coverage and Equity

Coverage and Poverty in Guatemala

The proportion of the target-age population who are living in households classified as poor is 68 percent for those of preschool age, 64 percent for those of primary school age, 57 percent for those of secondary school age, and 49 percent for those of post-secondary age. This steady decrease in the proportion of poor households as the age rises stems from the fact that household income is correlated with the average age of a nuclear family with children. Parental incomes increase with age, but, more significantly in the present context, so does the number of target-age children who are working. Most potential students in the university age-range of 19 to 22 work (the net enrollment ratio is only 9 percent). In fact, many have established their own households by that age and have few–if any–children, which means that their per capita income as a young couple can be quite high before any children are born.

The second and third data columns of Table 4 break the coverage of education in Guatemala into the poor and non-poor populations as specified by the year 2000 poverty line. Inequity in terms of educational coverage is evident throughout the system, but because of recent policies favoring primary schools, it is lowest at this level. The net primary school enrollment of poor children lags behind that of non-poor children by only 18 percentage points. Also, gross primary

coverage ratios are quite high for both the poor and the non-poor. Yet these ratios illustrate the most significant difference between the two groups. Primary school enrollment–even if late–is nearly universal for the non-poor (110 percent gross), whereas a significant number of the poor will never go (93 percent gross rate) to school.

Transition rates measure the percentage of graduates at one level that go on to the next level of schooling. Large differences in post-primary transition rates between the poor and the non-poor signal a drastic decline in equity at the secondary and tertiary levels in Guatemala. The net and gross enrollment rates of the non-poor in secondary schools are approximately four times higher than those of the poor. At the university level, the rates of the non-poor are 16 times higher.

Young people from low-income households have to work in order to contribute to the welfare of their households. However, in so doing, they reduce their educational attainment, which in turn will mark them as the poor parents of tomorrow.

The Indigenous Population

The categories of the poor and the indigenous overlap though not completely. Table 5 breaks down poverty rates by major ethnic categories and by target grade level. The share of indigenous school-age people who live in poor households ranges from 69 percent for the 19 to 23 university age range to 84 percent for the 5 and 6 preschool group. The poverty rate range for equivalent non-indigenous groups is 36 percent to 53 percent. Non-indigenous poverty rates are comparatively lower but are still very high by absolute standards.

Table 5:
Poverty
by Ethnicity and Target Grade Level

	Indigenous	Non-indigenous
Age Range	Percent in Poor Households	
-Preschool	84%	53%
-Primary	82%	48%
-Secondary	75%	42%
-University	69%	36%

Table 6 below disaggregates net and gross enrollment ratios by ethnicity. At the preschool and primary levels, the educational system appears to have an equalizing effect across ethnicities. Non-indigenous enrollment rates are higher but not by as large a margin as the differences in poverty rates between the two groups would predict.

In sharp contrast, the secondary and post-secondary sub-sectors are reinforcing differences in poverty between ethnic groups. Whereas gross enrollment of the non-indigenous in primary schools is only 9 percent higher than that of the indigenous, at the secondary level non-indigenous gross enrollment is 120 percent higher and at the university level it is 266 percent higher. As will be seen below, the differences in educational attainment is the major factor that explains differences in earnings among individuals.

Table 6:
Coverage by Ethnicity

	Indigenous	Non-indigenous	TOTAL
	Total Target Population		
SCHOOL LEVEL			
-Kindergarten	500,735	571,058	1,071,793
-Primary	870,565	1,071,223	1,941,788
-Secondary	699,509	922,900	1,622,409
-University	308,236	455,222	763,458
	Gross Enrollment Ratios		
-Kindergarten	20.9%	30.2%	25.9%
-Primary	94.2%	103.0%	99.1%
-Secondary	18.7%	41.0%	31.4%
-University	7.9%	29.0%	20.5%
	Net Enrollment Ratios		
-Kindergarten	18.3%	27.7%	23.3%
-Primary	71.6%	84.4%	78.7%
-Secondary	14.0%	33.4%	25.1%
-University	2.7%	12.6%	8.6%

Figures 3 to 5 neatly illustrate the difference in lifetime schooling between the two groups. Figure 3 shows their school attendance status at all levels. It shows not only that coverage of indigenous children is lower overall than that of non-indigenous children, but it also depicts the fact that indigenous children start school at a later age and withdraw from the system at a younger age than non-indigenous children.

Figure 4 shows primary school age/enrollment profiles for the two ethnicities. Indigenous children enroll later than non-indigenous children, about 10 percent fewer of them enroll, and their presence among over-age students is somewhat higher.

Figure 5, the last in the series, shows the very significant differences in coverage that appear at the secondary level. The u-shaped peak for the indigenous group contrasts with the tabletop profile for non-indigenous students, indicating that a large fraction of those who enroll at this level are not staying in school long enough to complete it that level.

Box 1:Who are the "Indigenous"?

Guatemalan census data have always distinguished between indigenous and non-indigenous people, but the criteria for classification has evolved with the maturation of national identity.

The Indian/non-Indian dichotomy was at first unequivocal. When European conquerors first established themselves in the territory, the word "indigenous" was simply an adjective that meant native-born. However, Spanish law granted full citizenship to anyone born of Spanish parents. This was true even if they were born in Guatemala, and it was even true if only one parent was Spanish. As this new group of locally born descendents of Europeans grew, its members came to be known as *"Ladinos."* Interestingly, the same name was used to designate the Spanish-born Jews expelled from Spain by Ferdinand and Isabel in 1492, also the year of the first Columbian voyage.

Throughout the early colonial period, ethnic classification became a matter of great consequence to the population and interest to the royal bureaucrats. Edicts banned the emigration of Jews, Moslems, and Protestants to the New World. Only non-Moslem, non-Christian (hence black-skinned) Africans could be sent as slaves. Indians were exempt from slavery, but only they were subject to a head tax. Thus in the colonial period, there was an economic incentive for Indians to try to get classified as Ladinos. Indians between the ages of 18 and 50 were obligated to pay a tribute of 2 pesos in cash or in kind per year. Zilberman de Luján (1995, p. 101) notes that, throughout the 18th century, the *"Población de Castas"* – later called "Ladinos" –grew in proportion to the Indian population because indigenous people wished to evade the tribute.[1] Cabezas-Carache (1995, p. 337) notes that, after the earthquake of 1717, many who lived near the capital city, tried to hide their origin by becoming Ladinos, calling themselves 'soldiers' and by marrying Mestizos and Mulatos, or by seeking refuge on one of the haciendas.

The censuses from 1893 to 1994 show a fairly steady but very uneven secular decline in the percentage of "Indians" reported. For instance, between 1893 and 1921, there was almost no change. In both years, classification was left up to the interviewer, who was told to "discretely write down the person's race" without asking the respondent, for it was known that asking resulted in "erroneously recording" individuals as Ladinos. Another 30 years later, the recorded percentage of indigenous people dropped by 11 points when instructions changed to using local standards. The census taker was to "use as a basis for classification whatever was the local social perception of that individual." Another 11 point drop resulted ater in only 14 years, when the 1950 methodology was "cross-checked" with "objective" criteria, including language spoken, dress, whether shoes were worn ,and whether the person ate bread or corn tortillas.

In 1973 and 1981, crosschecking was dropped and the census taker was allowed to decide, except in the case of maids, when the owner's opinion was to be recorded. The result was that between 1964 and 1973 the proportion recorded as indigenous rose slightly for the first and only time in Guatemala's history. By 1994, data collection was imbued with the spirit of post civil war democracy and pluralism. The census report notes that "the individual's right to self-identification with an ethnic group was respected. For this reason, [information on ethnicity] was obtained by means of a direct question and not through simple observation."

FIGURE 3
Lifetime Schooling, by Ethnicity
(All Grades)

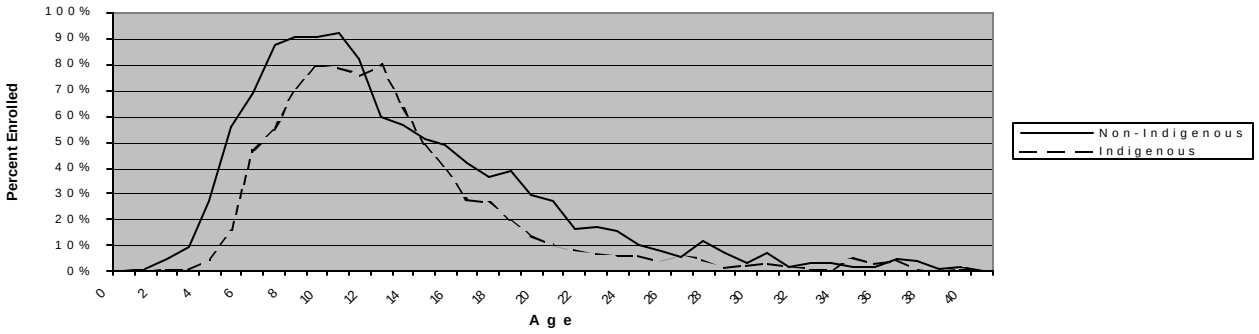


FIGURE 4
Primary School Coverage, by Ethnicity

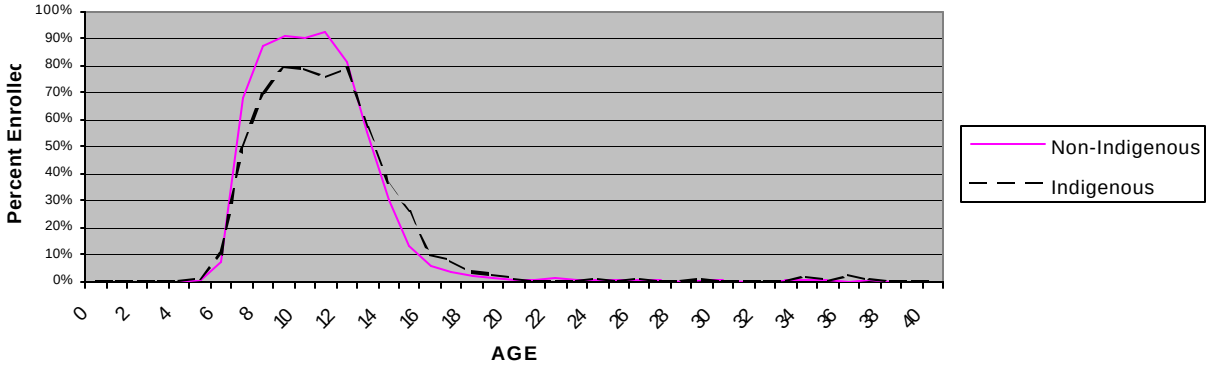
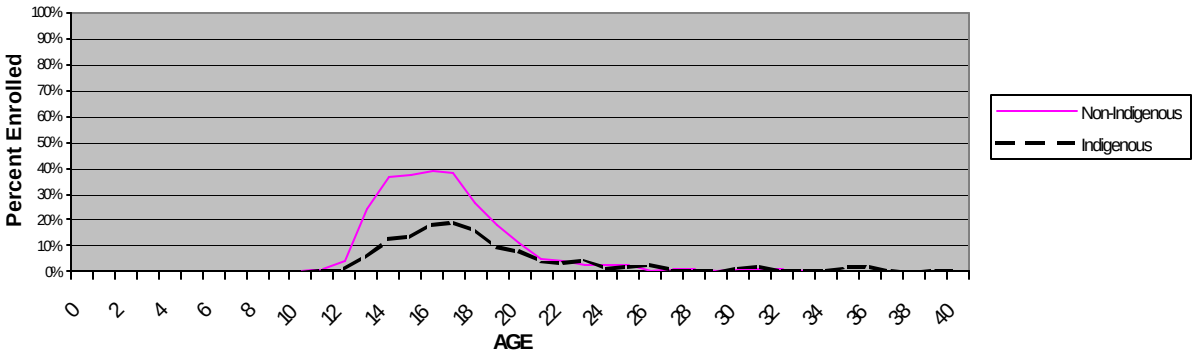


FIGURE 5
Secondary School Coverage, by Ethnicity



VII: The Links between Education and Poverty

Linking Income Inequality to Education Inequality

Income distribution and poverty are distinct concepts but they are linked.[6] Distribution is a question of how the pie is divided into portions, whereas poverty is a question of whether anybody is receiving a piece that is too small to provide the nourishment that they need. The criteria for what is "too small for necessary nourishment" can be established objectively and in a manner that is independent of the distribution and, for that matter, of the size of the pie. [7] The link between distribution and poverty is the fact that the poor are always at the lower end of the distribution. Therefore, understanding what determines income distribution can lead to a better understanding of poverty. The first step is to describe the distribution of education. This is done in Table 7 below.

Table 7:
The Distribution of Adult Education

	1	2	3	4	5	6	7
Cohort	Average Age	Target Initial Enrollment Year	Cohort as % Population Age 21-65	Cohort's Education as % of Total Education	Average Years of Schooling	Variance	Coefficient of Variation
1	64	1943	3%	1%	2.23	17.39	7.78
2	61	1946	3%	2%	2.11	14.02	6.66
3	58	1949	3%	2%	2.27	14.92	6.58
4	55	1952	4%	2%	2.33	17.05	7.31
5	52	1955	5%	3%	2.95	20.09	6.80
6	49	1958	6%	4%	2.89	20.08	6.95
7	46	1961	6%	5%	3.83	24.09	6.29
8	43	1964	6%	7%	4.34	28.72	6.62
9	40	1967	8%	8%	4.38	25.17	5.75
10	37	1970	8%	8%	4.61	27.38	5.94
11	34	1973	8%	9%	4.60	24.43	5.31
12	31	1976	8%	9%	4.77	23.00	4.82
13	28	1979	9%	11%	5.06	21.70	4.29
14	25	1982	11%	13%	5.26	21.99	4.18
15	22	1985	12%	16%	5.64	20.99	3.72
Total	37.8	1962	100%	100%	4.28	23.52	5.50

Column 5 of Table 7 shows that average educational attainment has more than doubled over the lifetime of the cohorts. The oldest five cohorts account for 17 percent of the population aged 21 to 65 but for only 10 percent of their education. By comparison, the youngest five cohorts

[6] For a formal treatment of this topic, see Atkinson (1987).
[7] A similar methodology is carefully developed for the Latin American context in Altimir (1982).

account for about 48 percent of the people in their age group and 58 percent of the education. The cohort who were scheduled to enter school in 1943 attained only 2.23 years of education on average. This is significant because it shows that the "pie" was small back then. It means that, if education had been equally distributed, everyone in the cohort would have remained functionally illiterate.[8] In contrast, the youngest cohort on average attained almost the equivalent of a primary school education. Thus, one source of inequality in educational (and therefore income) distribution in Guatemala comes from improvements in schooling. Younger people are better educated and, therefore, tend to earn more than older people.

The last two columns of Table 7 provide measures of the "dispersion" of education within each cohort. The variance (column 6) measures the average squared deviation from mean educational attainment. This measure of inequality grew by more than 50 percent, peaked in the mid-1960s and then began to decline back to where it was in the early 1950s. Since the variance is an absolute measure of deviation, it tends to get bigger as the average grows, when all other factors are equal. Therefore, it is common to calculate the "coefficient of variation," a related measure of dispersion that adjusts for the size of the mean, as well. This second measure (column 7) shows a nearly continuous decline in educational inequality over the 45-year period shown.

Table 8: Adult Males
Distribution of Education and Earnings

	1	2	3	4	5	6	7	8	9	10	11
Cohort	**Target Initial Enrollment Year**	**Return To School (β)**	**St. Err.**	**R-Sq.**	**Mean Y**	**V(Y)**	**Mean S**	**V(S)**	**β^2V(S)**	**V(U)**	**Sample Size**
1	1943	0.14	0.03	0.45	1.54	1.19	3.63	28.59	0.54	0.81	30
2	1946	0.11	0.03	0.30	1.22	0.42	2.30	10.78	0.13	0.55	33
3	1949	0.04	0.02	0.09	1.35	0.35	2.48	17.66	0.03	0.57	48
4	1952	0.10	0.02	0.20	1.52	1.09	3.05	23.21	0.22	0.94	63
5	1955	0.14	0.01	0.69	1.79	0.96	5.20	35.33	0.66	0.54	85
6	1958	0.14	0.01	0.64	1.69	0.77	4.91	26.90	0.49	0.53	104
7	1961	0.12	0.01	0.58	1.76	0.70	5.47	25.85	0.40	0.54	131
8	1964	0.14	0.01	0.51	1.87	1.22	5.83	32.42	0.62	0.77	145
9	1967	0.11	0.01	0.48	1.75	0.79	5.98	30.63	0.38	0.64	171
10	1970	0.12	0.01	0.52	1.72	0.80	6.65	29.95	0.42	0.62	156
11	1973	0.11	0.01	0.43	1.75	0.76	6.56	28.33	0.33	0.66	172
12	1976	0.12	0.01	0.38	1.76	0.93	6.87	25.85	0.36	0.76	193
13	1979	0.08	0.01	0.31	1.67	0.53	7.20	23.02	0.16	0.61	246
14	1982	0.09	0.01	0.27	1.57	0.50	6.50	18.23	0.13	0.60	288
15	1985	0.08	0.01	0.24	1.43	0.44	6.16	18.01	0.11	0.58	274
Total	*1962*	*0.11*	*0.00*	*0.39*	*1.65*	*0.73*	*5.99*	*25.11*	*0.26*	*0.44*	*2,139*

We can conclude that educational expansion over the second half of the 20th century had an equalizing effect, in that the variation in educational attainment declined.

[8] Recall that functional literacy is attained with at least three years of education.

The second step is to link education inequality to income inequality. In a seminal piece, Lam and Levinson (1991) developed a simple methodology for representing this link based on the well-known empirical regularity that education is the major source of variation in adult wages. The relation typically formulated as the "Mincer equation" is written as:

$$Y = \alpha + \beta S + u.$$

Here, "Y" represents (the log of) the wage rate and "S" years of completed schooling and "u" represents the influence of other factors that explain wages. Thus, α is the average hourly earnings of a person with no schooling (S=0), while β stands for the average increase in (log of) earnings per year of schooling. The latter is most commonly referred to as the "rate of return" to education. The distribution of wages (Y) is, therefore, algebraically linked to the distribution of education (S) and the rate of return to education (β). The variance in wages can be written as equivalent to the variance in the terms on the right-hand side:

$$V(Y) = V(\alpha + \beta S + u).$$

After working out the algebra, this can be rewritten as:

$$V(Y) = \beta^2 V(S) + V(u).$$

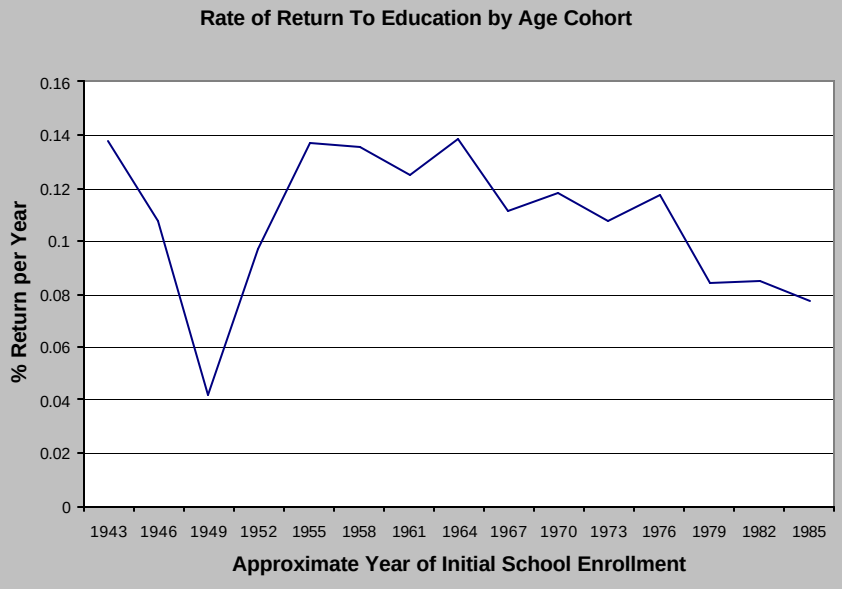
Namely, the variance in earnings is precisely decomposed into the variance in schooling times the rate of return to education (squared) plus the variance in the unexplained sources of variation in wage.

Box 2: School Quality and Earnings

The labor market returns to schooling received by people who are now in their late 50s and early 60s are sharply lower. Cohorts 2, 3, and 4 were of the correct age to be in primary school between 1945 and 1960, a period of great political tumult in Guatemala. The upheaval began with the presidency of Dr. Arévalo–a former professor of philosophy in Córdoba, Argentina–who adhered to the doctrine of "spiritual socialism." After his ascension to power, he determined that "schools would teach not only hygiene and literacy" but also "the doctrine of revolution" (Woodward, 1999, p. 238). His other reforms included decentralized government and a rapid expansion of the educational system to attack the population's illiteracy.

In 1950, Jacobo Arbenz was elected, which was the start of a rapid drift to the political left. Labor unions and the Communist Party cooperated closely with the government. Ernesto ("Ché") Guevara came to Guatemala to work on land reform within the Ministry of Agriculture. Eventually, the government was overthrown in 1954. When Carlos Castillo became head of the new junta, he moved quickly to "remove all communist influence from Guatemala." This included outlawing the Communist Party and banning "all Communist books and propaganda" (Woodward, 1999, p. 248). Castillo's assassination in in 1957 was followed by several years of short, unstable governments.

The variable "years of schooling" used in the analysis presupposes that all years are equivalent. Yet, the historical evidence suggests that, between 1945 and about 1960, the educational system fell prey to the political mayhem. The educational system became a tool for imparting the reigning political ideology and for pushing through an accelerated literacy campaign. It is likely that both of these changes diluted the academic content without which staying in school for many years would not translate into high financial rewards in the labor market. Thus, tThe lower rates of return that are observed for the cohorts who were in school during those years probably reflect this low-quality schooling.



The rate of return to education (β) for the full sample (last row) is 11 percent per year for schooling. It is highest (14 percent) for the cohorts that began school in the 1940s any figutres and early 1950s, begins a decisive downward trend after the 1964, with the lowest rate (8 percent) for the cohort that enrolled in school in the mid 1980s.

The relevance of this decomposition to the relationship between income inequality and educational inequality is that secular changes in the distribution of labor income can be caused either by a change in the distribution of education *or* by changes in the rate of return to education. The Guatemalan ENCOVI 2000 data bear this out.

Table 8 shows that income distribution across the cohorts is quite uneven. Two properties of this data are especially noteworthy. First, the trend over time in the variance of (log) income is much less clear than the trend in the variance of schooling. Second, the average years of schooling have grown steadily and smoothly, as was shown in Table 7, column 5. Taken together, these properties mean that changes in educational attainment are not the only factor behind interpersonal differences in earnings.

The distribution of education markedly improves for cohorts 9 through 15, which are the cohorts who became of school age after the mid-1960s. The income inequality decomposition formula suggests that the *rate of return* to education can also be a major source of inter-cohort variation in income. In the Guatemalan case, the *rate of return* to education and the *variance* in schooling are highly and positively correlated,[9] meaning that higher rates of return have *added* to income inequality when the variance in schooling was highest. Table 8 shows that, after the 1964 cohort, drops in the rate of return are a more significant cause of narrowing the income distribution than falling disparity in schooling.

Why should Returns to Education Vary?

Three major forces lie behind different rates of return to education: (i) job experience; (ii) wage compression; and (iii) education quality. The ENCOVI data cannot support a full analysis of *why* returns to education vary across cohorts or how much variation can be ascribed to each of these three potential sources. However, it is possible to say something about each.

Along with education, *job experience* is an important determinant of remuneration. More experienced workers are paid more. Also, age and job experience are closely related. Since each row in Table 8 represents a different age group, each row also represents a different potential level of job experience. Thus, since the rows in Table 8 already control for experience levels, this is not a likely source of the observed variations across cohorts.[10]

Like any other market-determined price, the wage premium for skills that children acquire at school depends on demand and supply. For a given demand, a higher supply of educated

[9] The correlation coefficient is 0.68.

[10] If job experience is affecting schooling coefficient estimates, it is only because of the interaction between experience and schooling and not because of the experience differential itself. School/experience interaction terms were insignificant in 12 of the 15 cohort estimates. In the three significant cases, the interaction coefficient was negative. This is consistent with the interpretation that people with fewer years of schooling also received a lower-quality education.

workers can cause *wage compression*[11] as it will tend to depress the skill differential in wages. Given the post-1964 expansion in functional literacy, it is likely that wage compression is partly behind the observed drop in returns to schooling.

Our analysis up to this point has treated education as a worker characteristic that can be measured in homogenous units called "years of schooling." In fact, *educational quality* almost certainly is *not* consistent among individuals.[12] Yet in order to affect the estimates in Table 8, educational quality must have varied systematically among cohorts as well as among individuals. Literacy campaigns, ideological modifications of the curriculum, and the general embroiling of Guatemalan schools in political turmoil from 1945 to about 1960 are likely to have led to precisely these systematic cross-cohort differences in educational quality (see Box 2). Whether similar forces are also behind the lower returns observed for the generation who were educated in the 1970s and 1980s remains an interesting but still unproven question.

The Education Poverty Line

A useful way to think of the education/poverty link is by defining what could be called an "education poverty line." As we have seen, earned income is a rising function of schooling. Therefore, how much schooling would a person need on average to earn sufficient income to be at or above the poverty line? First, we must establish which person, since characteristics other than schooling–such as job experience, gender, and ethnicity–also determine income. Also, since the poverty line is defined in terms of household consumption *per capita*, the necessary level of schooling will vary with the size of the household. The average household size in Guatemala is 4.3 people in non-poor households and 6.7 in poor households.

Table 9:
Years of School Needed to be Non-poor, by Household size

HH Size ==>	1	2	3	4	5	6	7	8
Headship								
Male Ladino	0.4	5.5	8.5	10.7	12.3	13.7	14.8	15.8
Male Indigenous	2.4	9.0	12.8	15.5	17.6	19.4	20.8	22.1
Female Ladino	3.6	8.5	11.4	13.5	15.1	16.4	17.5	18.4
Female Indigenous	7.3	14.2	18.3	21.1	23.4	25.2	26.7	28.1

Table 9 reports estimates of the level of schooling needed in Guatemala in order to be classified as non-poor.[13] The estimates are based on the assumption that only one person is earning income in the household and that that person is the household head. It is also assumed that this household head has the sample average of 25.7 years of post-schooling experience in the labor force. The first row shows the household size. Other entries indicate the schooling level needed to reach the per capita poverty line.

[11] This is the term used by Lam and Levison (1992) in their study of Brazilian inequality.
[12] For one of the few developing country studies of schooling inputs and adult earnings, see Bedi and Edwards (2002).
[13] Earnings equation estimates are presented in Appendix Table A8.

The table shows that single-occupant households headed by a Ladino male can be non-poor if they are fully employed, *even if this head has zero years of schooling.* In order to keep a two-person household out of poverty, an indigenous woman would need to have 14 years of schooling and to work full time. A male Ladino could do it with less than a primary school education. If he possessed a secondary school degree, he could support a family of five above the poverty line. An indigenous man would need a university degree. An indigenous woman would need a graduate degree to keep such a family at the same standard of living.

So poverty is related not only to the level of schooling but also to which household members have the schooling, which of them works, and how many people in the family work. This has profound implications for the family's education/work decisions and hence for education policy. For instance, Ladino sons clearly have the highest payoffs for staying in school. Yet a needy Ladino family will also be tempted to withdraw a son from school and put him to work, for his time will be most highly rewarded in the labor market compared to the wages paid to indigenous men and to indigenous *and* Ladino women.

It would be wrong to conclude that the observed differences presented in Table 9 are entirely the result of labor market discrimination. It is important to bear in mind that these dramatic differences among demographic groups are the combined effects of educational quality, job selection, and labor market rewards. For instance, it is probably true that the quality of education received by indigenous children is lower than that received by non-indigenous children. It is probably also true that Guatemalan women see themselves primarily as homemakers and are, therefore, likely to trade off some labor income for other job characteristics, including flexible hours and proximity to their home or to their children's schools. Yet, whatever the cause, it seems highly likely that there is a link between the much lower returns that indigenous women can expect from schooling and the fact that they are much less likely to attend school.

VIII: Internal Efficiency and School Quality

In this section, we will examine the progress made by the different social and geographic groups through the school system. The basis for monitoring progress through the school system will be repetition rates and a grade-for-age indicator of human capital growth akin to the height–for-age measure used in the health field.[14] Dropout behavior will be examined in the next section. The children targeted by the school system are either in school or out of school according to the ENCOVI data.

ENCOVI data provide imperfect information for generating standard measures of repetition, dropout, or the number of years it takes a student to acquire a degree. This imperfection is because not all transitions (between being in and out of school) are recorded and because the type of schooling data that was gathered was not the same for those in school and those out of school. One example is that the data tell us what type of school (public or private) the child attends if he or she is in school but not what type he or she attended in the past if the child is now

[14] The determinants of this measure as well as the determinants of the dropout hazard will be more formally modeled in the multivariate section.

out of school. This means we could not determine the impact of school type on dropout behavior.

Another example is that grade repetition data were only recorded for the in-school population and *only for the "current" year.* Therefore, we could calculate only current year repetition rates for students who were told to repeat the grade the previous year and have re-enrolled in the same grade. These must be expressed as a percent of *this* year's enrollment. More importantly, we could not count those students who were told to repeat but instead chose to drop out.

Table 10: Determinants of Grade-For-Age
(t-statistics)
Dep. Var.: GFA Z-score

Age	-0.08
	(-19.99)
Enrolled Late	-0.15
	(-4.12)
Years Delay	-0.31
	(-25.00)
Height for Age	0.13
	(15.00)
HH Size	-0.02
	(-4.37)
HH Cons. Per Capita	0.00
	(9.28)
Female	0.05
	(2.79)
K'iche	0.02
	(0.46)
Q'ueqchi	-0.16
	(-3.96)
Kaqchiquel	0.12
	(3.30)
Mam	-0.02
	(-0.39)
Other Maya	0.00
	(0.01)
Repeater	-0.78
	(-25.53)
Constant	1.22
	(21.10)
Num. Obs.=	5,862
R-squared	0.49

Grade-for-Age

It is clear from Figure 2 and from our discussion of gross versus net enrollment estimates that over-age enrollment is pervasive in the Guatemalan system. This sub-section will examine this characteristic in its totality. Subsequent sub-sections will then examine the individual determinants of the behavior underlying this delay in enrollment. A first impression of the total picture can be obtained with a new approach that involves estimating the determinants of "grade-for-age." This concept–adapted from the health literature–reflects cumulative schooling delays from all sources. These might include late initial enrollment, grade repetition, and temporary withdrawals from school. The grade-for-age (GFA) measure reported in the tables below is standardized by age, meaning that each person's grade attainment is measured in relation to the average grade attainment of people that age.

Table 10 reports results for a regression that examines the factors associated with the standardized GFA of all children currently enrolled in primary school. Not surprisingly, the coefficient on age is negative, reflecting the fact that older students who are still in primary school have had more opportunity to do poorly and that the best students are less likely to be in sample.

The decision by a child's parents to enroll their child late–over the age of 7–results in the child achieving a low attainment-for-age score. If the child's entry is delayed by several years, then this will lower his or her score even further. Neither of these results is new in and of themselves since there should be a simple algebraic relation between the age of enrollment and the number of grades attained by the age of X. This is true *unless* late enrollment is systematically associated with performance in school and the rate of transition from one grade to the next. The *magnitude* of the coefficients does provide us with some novel information. There is *no* one-to-one trade-off between enrollment delay and grade for age. In other words, children whose initial enrollment was delayed by two years are on average less than two years behind those who enrolled at the age of

7. This may imply that the enrollment delay involves some sort of corrective decision that eventually leads to a partial recovery of lost time.

Current repeaters are seen in the act of falling behind their age cohort. Estimates not shown here indicate that grade repetition translates into almost exactly a one-year delay in grade for age.

High household per capita consumption (an indicator of current well being) and a child's height-for-age that is above average (a proxy for all past well being)[15] are both associated with rapid progress through the school system. The first measure reflects wealth and current shocks, while the latter measure is associated with the lifetime health of the student and with a favorable intra-household resource allocation.[16]

Given all other characteristics, girls do slightly better than boys in school. Since girls are less likely to enroll, this result is either ironic–if we believe that the probability of female enrollment is independent of ability (girls generally do better than boys)–or tautological–if we believe it *is* correlated with ability (only the brightest children are enrolled and, since there is a smaller proportion of girls in school, they are on average brighter).

Perhaps the most surprising finding is that there is considerable inter-ethnic variation. Ethnicity coefficients measure the performance of indigenous children in school relative to the non-indigenous population. The K'iché, the Mam, and the conglomerate of about 20 smaller groups in the "Other Maya" category are in this restricted sense indistinguishable from the Ladinos. In contrast, the Q'ueqchí are about one-third of a year behind similarly situated Ladinos in terms of school attainment, while the average Kaqchiquel student is actually about one-tenth of a year *ahead*.

The most significant cause of low school attainment for a given age is delayed enrollment and early dropout. Since both of these are family–rather than school –decisions, we examine them later on in a separate section. Regarding the efficiency and quality of schools, we now turn to the limited information that can be garnered from the ENCOVI household survey.

Grade Repetition

Among the children who are in school, grade repetition is the principal cause of attainment delay or low GFA. It is important to note that the data presented in these tables measure the number of children currently in school who are repeating the grade that they are in–call this "Definition B." This number is expressed as a percentage of all children currently enrolled in that grade. A more exact measure of the quality problem described as "grade repetition" could be obtained by finding out at the end of the school year how many of the children who enrolled in a given grade that year did not pass or were told that they could not go on to the next grade (in other words, were "held back"). Call this "Definition A". Note that the two definitions are not identical and that the number of students under Definition B will generally be smaller than the number under Definition A as some of the students who are told that they must repeat a grade will decide not to re-enroll at all. The ENCOVI data only permit us to calculate Definition B.

[15] For an excellent micro-data application, see Cebu Study Team (1992).
[16] Note that this favorable allocation may also reflect child-centered values.

Table 11 shows primary repetition rates and Table 12 shows secondary repetition rates according to the more restricted Definition B as calculated from the ENCOVI data. For both primary and secondary schools, repetition rates are highest at entry levels.

The overall repetition rate is 12.8 percent for the six grades of primary school.[17] The repetition rates for the first two grades are so high–21.9 percent and 14.2 percent respectively–that they are a clear sign of serious deficiencies in the educational system. When one out of every five first-grade students is sitting through class for the second time something is seriously amiss. There are several possible explanations for this repetition pattern:

- The curriculum may unrealistically demanding.
- School quality and teacher "seriousness" may be implicitly judged by a "high standards" and this is demonstrated with a high repetition rate.
- Schools are thought to be "too full" so the lower grades are used as filters.
- The inherent characteristics of some students may make it difficult for them to perform adequately in school. In Guatemala, those characteristics might include a lack of fluency in Spanish as well as malnourishment and a lack of academic support in the home.

The fact that repetition rates are much lower in the later primary school grades than in the earlier grades should not be understood to mean that that students eventually learn more and repeat less. Instead, this is indirect evidence that many more of the repeaters drop out of school before reaching the later primary grades. This hypothesis is bolstered by some rough estimates of grade-specific dropout rates, to which we turn now. Breakdowns of primary repetition rates by gender and ethnicity shed little light on who is repeating or why. Averages for all six grades are almost identical statistically. Only the poverty status of the students' households produces significantly different repetition rates. The non-poor do significantly better than the poor.

The secondary repetition rate is much lower on the whole than the repetition rates in primary school, standing at 4.9 percent for grades 7 through 12.[18] However, repetition rates in secondary schools peak twice, once in grade 7 and again in grade 10, because of the institutional split of secondary education into two three-year cycles.

The discontinuities in repetition rates across grades are much more significant than they seem at first. It is much more likely that standards change from grade to grade than more students suddenly become incapable. Thus, it seems that the institutional structure creates a bottleneck at the beginning of each educational cycle, mainly because the standards between levels are not harmonized. What constituted an adequate standard of work in grade 6 is not sufficient in grade 7. What was fine in grade 9 is suddenly below par in grade 10.

Again, several explanations may account for this pattern. It may be that there are successively fewer schools that provide education at the higher grades and that the schools that do provide it

[17] This is somewhat lower than the rate of 14.5 percent reported by the Guatemalan Ministry of Education. See Anderson (2001), Table 1.5.

[18] This estimate is somewhat higher than the 3.7 percent rate reported in official sources for the year 2000. There were insufficient observations on students in the 13th year to produce a reliable estimate.

tend to be better schools. There are undoubtedly more primary schools than schools offering grades 7 to 9, and there are probably fewer that offer teaching for grades 10 through 12 than offer teaching for grades 7 through 9.[19] In this scenario, students that do adequate work in the smaller ("worse") schools find they are unprepared for the standards of the bigger ("better") schools that teach the higher grades. Another possibility is that the bottom grade at each level acts as a filter in an over-crowded system. For example, the top three secondary school grades may serve to filter out students whose work is not good enough to allow them to go on to university. In any case, the discontinuity between different levels of education is a red flag for differences in the quality of the education being provided, and clearly more research needs to be done on this issue.

Table 11: Primary School Repetition Rates (Definition B) by Grade (%)

Grade	ALL	Men	Women	Indig.	Non-indig.	Non-poor	All Poor	Extreme Poor
1	21.9	22.5	21.1	18.5	24.6	15.1	24.2	20.1
2	14.2	13.6	14.9	15.4	13.0	12.3	15.0	15.9
3	9.1	11.9	5.8	10.7	8.0	8.7	9.3	10.7
4	8.0	7.6	8.3	6.2	9.0	6.4	8.8	6.5
5	3.5	2.5	4.9	2.5	4.1	3.2	3.8	8.0
6	4.7	5.0	4.3	7.0	3.6	4.6	4.8	0.6
All Grades	12.8	13.2	12.4	12.7	12.9	9.1	14.7	14.7

TABLE 12: Secondary School Repetition Rates (%) By Grade

Grade	ALL	Men	Women	Indig.	Non-indig.	Non-poor	All Poor	Extreme Poor
7	7.0	6.3	7.8	a	8.2	7.5	6.4	a
8	3.4	3.3	3.5	a	4.9	3.6	3.2	a
9	4.6	6.2	2.4	a	3.5	4.4	5.0	a
10	6.4	8.0	4.9	a	1.8	1.4	22.2	a
11	2.5	2.5	2.5	a	2.9	3.0	0.4	a
12	1.7	1.9	1.4	a	2.0	1.9	0.0	a
All Grades	4.9	5.1	4.7	5.4	4.7	4.2	6.5	a

a Insufficient data for reliable estimate.
Source: World Bank Estimates based on ENCOVI 2000.

Dropouts

Estimated dropout rates are shown separately in Table 13.[20] They must be interpreted with care as the ENCOVI survey did not gather data that can be used to measure any of the standard

[19] Anderson (2001) provides descriptions of the sector that are consistent with this explanation.
[20] It was not possible to compute dropout rates at the secondary level. "Diversified" programs for grades 10 and above can last two, three, or even four years. The ENCOVI questionnaire identifies only the grade of enrollment, not the track.

definitions of "dropout" that are used in the literature.[21] The most common definition of a "high school dropout" would be a student who left school without completing a particular *level*. Occasionally, a dropout is defined as a student who was enrolled in a given *grade* but who definitely stopped going to school before the end of that academic year.

[21] Students that enrolled in the 2000 academic year were asked if they had definitively stopped going to school. However, since the survey was conducted well before the end of the school year, not all of the students who would eventually drop out had yet decided to do so. The *flow* of dropouts can also not be measured from the data gathered on the students who did not enroll since they were not asked *when* they had stopped going to school.

Table 13:
Internal Efficiency:
Estimated enrollment shares and drop out rates (% of grade)

Grade	TOTAL	
	Enr. Share	Dropouts
1	100.0%	26.7%
2	100.0%	6.8%
3	100.0%	19.3%
4	100.0%	21.4%
5	100.0%	5.6%
6	100.0%	a

	Men		Women	
	Enr. Share	Dropouts	Enr. Share	Dropouts
1	54.2%	31.0%	45.8%	16.9%
2	51.0%	1.3%	49.0%	10.8%
3	54.1%	20.3%	45.9%	17.0%
4	53.4%	14.5%	46.6%	27.1%
5	58.1%	11.9%	41.9%	b
6	54.2%	a	45.8%	a

	Non-indigenous		Indigenous	
	Enr. Share	Dropouts	Enr. Share	Dropouts
1	55.8%	31.4%	44.2%	16.9%
2	52.2%	b	47.8%	21.3%
3	61.5%	14.9%	38.5%	23.6%
4	64.8%	21.3%	35.2%	20.1%
5	64.9%	b	35.1%	19.5%
6	70.3%	a	29.7%	a

	Non-poor		All Poor		Extreme Poor	
	Enr. Share	Dropouts	Enr. Share	Dropouts	Enr. Share	Dropouts
1	33.3%	18.9%	66.7%	28.8%	20.7%	41.2%
2	35.2%	B	64.8%	14.2%	16.7%	28.5%
3	40.3%	12.5%	59.7%	23.1%	12.8%	33.4%
4	43.1%	B	56.9%	38.3%	10.5%	46.0%
5	55.4%	B	44.6%	16.1%	7.2%	14.2%
6	60.4%	a	39.6%	A	6.6%	a

a Estimation method does not permit computation of rate for grade 6.
b Unreliable estimate.

Since we could not measure either definition with the data we had available, we reported "total " dropout rates instead. We estimated these by examining the flow of total enrollments across grades and adjusting these for the repetition rates. This method partly involves subtracting enrollments in one grade from enrollments in the previous grade, and it therefore has two shortcomings. One shortcoming is that estimated dropout rates calculated in this manner are upwardly biased by enrollment growth over time. The other shortcoming is that the dropout rate

for the highest grade cannot be computed. Also, in the present context, the small size of the ENCOVI sample made it impossible to develop reliable dropout rates at the secondary school level.

Even with these caveats in mind, the estimates in Table 13 are informative. They show that there are very large and systematic variations by grade, with grades 1 and 3 having the highest dropout rates. This is corroborating evidence that the first grade of primary school is an insurmountable hurdle for a large proportion of the population. Also, the impediments appear to be more problematic for boys and for the non-indigenous population in general than for girls and the indigenous. There is also a higher dropout rate from grades 3 and 4. Gender ratios fluctuate somewhat throughout the six years of schooling, but the cumulative effect of dropping out is approximately the same for both genders. Girls make up 46 percent of first grade enrollment and 46 percent of grade 6 enrollment. On the other hand, the share of indigenous students drops from 44 percent in grade 1 to barely 30 percent in grade 6. Finally, the impact of the economic status of the students' families can be seen in the last panel, where nearly three-quarters of students in extreme poverty have left the school system before they reach grade 6.

These data substantiate the finding elsewhere in this paper that lower coverage among the poor is mainly not a supply-side "access" problem. Most students *can* attend school. Indeed, two-thirds of first grade students are from poor families. The big problem for these students is being able to continue in school once enrolled.

Why do poorer students stay in school for such a short time? Staying on in school depends on how much students are able to learn and whether they reach a level of minimum competency. Students may be forced to repeat a grade or may withdraw from school if the amount they learn is below the minimum standard set for their grade level. Learning requires not only the inputs provided by the school but also inputs from the students' home environments. This means there are two possible reasons for why poor students do not stay in school as long as non-poor students–the low standards and teaching quality of the schools that they attend and the low standards and quality (in an educational sense) of the homes in which they live. We will examine the issue of school quality in this section and the issue of the home environment in the section that follows.

Textbooks

One of the most important proxies for school quality in the ENCOVI data is the availability of textbooks. Educational researchers are often interested in textbooks not only because of their importance in teaching but also because textbook distribution in poor countries is often highly correlated with other indicators of school quality. Students are asked if they have "books" and, if so, how they had acquired them. Table 14 shows that 95 percent of primary school students had acquired books of some sort. According to this indicator, the schools that cater for Ladinos and the Kaqchikel are of a higher quality than those that cater for Spanish-speaking Mayans, especially if the latter belong to one of the smaller Mayan ethnic sub-groups.

Table 14: How Primary School Students Obtained Books

Ethnicity	Mother Tongue	Had None	Already Had them	Presents from Family & Friends	Free from School	Bought from School	Free from Gov't. Program	Free from Private Source or NGO	Bought from Gov't.	Private Purchase	Rented	Other	TOTAL
Ladino	Spanish	4.1	31.3	0.8	10.9	0.2	13.6	0.5	0.2	35.8	0.6	2.0	100
Indigenous	Spanish	5.7	29.3	1.6	17.3	0.3	7.6	0.0	0.0	33.4	3.1	1.9	100
	Mayan Lang.	7.0	27.7	1.1	21.7	0.1	14.4	1.4	0.1	21.5	2.0	3.2	100
-Kiche	Kiche	9.5	11.4	0.9	26.3	0.5	22.1	0.7	0.1	27.4	1.1	0.0	100
	Spanish	2.5	17.3	0.0	34.8	0.0	3.0	0.0	0.0	42.0	0.5	0.0	100
-Qeqchi	Qeqchi	2.5	44.9	0.5	21.7	0.0	13.7	2.3	0.0	7.8	5.5	1.3	100
	Spanish	10.0	35.3	2.2	11.9	0.0	17.3	0.0	0.0	14.9	5.4	3.1	100
-Kaqchikel	Kaqchikel	3.3	34.1	0.0	10.0	0.0	12.2	0.0	0.0	32.9	5.6	2.0	100
	Spanish	5.0	38.4	2.3	6.4	0.4	8.4	0.0	0.0	31.8	2.8	4.4	100
-Mam	Mam	6.1	24.3	2.0	22.7	0.0	10.2	2.0	0.0	26.1	0.0	6.6	100
	Spanish	11.2	32.2	0.0	14.1	0.0	6.6	0.0	0.0	25.4	10.5	0.0	100
-Other Mayas	Other Mayan	11.1	25.3	1.3	22.9	0.0	16.6	1.3	0.2	17.6	0.5	3.3	100
	Spanish	11.4	30.4	7.8	5.6	1.8	13.7	0.0	0.0	28.4	0.0	1.1	100
	Total	**5.1**	**30.1**	**1.0**	**14.7**	**0.2**	**13.1**	**0.7**	**0.2**	**31.5**	**1.3**	**2.3**	**100**
Poverty													
-Non-poor		8.0	31.6	1.3	22.7	0.0	18.5	0.8	0.1	14.1	0.4	2.6	100
-All Poor		5.4	32.2	0.7	17.5	0.1	14.3	1.0	0.3	24.2	1.8	2.7	100
-Extreme Poor		3.8	27.0	1.2	9.0	0.4	9.9	0.4	0.1	45.5	1.0	1.9	**100**

Table 15: How Secondary School Students Obtained Books

Ethnicity	Mother Tongue	Had None	Already Had them	Presents from Family & Friends	Free from School	Bought from School	Free from Gov't. Program	Free from Private Source or NGO	Bought from Gov't.	Private Purchase	Rented	Other	TOTAL
Ladino	*Spanish*	10.6	8.3	0.7	0.9	1.2	2.0	0.2	0.0	74.2	1.1	0.7	100
Indigenous	Spanish	9.2	9.5	2.1	0.3	4.7	1.4	0.1	69.5	1.0	2.2	9.2	100
	Mayan Lang.	8.4	16.2	2.1	3.6	0.8	3.2	2.0	61.2	1.7	0.9	8.4	100
Kiche	*Kiche*	9.0	3.0	0.0	2.2	0.0	0.0	0.0	0.0	85.7	0.0	0.0	100
	Spanish	4.1	6.3	0.0	0.9	0.0	0.9	0.0	0.0	82.6	0.2	5.0	100
Qeqchi	*Qeqchi*	4.5	29.0	2.9	5.5	2.0	9.7	1.0	0.0	42.1	3.4	0.0	100
	Spanish	12.9	12.3	0.0	0.0	0.0	0.0	0.0	0.0	61.4	13.4	0.0	100
Kaqchikel	*Kaqchikel*	3.1	9.7	0.0	5.5	2.4	0.0	1.4	0.0	74.7	3.3	0.0	100
	Spanish	11.8	7.7	5.3	0.0	11.8	2.0	0.0	0.0	61.1	0.0	0.4	100
Mam	*Mam*	18.0	17.2	3.7	1.1	0.0	0.0	0.0	0.0	60.1	0.0	0.0	100
	Spanish	0.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	92.0	0.0	0.0	100
Other Mayas	*Other Mayan*	9.8	22.3	3.8	2.4	0.0	4.8	4.1	0.0	50.0	1.8	1.1	100
	Spanish	22.7	19.2	0.0	0.0	0.0	1.6	0.0	0.0	55.3	1.3	0.0	100
	Total	**10.2**	**9.3**	**1.0**	**1.1**	**1.6**	**2.0**	**0.4**		**72.4**	**1.2**	**0.8**	**100**
Poverty													
-Non-poor		9.7	41.9	0.0	7.6	1.1	0.0	1.3		36.6	1.8	0.0	100
-All Poor		10.4	14.8	0.2	2.4	2.0	6.7	0.9		59.9	2.0	0.7	100
-Extreme Poor		10.1	7.3	1.3	0.7	1.4	0.8	0.3		76.5	0.9	0.9	**100**

Overall, about one-third of primary students report that they bought their own books and another 30 percent either already owned them[22] or borrowed them. In any case, fewer than 30 percent of students obtained books for free. There was a wide variation among ethnic groups in terms of how students acquired their textbooks. For instance 27 percent of Kiche-speaking students reported having purchased their books, but 42 percent of Spanish-speaking Kiche children did so. The "Free from Government Program" and "Free from school" categories tended to benefit speakers of native languages. This may reflect a compensatory component in the free distribution of all books or it may mean that schools that teach in the indigenous languages are the main consumers of free books. The response categories are not clear. The issue of textbook use and distribution is important enough to bear further examination.

More than 70 percent of secondary students buy their own books. This is not surprising as enrollment is far lower at the secondary level than at the primary level and, because more than half of that enrollment is private schools, most students come from affluent backgrounds. As a result, very few students get free books from school or from government programs. At the secondary school level, textbooks are a much more important component of learning than at the primary school level. Yet the data show that book distribution is very uneven. On average, 90 percent of all students report having books of some sort, but among the smaller Spanish-speaking indigenous groups, nearly one student in four has no books. This suggests that the quality of secondary schooling is highly variable and should be examined carefully.

IX: DETERMINANTS OF POVERTY-INDUCING BEHAVIOR

In the previous section, we examined the schools' side –or the supply-side –of the problem. We saw that children may not attend school for several reasons: (i) because there are no schools; (ii) because the schools do not want them; (iii) because they are not being taught well enough; or (iv) because schools that teach the earlier grades are not teaching their students well enough to keep up with the tougher standards that prevail in the higher grades.

Yet it is quite conceivable that children may also be out of school or may be in perfectly good schools but not learning very much for reasons that originate in the home. The analytical framework of this study posits that education plays a key role in keeping families in the poverty trap. Children from poor households are more likely to enroll in school late, to do badly in school, and to drop out after completing only a few grades. Belonging to a minority ethno-linguistic group may exacerbate the problem. This section will attempt to quantify these effects and ask *why* they exist.

Initial Enrollment

One of the earliest educational decisions parents make is *when* (or if?) to enroll their child in school for the first time. Although school attendance is compulsory in Guatemala from the age of 7, the empirical evidence that we have presented suggests that truancy laws are weakly enforced. Clearly, at this age child labor is not likely to be a predominant reason for parents deciding to keep their children out of school.

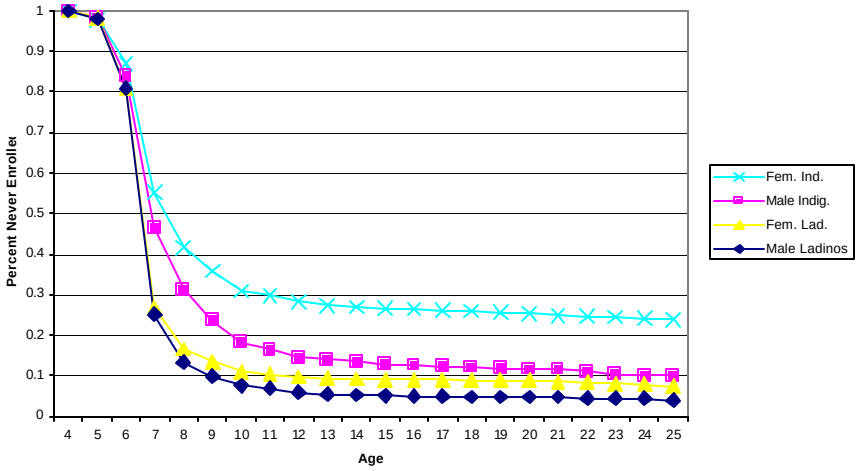
[22] This would presumably be the repeaters, but the category is somewhat imprecise.

The cross-sectional data provided by ENCOVI 2000 is "censored." In other words, if a person enrolled in school at some point in their life, we know *when* that enrollment occurred. However, for those who have never enrolled, we know only that they have never enrolled, but we do not know if and when they might enroll in the future. Thus, simply having data on students who have enrolled and their ages will bias estimates of who may or may not enroll and at what age they will do so.

Figure 6 displays estimated "survival functions," a technique that corrects for censored data. In this case, we have "layered" the observations according to ethnicity and gender. For each age, the graph shows the probability that a person will continue outside of the educational system without ever having enrolled in it. Notice that at 7, the legal age of first enrollment, 25 percent of male Ladinos and 55 percent of indigenous girls can be expected to *not* enroll. This gradually diminishes to about 4 percent for the former group and about 24 percent of the latter one.

The fact that the percentage never having enrolled declines with age has very significant

FIGURE 6
Likelihood of remaining out of school, given has never enrolled
(Kaplan-Meier Survival Function Estimates)



implications for policymaking. It signifies that a school exists for these children to attend but that their parents are choosing to not enroll them. The difference between the genders is fraught with similar meaning. Assume that boys and girls are randomly distributed among families. Assume also that about half of the population is female and half is male. Thus, for every boy in a given locale or socioeconomic condition, there is a corresponding girl. Yet twice as many Ladino girls (8 percent) as boys will never enroll. Thus, we know that at least 4 percent of Ladino girls have a school to go to and *could* be enrolled. We know this because their brothers *are* enrolled.

The initial enrollment of indigenous children tends to be delayed significantly more than that of Ladinos. Girls, especially indigenous girls, are kept out of school longer than boys. Survival function estimates indicate that some 46 percent of boys and 55 percent of indigenous girls will delay enrollment beyond the age of 7. At the age of 10, 18 percent of boys and 31 percent of

girls are still not in school. About 10 percent of indigenous boys and 24 percent of their sisters are kept out of school for their entire lives.

So primary school coverage is probably still a significant problem in Guatemala. However again we see that a lack of schools is not the only problem. Gender and ethnicity appear to be significant factors in parental decisions about enrolling their children in school. A rough estimate is that at least half of the children who are not enrolled *do* have access to a school that they could attend. This means that providing more or better schools cannot solve any more than about half of the coverage problem. It is as much a demand side problem as it is one of supply. Indeed, many of the children who are not attending school have a sibling who is enrolled. In conclusion, low net enrollment figures in Guatemala are at least as much a product of delayed primary school enrollment as they are the result of shortages of space or of high repetition and dropout rates.

The factors behind parents' decision to delay their child's enrollment in school can best be explored in a multi-variate setting. Hazard function estimates explain the instantaneous "risk" or hazard that a child will be enrolled in school as being dependent on a number of individual and household characteristics. Table 16 reports these estimates. They indicate that gender and ethnicity do operate independently and significantly. Being female reduces the likelihood of being enrolled in school at any given age. Being indigenous also reduces the likelihood of being enrolled in school at any given age. Furthermore, if a person has *both* characteristics, the likelihood that she will be enrolled is smaller than the sum of the two characteristic effects.[23]

Belonging to a large household also reduces the "hazard" of being enrolled, and this is true even after controlling for per capita household consumption. Hanushek (1992) carefully examined the impact of birth order on educational outcomes. He found that the relation is actually a bit more complex than what we have modeled here. For similar reasons, oldest and youngest children do relatively better. The oldest children do better because–at least in their early years–were members of a small family. The youngest do better because by the time they are of school age their older siblings have ceased to require so much parental attention.

[23] The interaction effect is also negative and significant.

Here, we find that, for a given family size, later children (in terms of birth order) tend to be enrolled in school at a younger age than their older siblings were. The bigger the family, the stronger this effect appears to be.

Having well-educated parents and high household per capita consumption are both on the "plus side.". Per capita consumption plays a major role in part through its impact on children's nutrition. More complete estimates reported in Appendix Table A7 point to a 10 percent delay in enrollment for one standard deviation difference in height-for-age, which is the preferred measure of the accumulated effects of malnourishment.[24] So we now see that education not only plays a large part in determining current poverty, it also plays a crucial role in continuing poverty into the next generation.[25] Education begets higher household incomes, but beyond that it also contributes both directly and indirectly to earlier school enrollment.

Table 16:
Chance of enrolling in school, having never enrolled (ages 4 to 25)

Variable	Haz. Ratio	Std. Err	z	P>|z|
Birth Order	1.10	0.02	4.18	0.000
Indigenous	0.80	0.06	-3.08	0.002
Female	0.84	0.04	-3.38	0.001
Indigenous and Female	0.77	0.07	-2.89	0.004
Father's Schooling	1.07	0.01	7.07	0.000
Mother's Schooling	1.07	0.01	6.21	0.000
Household Size	0.97	0.01	-3.19	0.001
Per capita consumption	1.00	0.00	7.00	0.000
.				
No. of subjects = 3202		Log likelihood =		-17470.71
No. of enrollments = 2332		chi2(11)	=	549.31
		Prob > chi2	=	0.0000

What are the costs of delaying enrollment? For a given school attainment and age of retirement, later school enrollment means later school completion and hence a shortened working life. Furthermore, because future earnings must be discounted, a person's total lifetime earnings differential will be significantly higher than the additional years of work might seem to indicate. These lost years are given up at the beginning not at the end of a working life. For instance, consider two people of the same age who will eventually obtain a high school education and then work until they are 65. For simplicity, assume that earnings are constant during the period and that there is an 8 percent discount rate. Now one person enrolls in school at the age of 7 and the other at the age of 9. Neither one of them repeats any grades. We can show that the person who had a two-year enrollment delay will have lifetime earnings that are 15 percent lower (at present value) than those of the other person.

[24] Glewwe and Jacoby (1995) found a similar effect in Ghana.
[25] For an excellent treatment of this topic in the U.S. context, see Neal and Johnson (1996).

Determinants of How Long Students Stay in School

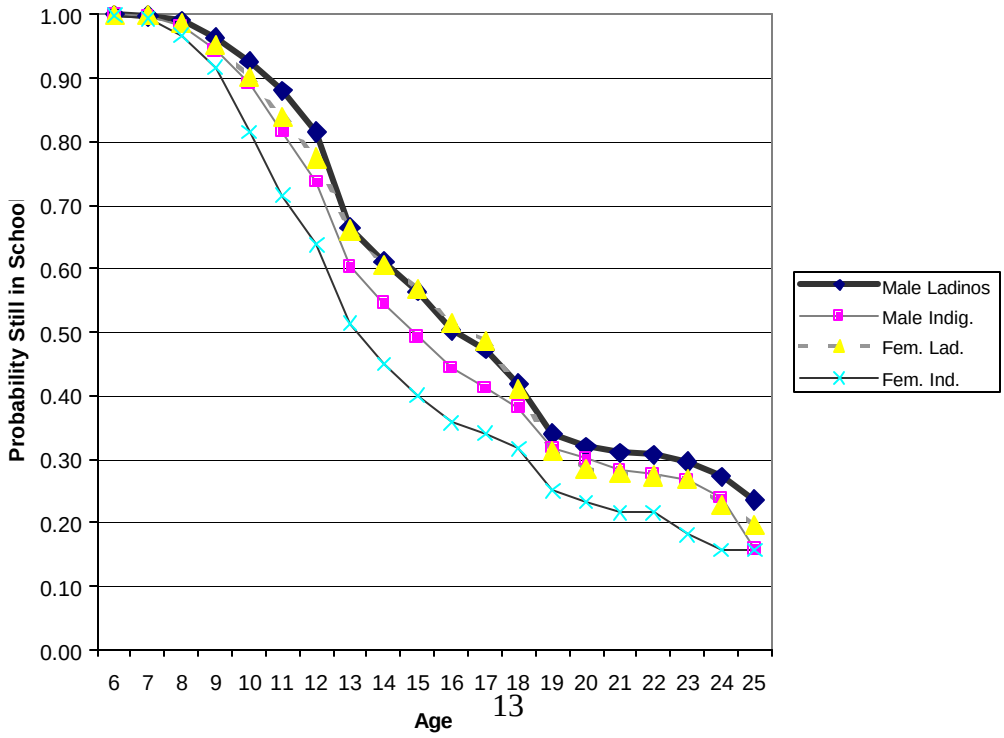
Dropout data in the ENCOVI questionnaire are even much more severely "censored" than the enrollment data. The age of enrollment is recorded for children in higher grades and even for people who have completed their schooling. Dropout data are similarly censored, in that we cannot know whether some children who were in school at the time of the survey were likely to drop out in the near future. The only data on dropouts are for any students who had enrolled in school in the year of the survey.

Because of this censoring, the determinants of the student's decision about how long to continue in school are also best analyzed in a survival and "hazard" setting. The timing of dropout decisions on the part of those who are not currently enrolled is proxied by age minus years of schooling completed minus initial

enrollment age. Figure 7 shows how long students who currently are or at some point had been enrolled remain in school. Since there are few enrollments before the age of 6 and 7, the likelihood that 6 and 7-year-olds who *have* enrolled will stay in school is nearly 100 percent. At the age of 10, the likelihood of remaining in school begins dropping off rapidly and also begins to show up characteristic ethnic and gender differences. About 93 percent of Ladino students will remain in school through their 10th birthdays compared to 81 percent of indigenous girls. By the age of 13, one-third of male Ladinos and a half of all indigenous girls will have left school. Many of these leave because they have completed primary school, but many other have not but dropped out after experiencing delayed enrollment and grade repetition.

Dropout hazard function estimates are presented in Table 17. They confirm that girls are 34

Figure 7:
Likelyhood of remaining in school, once enrolled
(Kaplan-Meier Survival Function Estimates)



percent more likely than boys to withdraw from school, even after controlling for other household characteristics. Late initial enrollment appears to play a curious and culturally distinct role. Before accounting for the indigenous/late-enrollment interaction, late enrollment and indigenous ethnicity appear to play no role in the likelihood of dropping out of school. After accounting for the indigenous/late-enrollment interaction, it becomes clear that indigenous children are more likely to withdraw from school at any given age than non-indigenous children. However, it would appear that late enrollment does not necessarily signify less educational attainment for indigenous children than enrolling on time. In fact for any given age, late-enrolled indigenous children are *less likely* to be withdrawn from school, which means that, while their schooling may be delayed, their educational attainment is not necessarily reduced.

Table 17:
Chance of dropping out of school,
Having once enrolled (ages 6 to 25)

Variable	Haz. Ratio	Std. Err	Z	P>|z|
Birth Order	0.92	0.03	-2.66	0.01
Indigenous	1.21	0.07	3.36	0.00
Female	1.34	0.07	5.73	0.00
Late Initial Enrollment	1.01	0.06	0.22	0.82
Late Enrollment and Indigenous	0.88	0.02	-5.66	0.00
Father's Schooling	0.95	0.01	-4.32	0.00
Mother's Schooling	0.93	0.01	-5.00	0.00
Household Size	0.97	0.01	-2.98	0.00
Per capita consumption	1.00	6.03E-06	-11.37	0.00
No. of subjects = 2,230		Log likelihood =		-11615.09
No. of dropouts = 1,698		chi2(11)	=	451.48
		Prob > chi2	=	0.00

X: Students' Out-of-pocket Costs of Attending School

There are three components to the cost of schooling:

- Direct pecuniary costs, including tuition and fees, books, transportation, food and lodging
- Opportunity costs implied by the time expended on schooling
- Public subsidies and tax expenditures.

This section examines the first type of cost.[26]

[26] For theoretical and empirical treatments of the child labor/schooling tradeoff, see Basu and Van (1998), Baland and Robinson (2000), Rosenzweig and Evenson (1977), and Ranjan (2001). The most up-to-date analysis of the Guatemalan labor market can be found in Vakis (2002), while a discussion of the third type of cost can be found in the section on public expenditure incidence in Anderson (2001).

Table 18:
Primary Schools
Out-of-pocket Costs (Quetzales)
and Enrollment Shares (%)

	All (Col. %)	Ministry Schools	PRONADE	PRIVATE	OTHER
Ethnicity					
	650	341	92	3,434	374
All (Row %)	100%	79%	9%	11%	2%
	905	405	100	4,012	444
Non-indigenous	60%	78%	5%	14%	2%
	262	245	88	1,111	236
Indigenous	40%	79%	14%	5%	2%
	399	329	111	1,466	a
-K'iche	8%	81%	9%	8%	a
	136	222	56	a	a
-Q'ueqchi	6%	45%	54%	a	a
	361	294	A	1,065	273
-Kaqchiquel	8%	85%	A	9%	4%
	244	218	A	a	a
-Mam	9%	92%	A	a	a
	170	155	27	724	a
-Other Mayan	9%	79%	14%	5%	a
Geographic Region					
	1,352	577	316	3,884	767
Urban	36%	73%	2%	23%	2%
	257	222	76	1,747	225
Rural	64%	81%	13%	4%	12%
Poverty					
	1,305	554	306	3,913	658
Non-poor	40%	74%	2%	22%	2%
	206	210	74	731	223
Poor	60%	81%	14%	3%	2%
	113	107	44	592	147
Extreme Poor	15%	74%	23%	1%	3%
Distribution Quintiles					
	2,485	754	A	4,767	790
Highest	16%	53%	1%	43%	3%
	556	504	A	1,115	504
Second Highest	20%	87%	3%	9%	1%
	323	309	100	773	332
Middle	22%	88%	5%	5%	2%
	200	205	101	626	194
Second Lowest	23%	81%	14%	2%	2%
	113	122	45	a	155
Lowest	19%	76%	20%	1%	2%

a Insufficient data for reliable estimate.

The ENCOVI data make it possible to identify direct expenditures on education by pupil and by the type of school involved. Tables 18 and 19 report the out-of-pocket schooling costs for each type of school as well as the share of students that are paying such costs. The data are broken down by the students' ethnicity, area of residence, and poverty status.

Primary Schools

The ENCOVI data show that the primary school sub-sector is overwhelmingly public.[27] The public sector consists of schools run by the Ministry of Education and of schools run by "compensatory" programs in more disadvantaged areas. The PRONADE program is designed to reach the poor at the primary school level, while Cooperative schools serve an equivalent role for grades 7 through 12. Schools run by the Ministry of Education account for 79 percent of all students, and PRONADE schools account for another 9 percent. The private sector enrolls barely 11 percent of all students but is much more prevalent in urban areas (23 percent) than in rural regions (3.5 percent). The average student at a Ministry school pays Qz 341 per annum in direct school costs compared Qz 3,434 paid by the average private school student. PRONADE students have the lowest out-of-pocket expenditures–only Qz 92 per annum.[28]

The direct expenditures incurred by non-indigenous students are even higher than those borne by indigenous students. This is partly because there are more non-indigenous than indigenous students in private schools, but even in private schools, they pay four times more than indigenous students. In Ministry-run schools, they pay Qz 405 per year compared to only Qz 245 paid by the indigenous students. Among indigenous students, the K'iché incur the highest costs and the smaller Mayan groups pay the least.

One very clear result is that public expenditures on government-run primary schools are progressive. Expenditures on PRONADE schools are obviously targeted to the poor. While PRONADE schools only enroll 9 percent of all primary students, they enroll a much higher proportion of certain disadvantaged groups including the Q'ueqchí (54 percent), the poor (14 percent), and the extremely poor (23 percent), than other kinds of schools. Income quintile data in the last panel of Table 18 clearly indicates that there is almost no leakage to the higher income groups. Also, the data show that the wealthiest students self-select into private schools–43 percent of primary school students from families in the highest income quintile are enrolled in private schools.

Secondary Schools

At the secondary school level, three types of schools also enroll nearly all of the students. There are private schools, Ministry schools, and Co-operative schools. However, the private sector plays a much more significant role at this level, enrolling 55 percent of all secondary students. Ministry schools enroll 30 percent of all students, and Cooperative schools enroll 10 percent.

[27] For a detailed description of the various types of primary and secondary school programs, see Anderson (2001).
[28] Note that the PRONADE model relies very heavily on "community" participation. The out-of-pocket costs reported to ENCOVI are likely to be an underestimation of the true costs to the family because they do not discover parental contributions in kind or in labor. See Valerio and Rojas (2000).

Secondary school enrollment patterns and the distribution of direct costs are both rife with evidence of disparities. The secondary school level is generating most of the education-based income inequality in Guatemala and thus is the level that will transmit inequality to the next generation. Nearly half of all secondary students come from the top quintile of the consumption distribution. In a country that is mostly rural, 68 percent of the secondary students are from urban areas. Three-quarters of the students are non-indigenous. It is also here that inequality *among* indigenous people is greatest.

Table 19:
Secondary Schools
Out-of-pocket Costs (Quetzales)
and Enrollment Shares (%)

	All (Col.%)	Ministry Schools	Cooperative	PRIVATE	OTHER
Ethnicity					
	2,951	1,705	1,525	4,017	1,758
All (Row%)	100%	30%	10%	55%	5%
	3,216	1,618	1,658	4,365	2,296
Non-indigenous	76%	32%	8%	57%	3%
	2,095	2,057	1,343	2,610	1,230
Indigenous	24%	26%	19%	46%	10%
	2,753	a	a	3,004	a
-K'iche	6%	a	a	51%	a
	1,705	a	a	2,488	a
-Q'ueqchi	2%	a	a	45%	a
	1,897	1,360	a	2,626	a
-Kaqchiquel	7%	29%	a	44%	a
	2,587	a	a	2,711	a
-Mam	3%	a	a	53%	a
	1,548	1,451	a	2,019	a
-Other Mayan	5%	23%	a	41%	a
Geographic Region					
	3,377	1,929	1,546	4,336	2,439
Urban	68%	29%	7%	61%	3%
	2,034	1,297	1,504	3,014	1,187
Rural	32%	34%	17%	41%	8%
Poverty					
	3,493	2,067	1,762	4,404	2,578
Non-poor	75%	27%	9%	62%	3%
	1,298	956	1,139	1,845	1,110
Poor	25%	40%	16%	33%	11%
	666	303	806	854	1,028
Extreme Poor	2%	41%	16%	17%	26%
Distribution Quintiles					
	4,299	2,405	1,902	5,076	3,178
Highest	47%	21%	5%	71%	2%
	2,277	1,824	1,779	2,746	2,370
Second Highest	26%	36%	13%	48%	4%
	1,481	1,072	1,224	2,056	1,399
Middle	17%	39%	16%	36%	8%
	1,091	939	1,078	1,595	584
Second Lowest	8%	45%	19%	25%	11%
	876	a	a	a	a
Lowest	2%	a	a	a	a

a Insufficient data for reliable estimate.

Most indigenous children do not go to secondary school but, among those who do, nearly half attend private schools.

The reason for the low coverage at this level is undoubtedly related to the high direct out-of-pocket costs of schooling. The average secondary school student pays Qz 2,951 per year. Ministry school students pay Qz 1,705, and Cooperative students pay Qz 1,525. The average annual direct costs paid by a private school student are nearly enough to keep one person out of poverty for an entire year. There can be no doubt that–especially for the poor–this is an insurmountable obstacle.[29]

The most noteworthy fact is that the degree of public subsidy declines drastically at this level. It is true that publicly funded secondary schools are cheaper for students to attend than private schools. On average, it costs students 58 percent less to attend a Ministry school than a private school and 62 percent less at a cooperative school. However, the *degree* of public subsidy at this level appears to be much lower.

Consider students in transition between primary and secondary school. For private school students, their direct costs rise by only 16 percent to Qz 4,017 for secondary school compared with the Qz 3,434 that they paid per year in private primary schools. On the other hand, a student who has just graduated from sixth grade in a Ministry school and wishes to continue on to a Ministry secondary school would face costs of Qz 1,705 instead of the Qz 341 that he or she paid at the primary level. This is a *five-fold* increase. Cooperative secondary students face a *16-fold* increase over the Qz 92 that they paid at the primary level.

There can be little doubt but that this sudden discontinuity in direct costs is a crucial factor in discouraging poorer students from continuing their studies. Table 19 reveals that almost half (47 percent) of all secondary students come from the top 20 percent of the income distribution. It is true that most of the extremely poor who go to secondary schools attend publicly funded schools. However, these students only constitute 2 percent of all secondary students. As a result, public funding is regressive. In fact, two-thirds of students in publicly funded secondary schools come from the top 40 percent of the income distribution.

Finally, while these data do not allow us to make a direct assessment of school quality, the observed variation in direct costs almost certainly reflects underlying differences in educational quality at this level.[30] Even among Ministry schools–purportedly all of the same type–there is a systematic co-variation between the expenditures reported by the students and the economic status of their families. The next section deals directly with equity in the distribution of public education resources.

[29] The per capita yearly poverty line was Qz 4318.56 for the year 2000.

[30] A recent study contrasting PRONADE with similar Ministry schools found "the infrastructure and basic service provision in PRONADE schools is very poor with 31 percent lacking water and 20 percent lacking sanitary facilities or latrines, compared to 12 percent and 11 percent respectively in control group schools." Anderson (2001), pg. 11.

Table 20: Guatemala 2000 Government Expenditures: Primary –School

	Ministry Schools	PRONADE	Student-weighted Average
Ethnicity			
All	100%	100%	100%
Non-indigenous	60%	35%	58%
Indigenous	40%	65%	42%
-K'iche	9%	9%	9%
-Q'ueqchi	3%	35%	6%
-Kaqchiquel	8%	a	a
-Mam	11%	a	a
-Other Mayan	9%	14%	9%
Geographic Region			
Urban	34%	7%	31%
Rural	66%	93%	69%
Poverty			
-Non-poor	38%	8%	35%
-Poor	62%	92%	65%
-Extreme Poor	14%	38%	16%
Distribution Quintiles			
-Highest	11%	1%	10%
-Second Highest	22%	6%	21%
-Middle	24%	12%	23%
-Second Lowest	24%	37%	25%
-Lowest	18%	44%	21%
Exp. Per Pupil (Qz)			
	1108	1014	1099

A Insufficient data for reliable estimate.

XI: The Equity of Public Spending on Education

Anderson (2001) reports mean government per pupil expenditures by school level and by certain program types. She estimates that mean per pupil expenditures at the primary level are Qz 1,108 for Ministry schools and Qz 1,014 for PRONADE schools. At the secondary level, Ministry schools spend an average of Qz 1,658 per student.[31] Cooperative schools receive central and local government subsidies amounting to approximately Qz 320 per student.[32]

This section examines the equity of public spending on education. We have combined Anderson's data on average government expenditure per program with enrollment share estimates to arrive at the proportion of total expenditures going to each group in which we are interested. Table 20 reports on the primary level, while Table 21 presents data on the secondary level. The much greater regressivity of public expenditures on secondary education as opposed to those on primary education is evident. This is true even though the data in the tables account for the fact that most secondary students are in private schools and that public school students tend to be less well off. Even so, two-thirds of public money spent on secondary education goes to the non-poor, with one-third going to students whose families are in the most prosperous quintile. This stands in sharp contrast to the primary level, where 65 percent of public spending goes to the poor, with only 10 percent going to those in the highest quintile. Government primary school expenditures are basically income-neutral

[31] Anderson actually reports Qz 1,306 for grades 7 through 9 and Qz 2,418 for grades 10 through 12. Since 67.7 percent of secondary students are in the first level, the student-weighted average for the full six grades of secondary school is Qz 1,658.16.

[32] Anderson reports that Cooperative schools receive a central government subsidy of US$1,000 per section and an additional US$133 from the municipality. Sections include between 20 and 45 students. Assuming the mean value of 32.5, this works out to be about US$41.01 per student or Qz 320 at the mean 2000 exchange rate of Qz 7.8 = US$1.00.

among the lower four quintiles. At the secondary level, those in the lowest quintile receive only 2 percent.

Table 21: Guatemala 2000 Government Expenditures: Secondary School

	Ministry Schools	Cooperative	Student-weighted Average
Ethnicity			
All (Row%)	100%	100%	100%
Non-indigenous	80%	58%	79%
Indigenous	20%	42%	21%
Geographic Region			
Urban	65%	49%	64%
Rural	35%	51%	36%
Poverty			
-Non-poor	67%	62%	67%
-Poor	33%	38%	33%
-Extreme Poor	2%	2%	2%
Distribution Quintiles			
-Highest	33%	24%	33%
-Second Highest	31%	31%	31%
-Middle	22%	27%	22%
-Second Lowest	12%	16%	12%
-Lowest	2%	3%	2%
Exp. Per Pupil (Qz)			
	1658	320	1246

a Insufficient data for reliable estimate.

Other equity indicators bolster the conclusion that the impact on poverty of secondary expenditures is vastly different from the impact of public expenditures on primary education. For instance, 64 percent of secondary expenditures are spent in urban areas, while 69 percent of primary expenditures go to the rural areas. Indigenous people benefit from only one-fifth of secondary expenditures, while they benefit from two-fifths of primary-level spending.

Even in compensatory programs like PRONADE and Co-operative schools, we can see a huge difference between the two levels. An estimated 92 percent of PRONADE expenditures benefit the poor, with 38 percent benefiting the extremely poor. In contrast, three-fifths of Cooperative subsidies appear to be benefiting the non-poor, with only 2 percent reaching the extremely poor.

The equity problem at the secondary level originates in the fact that very few students from the lower income groups enroll in secondary school at all. There are so few of them that it was not possible to obtain reliable expenditure incidence estimates for each of the various Mayan sub-groups from the ENCOVI data.

XII: Education and the Survival of the Mayan Identity

This section examines the survival of Mayan languages across generations. We have seen that education inadvertently plays a role in the intergenerational transmission of poverty. As will become clear, it unfortunately also appears to be a major factor in the disappearance of the Mayan languages. It may seem that this issue lies beyond the boundaries of a study linking education and poverty. Yet, to the extent that education and wealth are linked and that both have been used in Guatemala to impose one culture on all the others, the disappearance of Mayan languages is a moral issue that must be explicitly considered.

Consider members of the youngest generation aged between 7 and 25.[33] Data from the ENCOVI survey show that 40 percent of the grandparents, 35.3 percent of the parents and 31.1 percent of this youngest generation listed a Mayan language as their native tongue. The number of people who speak Mayan in each generation indicates the survival of a language.

Table 22 shows the breakdowns by language ancestry. The importance of having a *full* linguistic lineage is startling. The last column shows that over 96 percent of young people who consider themselves native speakers of Mayan had four Mayan-speaking grandparents and two Mayan-speaking parents. Nevertheless, only 89.9 percent of such people with a full linguistic lineage consider themselves native speakers. That is to say, despite the fact that they grew up with a Mayan language all around them, just over 10 percent say that they feel more comfortable speaking in Spanish.

The impact of intermarriage on native language survival is devastating. If both parents of a child speak Mayan but the number of *grandparents* that speak it falls from four to three, the likelihood that the young person will speak Mayan falls from 89.9 percent to 40.7 percent. If all four grandparents speak Mayan but only one of the parents does, it falls from 89.9 percent to only 17.5 percent. If all four grandparents speak a Mayan language but neither of the parents does so, there is only a 1.2 percent chance that the language will survive into the third generation.

Table 22:
Trans-generation Survival of Mayan as a First Language

People aged 7 to 25 (Weighted by Sample Weights)

Number of Mayan-speaking Grandparents	Number of Mayan-speaking parents	Number of Young People with this Linguistic Lineage	% Speak Maya	Number of Young People that Speak Mayan	% of all Maya Speakers with this Linguistic Lineage
4	2	1,300,000	89.9%	1,169,123	96.32%
4	1	23,829	17.5%	4,160	0.34%
4	0	105,169	1.2%	1,221	0.10%
3	2	10,712	40.7%	4,356	0.36%
3	1	20,319	4.9%	1,004	0.08%
3	0	16,716	0.3%	44	0.00%
2	2	13,802	42.9%	5,921	0.49%
2	1	39,364	56.5%	22,221	1.83%
2	0	112,768	1.4%	1,570	0.13%
1	2	75	0.0%	-	0.00%
1	1	7,514	5.7%	425	0.04%
1	0	43,262	0.0%	-	0.00%
0	2	3,989	75.8%	3,023	0.25%
0	1	2,045	0.0%	-	0.00%
0	0	2,200,000	0.0%	674	0.06%
Total		3,899,564	31.1%	1,213,743	100.00%

[33] The ENCOVI 2000 questionnaire asks language questions only of people aged 6 and older.

These data make it clear that intergenerational changes from speaking Mayan to speaking Spanish are very common. Changes in the opposite direction are much less likely. Over 10 percent of all people with two Mayan-speaking parents describe themselves as native Spanish speakers. In contrast, only about 0.1 percent of people with two Spanish-speaking parents describe themselves as native speakers of a Mayan language. When one parent is a Spanish speaker and the other is a Mayan speaker, then the children will be raised to speak Spanish in more than 70 percent of cases.

Formal multivariate estimates of the probability that a young person speaks a Mayan language as his or her mother tongue (Table 23) reinforce the importance of heredity.

Table 23:
Determinants of Native Proficiency in a Mayan Language
(Sample: Ages 7 to 25, have at Least 1 Mayan-Speaking Grandparent)

	Marginal Effect	Asymt. t-stats
Age	0.022	10.45
Youngest Child	0.027	0.89
Gender (Female=1)	-0.006	-0.36
Years of schooling completed	-0.024	-6.82
Has never enrolled in School	0.036	1.29
Mother Speaks Mayan Lang.	0.696	19.44
Father Speaks Mayan Lang.	0.637	15.84
# Grandparents Speak Mayan	0.084	4.79
Mother's years of schooling	-0.018	-4.74
Father's years of schooling	-0.001	-0.2
Mother's age	-0.006	-5.39
Father's age	-0.003	-3.11
# Persons in Household	-0.004	-1.04
Household income per capita	-2.50E-05	-7.01
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Obs. Probability at mean		0.721
Predicted Probability at mean		0.74
Log Likelihood		-173.40
Prob.>Chi Sq.		0.00
Pseudo R2		0.78
Number of obs		12,829
chi2(14)		12634.47

They also indicate that native proficiency in the Mayan languages is declining very rapidly among 7 to 25-year-olds. There is a two-point decline in the probability of being proficient in a Mayan language for each year reduction in age. The most thought-provoking results in the context of this study pertain to the role that education is playing in the death of Mayan culture. Given all other individual and family characteristics, there is a 1.8 percent decline in the probability of a child being fluent in an indigenous language for each year of schooling completed by the mother and a further 2.4 percent decline for each year of schooling completed by the child.

This is the "switch" generation. It will determine whether the Mayan languages will continue to be spoken in the future as living languages or whether they will disappear. Formal schooling seems be heavily biased towards making these languages disappear.

XIII: Summary of Findings and Policy Implications

Coverage Data as a Guide to Education Policy

Primary school coverage has long been a favored development indicator. Indicators have a way of becoming goals, and development goals require a consensus. The basis for the consensus on this indicator is the association of primary schooling with basic literacy and numeracy. Also, there is substantial evidence that the individual and social rates of return to investment in primary education are very high (Psacharopolous, 1981). Its potential for contributing to social equity is yet another reason for the consensus. Politicians can defend it on the basis that so few of the poor in developing countries have any schooling beyond the primary level. Economists can point out that decreasing marginal returns to education make concentrating on primary coverage both equitable and efficient.

Therefore, extending the coverage of primary education has dominated the attention of analysts for the last half of the 20th century. As a result, many rural schools were built and staffed in low-income countries. Coverage was also expanded by the permanent migration of families from isolated rural communities to urban centers where it is easier to provide good schooling. Now, as universal primary coverage seems close to being achieved, educational policymakers are turning their attention to other problems. At the primary school level, there is still much fine-tuning to be done. A very significant remaining concern is the *quality* of primary schooling.[34] However, the shift in policymakers' focus can best be described as switching from supply-side to demand-side issues. The question used to be: which communities are without schools? Now the policymaker may ask: why do children who have access to schooling drop out or fail to enroll altogether?[35]

At the same time, on the supply-side (coverage), the efforts of policymakers–and much World Bank lending–has begun to shift away from the primary level to preschool, secondary, and even tertiary education. There is much less solid evidence that attending preschool enhances an individual's future economic returns than there is for attendance at the primary level.[36] Perhaps for this reason, the poor are less likely than other families to enroll their children in preschools. Yet, even if there is no pecuniary payoff, there is a serious equity issue in the sub-sector. To the extent that preschools are publicly funded, then preschool programs that are not utilized by the poor (for whatever reason) are inherently regressive.

Coverage among the poor is generally even lower and more skewed at the secondary and tertiary levels than at the preschool level. Salary differentials for post-primary degrees can be quite substantial. Also, the fact that the people served by these schools are older than those served by primary schools adds two more layers to analysis of *why* some do enroll and others do not. First, at the high school and university levels, the students themselves as opposed to their parents are much more involved in making enrollment and withdrawal decisions. So, how do the desires of maturing offspring interact with the desires of their parents in determining their enrollment in

[34] Behrman and Birdsall (1983).
[35] Glomm (1997).
[36] For instance, see Edwards and Liang (1998).

school? The second layer is formed by the link between schooling and the labor market, which has both institutional and economic dimensions. The economic dimension is because the potential labor-market earnings of young people increase rapidly with age and with educational attainment. The institutional dimension exists to the extent that laws determine (and agencies enforce) a legal minimum age for remunerated employment. Finally, students generally work less than non-students or not at all. If young people choose to work full time, they earn more money than if they worked part time and generally do not go to school. This means that, when the household incomes of students and non-students are compared, the secondary and university systems will appear to be less inequitable than they actually are. Thus, school coverage data are fundamental to understanding income distribution and poverty.

Here are the basic facts:

- Schooling is the most significant determinant of adult income.
- Parental (adult) income and parental education are the most significant determinants of children's schooling.
- Together with health and social security, education is one of the three most significant public expenditure items.
- Public expenditures are funded from taxes that everyone pays.

Taken together, the first two facts imply that education is the key to the inter-generational transmission of poverty. The third and fourth facts imply that the public sector unwittingly plays a fundamental role in this transmission. The data examined in this study corroborate the structural links among these facts. The next section summarizes our findings as a preamble to recommendations for what can be done.

Major Findings

Guatemalan Education in a Regional Context. Guatemalan literacy is not only below average in Latin America–it is *far below* average. In 1980 and 1990, Guatemala ranked last in Latin America with illiteracy rates of 46.2 percent and 38.5 percent, respectively. Within the LAC region, only Haiti had higher rates. Projections for the year 2000 show that overall adult illiteracy is a bit worse in Nicaragua than in Guatemala, but that female illiteracy rates in Guatemala continue to be last in the rankings.

Estimates of literacy for the population aged 15 and older derived from the ENCOVI data are very similar to the UN's forecasts, although the gender difference appears to be somewhat higher in the ENCOVI data. The survey-weighted mean rate of illiteracy is 31.8 percent for both men and women versus 21.8 for men and 39.8 for women taken separately.

Primary school coverage is still low by both regional and world standards. The most recent aggregates place the average primary enrollment rate for lower-middle income countries at 94 percent. Indeed, this is also the average for all of Latin American, meaning that Guatemala lags 20 percentage points behind the region as a whole.

One likely reason for this is the low level of spending on education in Guatemala. Over the past quarter-century, expenditures on education in Central America have remained remarkably

constant at roughly 3.5 percent of GNP. Guatemalan expenditures as a percent of GNP have also remained very constant but at about *half* this continental average. By the late 1990s, educational expenditures in Guatemala amounted to only 1.7 percent of GNP, compared to 3.6 percent for Latin America and 4.6 percent for lower-middle income countries in general.

Altogether 4.5 million Guatemalan adults have 19.2 million years of education or an average of 4.28 years per person. Two-thirds of these people consider themselves to be literate. Just over half are "functionally literate," having completed at least three years of schooling. Although at least this many people enrolled in school, only 36 percent completed the primary level, only 12 percent completed high school, and only 4 percent have completed at least four years of university education.

The Education Stock among Guatemala's Adults. For the population between the ages of 21 and 65, mean educational attainment stood at 4.8 years in 2000. Two-thirds reported themselves as able to read, and 53 percent had completed at least three years of schooling.

There has been tremendous improvement over the last half-century. Mean attainment more than doubled from 2.2 years for the cohort that entered school in 1943 to 5.6 years of schooling for the cohort that entered in 1985. Over the same period, functional literacy grew from 28 percent to 71 percent, while self-reported literacy nearly doubled from 41 percent to 79 percent.

However, progress in teaching women to read and write lags about 20 years behind what has been achieved for males.

Current Enrollment. Guatemala has made great strides towards achieving universal access. In the early 1970s, just over half of the target population enrolled in primary schools. Existing sources show that net enrollment rates increased dramatically in only one generation, to 74 percent by the late 1990s. Estimates based on the ENCOVI data indicate that net primary enrollment currently stands at 79 percent.

Approximately 5.4 million potential students comprise the "target population" of Guatemala's preschool through university system. Of these, 20 percent are in the preschool age range (4 to 6), 36 percent are in the primary school age range (7 to 12), 30 percent are in the secondary school age range (13 to 18), and 14 percent are of target university age (19 to 22).

The distribution of *students* is quite different from the distribution of potential students. About 11 percent (compared to the 20 percent target) of Guatemala's students actually attend preschools, and more than 68 percent (compared to the 36 percent target) attend primary school. At the higher levels, only 18 percent attend secondary school (compared to the 30 percent target), and barely 3 percent (compared to the 14 percent target) go beyond that to the university level. In other words, transition rates are very low.

The conjunction of these numbers signify that, if this cross-sectional snapshot holds over the next decade, the majority of Guatemala's children will never attain more than a primary school education.

The ENCOVI data reveal a substantial divergence between the age targeting of Guatemala's educational system and its actual impact. According to these data, of the 5.4 million children in the target population, only 2.2 million (42 percent) were enrolled in the level appropriate for their age in 2000. The net enrollment rate for primary school stands at 79 percent, up about 5 percentage points from the most recent data available before ENCOVI 2000 but still significantly below the regional average.

Policymakers' emphasis on expanding primary enrollment is evident in the fact that enrollment of the target group is highest for this level, with dramatically lower net coverage rates for other schooling levels. Preschools enroll only 23 percent of their target age group, while secondary schools reach only 25 percent and universities reach barely 9 percent of their target populations.

ENCOVI data also show that educational practice distorts educational policy in a number of other ways. For one thing, 8 percent of 6-year-olds are already in primary school, while only 43 percent are in preschool. Also, only 60 percent of 7-year-olds are in primary school.

The fact that 100 percent coverage is not reached at any age indicates that some access issues probably still need to be addressed. However, demand-side problems are the principal reason for less than full coverage at this level. Primary enrollment begins at 60 percent for children aged 7 and then rises to 79 percent at age 8, and to 86 percent at ages 9 and 10. After this it declines again, so that by age 12 it is back down to only 80 percent.

In summary, not all Guatemalan children go to school. It is clear that compulsory school attendance laws are only weakly enforced. Furthermore, for about 30 percent of those who do enroll, their initial enrollment is delayed by at least one year. This delay–together with grade repetition–results in significant amounts of over-age enrollment. In fact, 19 percent of all 15-year-olds are still in primary school.

Over-age enrollment imposes a significant cost on students because, for any given level of attainment, it delays their entry into the labor market and also because it is associated with lower grade attainment. In addition, grade repetition can impose a heavy burden on the school system.

Economic inequity is evident throughout the system, but, because of the institutional and economic arguments favoring investment in primary schools, it is lowest at this level. Net primary school enrollment of poor children lags by only 18 percentage points behind that of non-poor children. Also, gross primary coverage ratios are quite high for both the poor and the non-poor.

Large differences in post-primary transition rates between the poor and the non-poor are a sign of a drastic decline in equity at the secondary and tertiary levels. The secondary school net and gross enrollment ratios of the non-poor are approximately four times higher than those of the poor. At the university level, they are 16 times higher.

Young people from low-income households have to work in order to contribute to the welfare of their households. However, in so doing, they reduce their educational attainment, which in turn marks them as the poor parents of tomorrow.

At the preschool and primary levels, the educational system appears to have an equalizing effect across ethnicities. Non-indigenous enrollment rates are higher than the rates of indigenous children but not by as large a margin as the differences in poverty rates between the two groups would predict.

In sharp contrast, the secondary and post-secondary sub-sectors are reinforcing poverty differences between ethnic groups. Whereas the gross enrollment rate of non-indigenous children is only 9 percent higher than that of indigenous children , at the secondary level non-indigenous gross enrollment is 120 percent higher and at the university level, it is 266 percent higher.

The major reason for low enrollment at the secondary level appears to be a sudden sharp increase in the direct costs that students are expected to pay for their schooling. Costs to students in the Ministry of Education schools are on average five times higher at the secondary level than at the primary level. Students in compensatory programs face a 16-fold increase in costs between the primary and secondary levels.

Another important reason for low enrollment in secondary schools is a discontinuity in standards for students attempting to move up to higher levels of schooling. This results in high repetition and dropout rates in grades 7 (the end of primary education) and 10 (the end of secondary).

Education and Income Inequality. The decline in educational inequality has been nearly continuous over the last half-century. Paradoxically, the increase in educational attainment over time is the most salient reason for unequal distribution of education across the population.Inequality in the distribution of education accounts for 40 percent of observed earnings inequality among employed adult males.

In the Guatemalan case, the *rate of return* to education and the *variance* in schooling are highly and positively correlated,[37] meaning that higher rates of return have *added* to income inequality when the variance in schooling was highest.

Literacy campaigns, ideological modifications of the curriculum, and the general embroiling of Guatemalan schools in political turmoil from 1945 to about 1960 are likely to have led to systematic cross-cohort differences in education quality. These translate into systematically lower rates of return to education for the cohorts affected by these developments and are a significant reason why older generations of Guatemalans receive lower income for a given amount of schooling than younger cohorts. .

Education and Poverty. The average Guatemalan household has more than six members. It is currently not possible for a family of this size to be supported above the poverty threshold by the labor market earnings of one adult worker, unless that worker has about 14 years of schooling.

Earnings sufficiency comes at much higher schooling levels for the indigenous population, especially for female-headed households. This may be due to the low quality of their schooling in some cases and/or by discrimination in the labor market. There is probably a link between

[37] The correlation coefficient is 0.68.

low expected schooling returns for indigenous women and the fact that they are much less likely to go to school.

Internal Efficiency. The overall repetition rate is 12.8 percent for the six grades of primary school. The first grade repetition rate is estimated to be 21.9 percent, which is a sign of serious deficiencies within the system. The secondary school repetition rate is 4.9 percent for grades 7 to 12. It was only possible to calculate dropout rates at the primary level, and then only roughly. Those estimates reinforce the impression that efficiency is low and that first grade is a bottleneck.

Higher household per capita consumption (an indicator of current well being) and a child's higher height-for-age (a proxy for all past well being) are both associated with more rapid progress through the school system.

Interestingly, some indigenous groups are doing better than others. The K'iche and the Mam, for instance, are doing no better and no worse than similarly situated Ladinos in primary school. In contrast, the Q'ueqchí are about one-third of a year behind Ladinos, while the average Kaqchiquel student is actually about one-tenth of a year *ahead*.

Poverty-inducing Behavior. Delayed primary school enrollment is a serious problem in Guatemala. The official starting age for primary school is 7 years old. According to the ENCOVI data, 25 percent of male Ladinos and 55 percent of indigenous girls can be expected to delay their enrollment.

The percentage who have never enrolled in school at all declines with age to a minimum of 4 percent of male Ladinos and to about 8 percent of Ladino girls.

This decline with age and the difference between genders is very important for policymakers to bear in mind. It signifies that schools exist for these children to attend but that their parents are choosing to not send them, which makes this is a demand-side problem.

The initial enrollment of indigenous children is delayed more than that of Ladinos. Gender differences are also much more pronounced among the indigenous population than among the non-indigenous population. About 10 percent of indigenous boys will never be enrolled in school compared to 24 percent of indigenous girls. In this case too, enrollment delays and gender disparity in enrollment indicates demand-side problems.

Thus, primary school coverage is still a significant problem in Guatemala. However, a lack of schools is not the only cause. Gender and ethnicity appear to play an equally significant role in parents' decisions about whether or not to send their children to school. A rough estimate is that at least half of the children who are never enrolled have access to a school. This means that building more schools will not solve more than half of the problem.

Similarly, low net enrollment figures are at least as much a product of delayed primary school enrollment as they are the result of a shortage of space or of high repetition and dropout rates.

Children of the poor, especially girls in poor indigenous families, suffer the largest enrollment delays.

Not only are disadvantaged children enrolled at a later age, but they are also more likely to be withdrawn from school sooner than other children. More educated and higher-income parents keep their children in school longer. Girls and indigenous children are at greater risk of being withdrawn from school at any age than boys and non-indigenous children.

For Ladino children, there is no link between late enrollment and the age of withdrawal from school. For these children, their late enrollment reduces their total number of years of schooling when they are withdrawn from school.

There are different reasons why indigenous children enroll late. Indigenous children who are enrolled late are also more likely to be withdrawn at a later age. This means that for indigenous children, late enrollment means delayed schooling but not necessarily less schooling.

Initial enrollment delays significantly decrease an individual's lifetime earnings. For instance, a high school graduate with a two-year enrollment delay earns 15 percent less over his or her lifetime.

Policy Conclusions

Education is the most important means for preventing the inter-generational transmission of inequality and poverty in Guatemala.

Variations in educational outcomes can be explained by variations in the characteristics of schools, students, and parents. An important factor to note is that most poor parents are poor partly because of their own limited education.

Scant education, and consequently low household income, handicaps poor parents in their struggle to complement the school's efforts by tutoring their children and providing them with other private inputs. Thus, poorer students and students with less educated parents are enrolling at a later age, repeating grades more frequently, and are more likely to drop out of school than other students. They also tend to do less well while in school than other students. Thus, poverty in the home–at least partly caused by low educational attainment of the parents–sets the stage for transmitting poverty to the next generation through low educational attainment of the children.

There is ample evidence of malnourishment among the school-age population. There is now also evidence that nutrition–as measured by a child's height-for-age–is itself an educational input. Even after accounting for the direct impact of parental education and household poverty, well-nourished children enroll sooner and attain more grades for their age than undernourished children.

Secondary education is key to preventing for the transmission of poverty through education. Currently 55 percent of secondary school students are in private schools. Nearly three-quarters of secondary school students come from the top two income quintiles, while only 2 percent come

from the lowest quintile. Net enrollment of Ladinos is 33 percent, but enrollment among indigenous children is only 14 percent.

Secondary school coverage is very low mainly because of the high direct costs that must be paid by the students. The average direct cost of secondary school currently stands at nearly Qz 3,000 per year. This is equivalent to 70 percent of the income needed for one person to stay above the poverty line for an entire year or for three years at the extreme poverty line.

Because secondary education is publicly funded but only wealthier children enroll, Guatemala's public education is regressive as it currently stands.

Indigenous languages are being lost at a very fast pace, and the educational system is implicated in this rapid cultural erosion.

Policy Recommendations

The Guatemalan government needs to increase its overall level of spending on education to catch up with the regional average.

At the primary level, demand-side issues should be carefully studied and more resources should be allocated to addressing them.Major issues at this level are: (i) the age of initial enrollment is too high; (ii) the fact that girls have lower enrollment rates than boys, especially indigenous girls; (iii) there are high repetition rates for the first grade; and (iv) there is a need for early childhood nutrition to be provided through the schools.

"Education" is a combination of inputs that children receive through their schools and inputs that they receive in their homes. The link between the home environment and educational attainment should be carefully studied and exploited. Because primary school coverage in Guatemala is fairly high, the children who are still not in school must not be from average backgrounds. Policymakers should consider instigating programs that, for example, , integrating traditional schooling with day-care to encourage mothers to work–thus raising household income—or substituting a trained educator for an illiterate parent to help children prepare their homework.

Delayed initial enrollment is costly to the student and relatively inexpensive to remedy. Policymakers should make it a priority to ensure timely initial enrollment of all children. In this spirit, Guatemala should consider lowering the age of initial enrollment by one year to the age of 6. This would lower the age at which students complete primary schooling from 12 to 11, which is important as older children have greater competing demands on their time.

At the secondary school level, access is still a binding constraint. More public schools need to be built. Demand-side policies will have to include some sort of scholarship programs to compete with labor market demands on secondary students' time and to help the students' families with the direct cost of schooling.

Evidence of textbook use and high repetition and dropout rates in transitional years between different schooling levels suggest that quality is an issue throughout the system.

The quality and effectiveness of the secondary school system structure needs to be particularly carefully studied. The current four-track system with reportedly dozens of "programs" together with the dominance of the private schools in the sub-sector provide too much scope for unscrupulous for-profit operations.

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Appendices

Table A1: Guatemala 2000 Education Stock

	All		Non-Indigenous		Indigenous		Row
	Men	Women	Men	Women	Men	Women	Average
Age 14-18	5.17	4.40	5.72	5.32	4.30	3.07	4.78
Age 19-25	5.99	5.16	6.81	6.58	4.54	2.72	5.53
Age 26-40	5.53	4.01	6.77	5.49	3.48	1.57	4.73
Age over 40	3.41	2.43	4.63	3.60	1.57	0.54	2.9
All age 14 and older	4.85	3.81	5.88	5.08	3.20	1.76	4.3

MAYANS

	K'iche		Q'ueqchi		Kaqchiquel		Mam		Other Mayans		Row
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Average
Age 14-18	4.60	3.59	3.05	2.08	5.94	3.64	4.05	3.18	3.66	2.53	3.67
Age 19-25	4.70	3.31	3.42	2.13	6.15	4.05	3.95	2.16	3.86	1.63	3.53
Age 26-40	3.79	2.13	2.57	0.70	5.14	2.22	1.98	0.91	3.33	1.32	2.45
Age over 40	2.36	0.96	1.01	0.20	1.79	0.69	1.12	0.16	1.28	0.38	1.02
All age 14 and older	3.65	2.29	2.33	1.11	4.34	2.29	2.39	1.39	2.84	1.34	2.44

URBAN/RURAL

	All		Urban		Rural		Row
	Men	Women	Men	Women	Men	Women	Average
Age 14-18	5.17	4.40	6.63	6.11	4.35	3.30	4.78
Age 19-25	5.99	5.16	8.30	7.95	4.43	2.93	5.53
Age 26-40	5.53	4.01	8.22	6.61	3.44	2.02	4.73
Age over 40	3.41	2.43	6.15	4.33	1.46	0.77	2.9
All age 14 and older	4.85	3.81	7.01	5.85	3.23	2.20	4.3

Table A1 (Continued): Guatemala 2000 Education Stock

	POVERTY STATUS								
	NON-POOR		ALL POOR		EXTREME POOR		Row		
	Men	Women	Men	Women	Men	Women	Average		
Age 14-18	6.71	6.29	3.94	2.90	2.73	1.98	4.78		
Age 19-25	7.86	7.56	4.08	2.70	2.71	1.36	5.53		
Age 26-40	8.17	6.55	2.94	1.58	1.77	0.83	4.73		
Age over 40	5.36	3.84	1.16	0.62	0.93	0.21	2.9		
All age 14 and older	6.96	5.92	2.94	1.91	1.93	1.09	4.3		
	CONSUMPTION QUINTILES								
	Highest		Fourth		Middle		Second		Lowest		Row
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Average
Age 14-18	7.70	7.29	6.03	5.68	5.15	3.81	4.06	3.14	2.82	1.97	4.78
Age 19-25	9.86	9.66	6.40	5.65	5.13	4.07	3.89	2.52	2.95	1.46	5.53
Age 26-40	10.37	8.87	6.20	4.73	4.47	2.80	2.80	1.42	1.86	0.86	4.73
Age over 40	7.65	5.61	3.12	1.68	1.63	0.97	0.96	0.58	0.95	0.21	2.9
All age 14 and older	6.71	6.07	3.59	3.06	2.51	1.96	1.76	1.23	1.17	0.70	4.3
	REGIONS										
	Metropolitan	North	Northeast	Southeast	Central	Southwest	Northwest	Peten			
Age 14-18	6.53	3.23	4.83	4.53	5.12	4.72	3.20	4.23			
Age 19-25	8.11	3.43	4.82	4.80	5.74	5.22	3.21	4.99			
Age 26-40	7.64	2.54	4.68	3.86	4.75	3.94	2.58	3.42			
Age over 40	5.82	1.33	2.39	1.75	2.45	2.10	0.88	1.89			
All age 14 and older	6.92	2.52	3.92	3.49	4.35	3.75	2.31	3.49			

Table A2: Guatemala 2000 Literacy (Ages 14 and over)

	All	Men	Women
All	68.9%	77.8%	60.9%
Non-indigenous	79.8%	85.4%	74.9%
Indigenous	51.4%	65.6%	38.5%
-K'iche	56.7%	72.5%	43.6%
-Q'ueqchi	36.2%	47.8%	24.0%
-Kaqchiquel	62.5%	76.3%	49.5%
-Mam	48.9%	63.2%	36.8%
-Other Mayan	46.1%	62.3%	31.4%
Region			
Urban	83.8%	90.3%	78.3%
Rural	58.0%	69.2%	47.4%
-Metropolitan	84.5%	91.0%	78.9%
-North	46.7%	57.1%	36.5%
-Northeast	67.8%	72.1%	63.8%
-Southeast	70.0%	76.6%	63.8%
-Central	76.4%	83.7%	69.3%
-Southwest	66.9%	78.6%	56.8%
-Northwest	48.6%	63.3%	35.5%
-Peten	69.7%	74.2%	65.1%
Poverty			
-Non-Poor	83.2%	89.4%	77.6%
-Poor	54.5%	66.2%	43.8%
-Extreme Poor	41.6%	54.7%	30.1%
Distribution Quintiles			
-Highest	90.5%	95.0%	86.7%
-Second Highest	76.6%	84.7%	69.2%
-Middle	66.3%	76.5%	57.2%
-Second Lowest	55.7%	66.9%	44.8%
-Lowest	43.0%	56.6%	31.0%

Table A3: Guatemala 2000 Gross and Net Coverage Rates: Pre-School

	Gross Coverage			Net Coverage		
	All	Men	Women	All	Men	Women
Ethnicity						
All	26%	24%	27%	23%	22%	25%
Non-indigenous	30%	30%	30%	27%	27%	28%
Indigenous	21%	18%	24%	18%	16%	20%
-K'iche	25%	20%	30%	21%	18%	25%
-Q'ueqchi	16%	16%	16%	15%	15%	14%
-Kaqchiquel	25%	19%	32%	23%	17%	30%
-Mam	19%	15%	23%	15%	15%	15%
-Other Mayan	19%	18%	20%	16%	16%	16%
Region						
Urban	38%	36%	40%	35%	32%	38%
Rural	20%	18%	21%	17%	17%	18%
-Metropolitan	38%	38%	38%	34%	32%	36%
-North	21%	22%	20%	19%	20%	18%
-Northeast	22%	25%	18%	20%	23%	16%
-Southeast	24%	21%	27%	23%	20%	25%
-Central	29%	26%	32%	27%	23%	29%
-Southwest	24%	20%	28%	22%	19%	24%
-Northwest	19%	18%	20%	15%	15%	16%
-Peten	25%	23%	28%	23%	22%	24%
Poverty						
-Non-poor	42%	39%	45%	39%	35%	43%
-Poor	19%	19%	20%	17%	18%	17%
-Extreme Poor	15%	14%	16%	13%	13%	12%
Distribution Quintiles						
-Highest	65%	68%	62%	58%	58%	58%
-Second Highest	33%	30%	36%	31%	28%	35%
-Middle	21%	19%	22%	19%	18%	20%
-Second Lowest	20%	19%	21%	18%	17%	19%
-Lowest	15%	15%	16%	12%	13%	12%

Table A4: Guatemala 2000 Gross and Net Coverage Rates: Primary School

	Gross Coverage			Net Coverage		
	All	Men	Women	All	Men	Women
Ethnicity						
All	99%	103%	95%	79%	81%	76%
Non-indigenous	103%	94%	104%	84%	71%	86%
Indigenous	100%	101%	87%	75%	82%	67%
-K'iche	92%	96%	87%	71%	78%	64%
-Q'ueqchi	86%	102%	69%	59%	65%	52%
-Kaqchiquel	95%	96%	95%	77%	78%	77%
-Mam	97%	102%	91%	75%	78%	71%
-Other Mayan	96%	105%	87%	71%	75%	67%
Region						
Urban	104%	105%	104%	85%	88%	82%
Rural	96%	102%	91%	75%	78%	72%
-Metropolitan	104%	103%	106%	85%	86%	83%
-North	91%	101%	80%	65%	69%	61%
-Northeast	98%	100%	96%	82%	84%	78%
-Southeast	100%	104%	96%	81%	87%	75%
-Central	101%	101%	100%	84%	85%	83%
-Southwest	102%	107%	97%	80%	83%	78%
-Northwest	89%	96%	82%	69%	73%	64%
-Peten	98%	102%	94%	77%	80%	74%
Poverty						
-Non-poor	110%	111%	109%	90%	90%	89%
-Poor	99%	102%	96%	78%	81%	75%
-Extreme Poor	77%	86%	70%	58%	65%	53%
Distribution Quintiles						
-Highest	113%	114%	112%	93%	95%	91%
-Second Highest	108%	110%	107%	88%	88%	88%
-Middle	102%	99%	106%	82%	82%	83%
-Second Lowest	100%	107%	93%	78%	83%	72%
-Lowest	80%	88%	72%	60%	66%	55%

Table A5: Guatemala 2000 Gross and Net Coverage Rates: Secondary School

	Gross Coverage			Net Coverage		
	All	Men	Women	All	Men	Women
Ethnicity						
All	31%	33%	30%	25%	26%	24%
Non-indigenous	40%	39%	41%	32%	32%	33%
Indigenous	19%	24%	13%	14%	18%	11%
-K'iche	20%	28%	13%	17%	23%	12%
-Q'ueqchi	11%	16%	6%	6%	9%	3%
-Kaqchiquel	30%	39%	20%	23%	28%	17%
-Mam	12%	11%	13%	9%	9%	10%
-Other Mayan	19%	25%	14%	13%	17%	10%
Region						
Urban	57%	58%	56%	46%	48%	44%
Rural	16%	19%	13%	12%	14%	10%
-Metropolitan	49%	50%	49%	41%	41%	41%
-North	17%	22%	12%	13%	17%	9%
-Northeast	34%	30%	39%	24%	22%	27%
-Southeast	28%	30%	25%	23%	24%	21%
-Central	34%	38%	29%	27%	30%	23%
-Southwest	29%	31%	27%	24%	26%	23%
-Northwest	15%	20%	11%	11%	14%	8%
-Peten	30%	29%	31%	21%	22%	20%
Poverty						
-Non-poor	54%	55%	54%	44%	44%	45%
-Poor	18%	20%	15%	13%	16%	10%
-Extreme Poor	3%	4%	2%	3%	3%	2%
Distribution Quintiles						
-Highest	76%	77%	75%	62%	62%	63%
-Second Highest	40%	40%	39%	32%	32%	32%
-Middle	26%	31%	21%	19%	25%	14%
-Second Lowest	13%	14%	12%	10%	11%	9%
-Lowest	4%	6%	2%	3%	4%	2%

Table A6: Marginal Probabilities of Primary Grade Repetition (Asymt. Z-statistics)

Dep. Var.: Repeating Grade

Current Grade	-0.04
	-14.12
Enrolled Late	0.00
	0.06
Years Delay	0.00
	-0.37
Height for Age	-0.01
	-2.63
HH Size	0.00
	1.75
HH Cons. Per Capita	-0.00
	-2.36
Female	-0.01
	-1.25
K'iche	-0.01
	-0.70
Q'ueqchi	-0.01
	-0.85
Kaqchiquel	0.02
	1.50
Mam	-0.01
	-0.79
Other Maya	-0.01
	-0.63
Number of Obs.	*5862*
Pseudo R-Squared	*0.07*

Table A7: Initial Enrollment Hazard Function Estimates

Asymptotic t-statistics

	BOTH	BOTH	BOTH	BOTH	BOTH	MEN	WOMEN
Household size	0.97	0.98	0.99	0.99	0.99	0.99	0.99
	-9.15	*-3.78*	*-2.95*	*-2.60*	*-2.23*	*-1.78*	*-1.51*
Birth Order	1.04	1.04	1.03	1.03	1.03	1.01	1.04
	6.07	*5.27*	*3.63*	*3.51*	*3.24*	*1.28*	*3.34*
Female	0.93	0.95	0.95	0.95	0.95		
	-3.49	*-2.45*	*-2.09*	*-2.17*	*-2.22*		
Indigenous	0.75	0.90	0.97				
	-11.60	*-3.78*	*-1.17*				
Indigenous Female	0.81	0.80	0.79	0.79	0.81		
	-5.94	*-6.17*	*-5.93*	*-5.95*	*-5.50*		
Father's schooling (years)		1.04	1.04	1.04	1.04	1.04	1.04
		15.01	*13.74*	*13.36*	*12.96*	*8.95*	*9.50*
Mother's schooling (years)		1.03	1.03	1.03	1.03	1.03	1.03
		9.94	*8.35*	*8.36*	*8.12*	*5.18*	*6.12*
Per capita consumption		1.00	1.00	1.00	1.00	1.00	1.00
		3.03	*2.17*	*2.24*	*2.52*	*1.42*	*2.30*
Height-for-age z-score			1.09	1.09	1.09	1.09	1.09
			10.50	*10.72*	*10.23*	*7.06*	*7.43*
Kiche				0.98			
				-0.51			
Qeqchi				0.72			
				-7.28			
Kaqchikel				1.28			
				6.22			
Mam				1.02			
				0.44			
Other Mayas				0.91			
				-2.46			
Kiche, native speaker					0.77	0.75	0.65
					-4.67	*-3.79*	*-6.17*
Qeqchi, native speaker					0.66	0.64	0.55
					-8.51	*-7.28*	*-9.11*
Kaqchikel, native speaker					1.22	1.16	1.04
					3.70	*2.08*	*0.53*
Mam, native speaker					0.97	0.96	0.80
					-0.56	*-0.55*	*-3.03*
Other Mayas, native speakers					0.84	0.88	0.65
					-4.14	*-2.60*	*-7.87*
Kiche, Spanish speaker					1.39	1.26	1.26
					5.50	*2.90*	*2.84*
Qeqchi, Spanish speaker					1.08	1.03	0.93
					0.75	*0.22*	*-0.49*
Kaqchikel, Spanish speaker					1.29	1.19	1.16
					5.28	*2.83*	*2.18*
Mam, Spanish speaker					1.12	1.05	0.97
					1.18	*0.36*	*-0.24*

Other Mayas, Spanish speakers					1.26 *2.93*	1.14 *1.24*	1.15 *1.28*
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Number of Obs.	19,460	17,896	16,279	16,279	16,279	7,987	8,292
Log Likelihood Ratio	*-124,974*	*-113,352*	*-101,400*	*-101,400*	*-101,363*	*-47,448*	*-46,025*

Table A8: Mincer Equation Estimates

	FULL SAMPLE		LADINO SAMPLE		INDIGENOUS MALE SAMPLE		LADINA SAMPLE		INDIGENOUS FEMALE SAMPLE	
	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Erro
School	0.10	0.005	0.10	0.06	0.07	0.07	0.12	0.01	0.08	0.12
Experience	-0.007	0.001	-0.005	0.002	-0.011	0.002	-0.003	0.003	-0.007	0.004
Exp*Skul	0.001	0.0002	0.002	0.0003	0.001	0.001	0.001	0.0005	0.001	0.001
Female	-0.40	0.03								
Indian	-0.32	0.03								
Const.	0.86	0.04	0.79	0.06	0.75	0.07	0.28	0.11	0.15	0.12
R-Square	0.28		0.28		0.13		0.26		0.09	
No. Obs.	6,931		3,124		1,933		1,298		573	