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Socioeconomic and Ethnic Determinants of Grade Repetition in Bolivia and Guatemala

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Children from less wealthy households and children of indigenous origins are more likely to repeat a grade, so targeted interventions could be directed at the poor and could have an indigenous component, such as bilingual education.

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After reviewing the literature on repetition (students repeating grades in school) in developing countries, Patrinos and Psacharopoulos examine factors related to repetition in Bolivia and Guatemala. They develop a model to estimate the incidence and determinants of repetition. They use multivariate logistic regression analysis to estimate the determinants of repetition, using the results in simulations to determine probabilities of who is more likely to repeat.

Their empirical analysis shows that certain populations are more likely to repeat a grade: children from less wealthy households and children of indigenous origins. This suggests that any targeting activities could be directed to the poor and could have an indigenous component, such as bilingual education.

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SOCIOECONOMIC AND ETHNIC DETERMINANTS OF GRADE REPETITION IN BOLIVIA AND GUATEMALA

by

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I. Introduction

School dropout and grade repetition are among the most serious problems plaguing educational systems around the world today. This problem is especially pronounced in Latin America and the Caribbean, the region with the highest incidence of repetition and dropout in the world (see Unesco 1991). Nearly half the children who enroll in the first grade never complete the fourth grade. Latin America leads the developing world in the percentage of repeaters in primary education. On average, about 29 percent of all primary students are repeaters each year; and 42 percent are repeating the first grade (Schiefelbein 1992). Clearly, repetition is *the* key issue in Latin American primary education, both for improving overall efficiency and reaching suitable levels of quality (Schiefelbein 1989). Repetition also acts as a signal that something is wrong, that achievement is inadequate, that the quality of schooling is low, or that learning disabilities brought from a deprived learning environment are present.

School repetition and school dropout are closely linked, the one often leading to the other. They can be attributed to the supply side, i.e. the offering of low quality instruction, or to the demand side, i.e. families needing child labor for agricultural production and hence withdrawing their children from school, or forcing them to repeat because they have not learned the material during the school year because of work-related distractions.

It is important to note that the reduction of repetition and dropout are not ends in themselves. Regarding repetition, learning is the issue. If a student learns more by repeating a grade, repetition is not a problem (see Psacharopoulos, Rojas and Vélez 1992), except in terms of efficiency costs if alternatives exist. However, it is a problem if repetition becomes perennial, leading to dropout before a child attains literacy. At some stage, a child must "drop out" of school, e.g. at the end of the primary, secondary or higher education cycle. But if dropout occurs before a child finishes the compulsory level of education, presumably also missing literacy for life, then dropping out of school is a very serious problem.

In this paper we first review the literature on repetition in developing countries and then examine a series of factors that relate to repetition based on household survey data for both Bolivia and Guatemala. We then proceed to estimate the determinants of repetition using a series of household demographic and ethnic variables. Results from the analysis are used to simulate the probabilities of repetition against particular characteristics.

II. Literature Review

The high levels of repetition and drop out at the primary schooling levels prevent the realization of universal primary education in many developing countries (Davico 1990; Schiefelbein 1989). Repeaters reduce the enrolment capacity of their class, thus preventing other children from being admitted. Repeaters also cause overcrowding, which raises school costs (Unesco 1984). Many authors have found that the major obstacle is the first grade (see, for example, Davico 1990; Schiefelbein 1992). Repeating the first grade often leads to more repetition, which is followed by eventual drop out, often resulting in illiteracy for life.

Davico (1990) found that poor teachers and inadequate support to poor children are to blame for the high rates of repetition and drop out in Brazil. It is often the case that the poorest teachers are to be found in the first grade. There is also evidence of discrimination against students from disadvantaged backgrounds, and a belief among teachers that poor students cannot learn. The teaching method reinforces such attitudes, leading to high rates of repetition and drop out for those from disadvantaged backgrounds. Schiefelbein also finds that repetition is especially severe among the most deprived; that is, those whose parents have the lowest levels of education and income are more likely to repeat a grade (Schiefelbein 1992: 7). Recent research for Uruguay has found that repetition decreases significantly as the level of the parents' education income increases (Schiefelbein 1992: 6).

Repetition rates are also high among those living in rural, isolated areas, and among indigenous peoples and non-whites. It has been found that the repetition rate is twice the national average in Malleco province in Chile, which has the highest proportion of indigenous people in the country (Schiefelbein 1992). Significant differences by gender have not been detected, and although girls in general do better than boys, gender differences have been diminishing over time (Schiefelbein 1992: 8). Schiefelbein (1992, 1989, 1975) adds some further explanatory factors, such as children with learning disabilities, "age heterogeneity" in the classroom (see below), language and, in some cases, the lack of bilingual education.

Psacharopoulos and Yang (1991), in their study of educational attainment in Venezuela, also examined the problem of repetition. Using a 1987 sample of school children aged 10 to 18 years, they found that grade repetition was associated with urban areas (negative) and with being male (positive). They also established that family background (father's education) has a significant effect on lowering the repetition rate.

Regarding the determinants of grade repetition, Schwille et al. (1991) presented a detailed causal model to explain grade repetition. Three main categories were put forward, including: student characteristics, such as gender, ethnicity, family influences, place of residence, age, prior repetition experience, aptitudes, and perceived opportunities for work/employment; national policies regarding language, repetition, secondary school entrance, other access and selection policies, and the quality of instruction; and school characteristics, such as school management practices, coverage of syllabus, quality of instruction, compliance with national policies, and the capacity of the school relative to the number of non-repeaters. All this is hypothesized to cause repetition, which in turn affects student learning, student motivation, student self-esteem, the examination success rate, the enrolment rate, the dropout rate, and the mean time required to produce graduates.

The demand for child labor, whether paid or unpaid, affects schooling, often causing grade repetition. This relationship was examined by Bowman and Goldblatt (1984), who found that the demand for the productive contributions of children to the household economy are closely associated with "overage" and the proportions of youth who do not complete even four years of primary schooling (Bowman and Goldblatt 1984).

Using a unique follow-up data set for Northeast Brazil, Gomes-Neto and Hanushek (1991) examine the causes and effects of grade repetition. They find that student achievement levels are very important, as is the availability of advanced grades. Jamison (1978) examined the determinants, among other things, of student failure and repetition in Nicaragua. Through an evaluation of the Radio Mathematics Project, and using maximum likelihood methods, he found that males are less likely to fail, that the number of times repeated has negative impact on failing during the current year, and that student achievement on test score are significant factors.

The costs of repetition are very high for a developing country. Estimates for Brazil show that the cost of repetition represents an amount equivalent to the entire federal government contribution to first level schooling (World Bank 1986). Policies to reduce repetition and dropout are advocated for the more efficient use of education resources. Cuadra and Fredriksen (1992) estimated efficiency gains associated with reducing repetition and dropout through a simulation exercise. They found that reductions in repetition and dropout rates would result in more students completing the basic cycle of education at a lower input per graduate. Less repetition frees places and lowers the cost of graduating a cohort, while reduced dropout results in more students completing the cycle. Furthermore, less repetition may mean less dropout as the foregone earnings associated with schooling, which are greater when repetition is higher, decrease as the rate of repetition falls.

High levels of grade repetition do not only have cost and efficiency implications, but also affect the foregone earnings associated with attending school, outcomes, and the returns to education. It has been found that repetition rates affect the rate of return to education. Assuming it takes on average two extra years to complete the basic education cycle, and more for those from lower socioeconomic backgrounds, the returns to schooling are found to drop significantly in Brazil, from 13 percent to 8 percent, after repetition is factored into the calculations (Jallade 1977). Also, Behrman and Deolalikar (1991), using Indonesian data, find that failure to account for repetition and drop out leads one to overestimate the returns to schooling.

III. A Bird's Eye View of Repetition in Latin America

Table 1 presents key information on primary schooling in Latin America, as well as conservative estimates of the indigenous population in some countries. While many children do not start school on time - according to the official primary school entry age -, most do, however, eventually enroll. Primary school coverage is complete in the Anglophone Caribbean region and Mexico, as well as for a number of Central and South American nations. The lowest levels of primary school coverage occur in Haiti, Guatemala, El Salvador, the Dominican Republic, and Nicaragua.

Table 1. **School Access, Repetition, Grades Attained, and Indigenous Population in Latin America and the Caribbean**

Sub-region/ Country	School Access (%) On time	School Access (%) Ever	Repetition (%)	Years in Primary	Grades Attained	Indigenous (%)
South America	..	93	45	7.1	4.2	..
Argentina	..	..	26	..	..	0.1
Bolivia	61	90	38	4.8	2.2	66
Brazil	69	92	54	7.7	3.9	1
Chile	44	98	11	6.4	5.5	9
Colombia	43	83	44	6.2	4.5	1
Ecuador	82	100	28	6.2	5.2	21
Paraguay	100	100	28	6.3	4.8	3
Peru	66	97	29	6.5	5.1	40
Uruguay	43	100	18	6.3	5.7	..
Venezuela	76	95	28	6.4	4.5	1
Central America	..	81	47	6.7	4.1	..
Costa Rica	43	99	23	6.4	5.2	1
El Salvador	65	73	51	7.0	4.0	21
Guatemala	52	72	47	6.4	4.0	50
Honduras	83	93	49	6.9	4.5	7
Nicaragua	73	78	60	6.8	2.7	3
Panama	82	99	26	6.5	5.4	6
Gulf of Mexico	..	96	33	5.8	4.1	..
Haiti	1	44	54	4.8	1.3	..
Mexico	96	100	32	5.7	4.3	11
Dominican Republic	76	74	55	6.7	3.4	
Anglophone Caribbean	..	100	7	5.6	4.9	..
Bahamas	2	100	0	6.0	5.7	..
Barbados	87	99	18	5.7	5.0	..
Dominica	95	98	26	6.3	5.2	..
Grenada	88	100	15	6.0	4.4	..
Guyana	73	100	8	6.0	5.4	3
Jamaica	82	100	4	5.3	4.7	..
St. Kitts and Nevis	21	100	2	6.0	5.9	..
St. Vincent	87	99	23	6.3	5.2	..
St. Lucia	96	100	4	5.8	5.4	..
Trinidad and Tobago	100	100	8	5.7	4.8	..
Overall	41	93	42	6.8	4.2	..

Sources: Schiefelbein (1992); Indigenous population estimates: Berger (1990).
Note: .. not available.

The rate of primary school coverage, however, has little relation to the rate of grade repetition in a country. Repetition rates at the primary level are very high, especially in South and Central America. The rate of repetition, for instance, is over 50 percent in Brazil, and 60 percent in Nicaragua. The lowest rates of repetition occur in the Anglophone Caribbean.

In addition to very high repetition rates, primary schooling in most Latin American countries is inefficient. It takes, on average, seven years to complete four grades of primary schooling in South America. This means that one-and-one-half years of schooling are required to complete one grade at the primary level. In Brazil and Haiti, the differential between years of schooling and grades attained is even greater. This inefficiency occurs at a high level in Nicaragua, El Salvador, the Dominican Republic, Bolivia, and Guatemala. The difference between years of schooling and grades attained is negligible in most Caribbean countries.

Another feature of Table 1 is that it provides estimates of the indigenous population expressed as a percent of the total population for countries where this is relevant and the data was available. Several Latin American countries have sizable indigenous populations, the biggest being in Bolivia and Guatemala, where, according to most estimates, they constitute the majority of the population.

In many countries, due to a variety of factors, including language, lack of provision of social services, geographical location, and discrimination (see Kelley 1988; Stephen and Wearne 1984), being an indigenous person is associated with, among other things, extreme poverty and illiteracy. This is especially the case in rural, isolated areas, which places children in an extreme disadvantage. In rural Peru, for instance, where the majority of the population is indigenous, it has been found that 70 percent of Quechua-speaking people over the age of five have never received any schooling, relative to only 40 percent of rural non-indigenous Peruvians (Hernandez 1988: 126).

IV. An Empirical Investigation

In this paper we focus on children attending the primary level, aged less than 15 years. The reason for concentrating on primary schooling is that repetition is less of a problem at the secondary or tertiary levels. Also, since we do not have matching data on learning, we focus on household demographic, wealth and other demand factors in determining repetition. We also control for ethnicity by including indigenous identity as an independent variable in the analysis. For this reason we concentrate on the two Latin American countries with the highest proportion of indigenous peoples in their populations, Bolivia and Guatemala.

The data from Bolivia used in this analysis come from the 1989 *Encuesta Integrada de Hogares* (EIH) conducted by the *Instituto Nacional de Estadística*. The survey covers only urban areas with populations over 10,000. Our analysis is limited to 5,614 enrolled primary school children between the ages of 7 and 14 who are still in school. For Guatemala, the data come from the *Encuesta Nacional Socio-Demografica* (ENSD), conducted in 1989 by the

Instituto Nacional de Estadística. The survey covers about 11,000 households in all parts of the country. Our analysis is limited to 2,974 enrolled primary school children between the ages of 10 and 14.

The key dependent variable among the two groups of primary school children is REPEATER, or "overage", or "age/grade distortion." A repeater is a student whose age is above the normal for the grade he/she just completed or is currently attending. Using a variable called *schooling-for-age* (SAGE) (see Psacharopoulos and Yang 1991), we assess the progress of a child in the school system and estimate repetition, or "overage". Using the formula:

$$\text{SAGE} = \left(\frac{\text{Years of Schooling}}{\text{Age - E}}\right) 100$$

where E represents the usual school entry age in the country, age six in Bolivia, seven in Guatemala. We consider all those with a score under 100 as being below normal progress in the school system because of grade repetition or late entry.

However, as this measure of repetition may be capturing late entrants, it can be described more as a measure of "age-grade distortion," or "overage." Schiefelbein (1992: 31) noted that 60 percent of children in Bolivia enter school on time, that is, at age six; first grade repetition is 38.4 percent. The sample we are using, however, is urban only; therefore, late entrants may be fewer. Moreover, our method does not overestimate repetition - it underestimates it. According to our model, only 16.8 percent of Bolivian school children are estimated to be first grade repeaters.

The Guatemalan education system, however, is characterized by high rates of failure at all grade levels, accompanied by repeating. While 52 percent of children enroll on time, more than 70 percent of rural students are older than the expected age for their grade, compared to 50 percent in urban areas. Still, only 72 percent of Guatemalans ever enroll; and the rate of repetition is 47 percent (Schiefelbein 1992), although higher in rural areas. Our method gives a much higher rate, but it should be noted that this has much to do with the fact that the Guatemalan sample consists of children are already overaged; the sample is limited to those ten years of age and older (the Guatemalan survey did not collect information on those under ten years of age). Also, our sample, however, includes students between the ages of 7 and 14 (10 and 14 in Guatemala), in all primary school grades, so that a number of "late entrants" will have dropped out, and will consequently not be included in our study.

An important characteristic of the Latin American primary school, as well as a factor determining repetition, is the presence of children of various ages in the same grade, some of whom are themselves repeaters (Schiefelbein 1992: 10). Estimates of the "overaged" in primary schools in Latin America and the Caribbean range from 43 percent in Brazil, 34 percent in the rest of South America, and 32 percent in Central America (32 percent), to just 11 percent in the Anglophone Caribbean (OAS 1992). In general, age/grade distortion is much greater in rural

areas. In Peru, over 90 percent of urban children are in school by age six, while the same can be said for only 57 percent of rural children (Ilon and Moock 1991).

Bowman and Goldblatt (1984) examined the phenomenon of "overage" in Mexican primary schools. They found that overage and low family incomes are strongly related, and that "low incomes (low ability to pay) had more serious negative effects on the schooling of girls than of boys." A particularly interesting and useful finding was that overage in the first grade, and overage in primary school in general, are not the same thing; in fact, they are negatively correlated. Early grade repetition is strongly associated with drop out, while being overage in primary school (but not first grade) indicates school progress.

On the question of whether "overage" more heavily represents repetition or late entry, the answer is unclear and although there are competing theories, the evidence to date has not been conclusive. Enrolling in primary school on time has been found to be positively associated with family wealth and parents' schooling, and negatively associated with school costs in Peru (Ilon and Moock 1991). This means that for a variety of reasons it is the poor who are more likely to enroll late, repeat grades and eventually drop out of school, given the relationship between overage, repetition, and dropout. Other reasons put forward for delayed enrollment in primary school include borrowing constraints, the opportunity cost of child labour, a lack of school places, and malnutrition (Glewwe and Jacoby 1992).

Some researchers, however, argue that the principal cause of age/grade distortion is grade repetition, and not late entrance (Verhine and de Melo 1988: 564). Schiefelbein (1992, 1975) hypothesizes that "age heterogeneity" is also a *cause* of repetition. This is because of the effect on learning and teaching methods in the classroom when there are children of various ages in the same grade. It is "difficult for the teacher to generate learning experiences of interest for the whole range of ages" (Schiefelbein 1992: 10). He goes on to report that "for the most part, age heterogeneity corresponds to overage resulting from repetition." Repetition generates age heterogeneity, which causes problems in the classroom for non-repeaters as well, as teaching methods change in an attempt to accommodate children of various ages in the same grade. Repetition is expected to be greater, the higher the level of age heterogeneity in a given classroom. In other words, present repetition leads to a cycle of increased repetition. All this shows that even the late entrants in our sample of "repeaters" has consequences, for themselves, as well as for the students in a normal schooling trajectory. The evidence and theory, therefore, tentatively point to the conclusion that overage and repetition may be the same thing in Latin America.

The independent variables to be considered in the empirical analysis are as follows:

AGE, the student's age: ranging from 7 to 14 in Bolivia, and 10 to 14 in Guatemala

MALE, the gender variable (0-1 dummy)

INDIG, whether the student is indigenous (0-1 dummy)

REGION, residence in one of Bolivia's eight *Departamentos*, or urban/rural in Guatemala

PRIVATE, attendance at a private school (0-1 dummy), Bolivia only

SM, mother's years of schooling

YFAM, family income

MALEHHD, male household head (0-1 dummy)

OCCHHD, occupation of household head (5 major categories in Bolivia, 4 in Guatemala)

NSIBS, the number of brothers and sisters

NROOMS, number of rooms in the household

KITCHEN, the presence of a kitchen in the household (0-1 dummy)

RUNWATER, the presence of running water in the household (0-1 dummy)

The means and standard deviations of the sample variables are presented in Annex 1.

We are interested in the effect of the above independent variables on repetition. The model to be estimated is a regression with a dichotomous dependent variable, REPEATER, defined as above. For this reason, logistic regression analysis will be used. The model is as follows:

$$REPEATER = f(AGE, MALE, INDIG, REGION, (PRIVATE,) SM, YFAM, MALEHHD, OCCHHD, SIBS, NROOMS, KITCHEN, RUNWATER)$$

As mentioned above, the aim of this empirical study is to explain the determinants of repetition with household characteristics, controlling for ethnicity. It is expected that family income and indicators of relative wealth (such as KITCHEN, RUNWATER, NROOMS) will be negatively associated with repetition. Positive associations with repetition are expected for the variables controlling for indigenous origins and numbers of brothers and sisters. As parental schooling is considered important, it is expected that mother's schooling will be negatively associated with repetition. Mother's schooling was chosen over father's schooling as a control variable because at early ages it is the mother who spends more time with the child. Nevertheless, the presence of a male household head is also controlled for, the hypothesis being that female-headed households are likely to be less wealthy, consequently less able to provide the proper home environment for the child to ensure success at school. It is, therefore, expected that the presence of a male household head will be negatively associated with repetition. We also control for the household head's occupation, regardless of gender. Region of residence is expected to show great differences in repetition rates, reflecting the quality and accessibility of

schooling in different areas, as well as relative wealth. For Bolivia, being an urban-only sample, we control for *Departamento* of residence. For Guatemala, we use the rural/urban divide, and judging from previous analyses, we expect the rate of repetition to be considerably higher in rural areas, for reasons such as inferior quality schools. Age, another control variable, is expected to be positively associated with repetition because the longer one remains in primary school, the more likely it is they have repeated a grade.

Descriptive Statistics

The mean sample characteristics for repetition by discrete independent variables are presented in Table 2. The mean repetition rate increases with age, as those students that continue in the system accumulate repeated grades.

Girls have a slightly higher rate of repetition than boys. This aggregate result is somewhat surprising since, according to other accounts, boys have higher rates of repetition in most Latin American countries (Schiefelbein 1992).

Indigenous ethnicity and repetition are highly correlated. A primary school student of indigenous origin is almost twice as likely to be a repeater relative to a non-indigenous child in Bolivia, while the rate of repetition for indigenous children in Guatemala is almost 90 percent.

The rate of repetition varies by region, or *Departamento* in Bolivia, of residence. It ranges from only 16 percent in *Chuquisaca* in southern Bolivia, to 37 percent in *Beni*, in the north. The Bolivian sample refers only to the urban sector. In Guatemala, however, where we possess information on both the rural and the urban sectors, great diversities are made apparent. While the overall rate of repetition is only 55 percent in urban areas, it is over 80 percent in rural areas.

For Bolivia, the type of school attended is known. For those attending public schools, the rate of repetition is over 29 percent; it is a mere 8.7 percent for those in private schools.

Parent's schooling and family income also affect repetition rates. In Bolivia, if the father has less than a primary education, the aggregate repetition rate is over 34 percent; however, for those whose mothers have a complete secondary education or more, the repetition rate on average is less than 9 percent. In Guatemala, for those whose mother (father) has incomplete primary schooling, the rate of repetition is 74 percent; for those whose mother (father) has a complete secondary education, the rate of repetition is only around 30 percent. The rate of repetition also varies according to family income quintile, ranging from almost 29 percent for those in the bottom 20 percent, to less than 17 percent for those in the top 20 percent in Bolivia. In Guatemala, repetition varies from 84 percent at the bottom of the income distribution, to 50 percent at the top.

The occupation of the household head also matters. In Bolivia, the rate of repetition is lower for children from households where the household head is an employer (12 percent), as

opposed to a laborer (35 percent). In Guatemala, the lowest rate of repetition registered is for those where the household head is a public sector employee (49 percent), and the highest is for self-employed household heads (78 percent).

Repetition is found to be less for school children in Bolivia in households where the household head is male, while in Guatemala, surprisingly, repetition is lower if the household head is female. The reasons for this anomaly are unclear.

Several other household variables are used in the analysis. In general, the fewer brothers and sisters one has, the more rooms in the house, the presence of a kitchen and running water are all associated with lower rates of repetition in both countries.

Table 2. Mean Repetition Rates by Selected Sample Characteristics (%)

Characteristic	Bolivia	Guatemala
Age		
8	14.8	
9	22.8	
10	25.6	60.7
11	28.2	65.2
12	30.6	70.2
13	37.4	78.9
14	49.7	100.0
Gender		
Female	25.5	71.8
Male	24.1	70.6
Ethnicity		
non-Indigenous	22.6	64.3
Indigenous	40.8	87.6
Region/*Departamento*		
Chuquisaca	15.8	
Cochabamba	17.8	
Oruro	22.4	
Santa Cruz	22.4	
Tarija	23.5	
Potosi	26.9	
La Paz	29.5	
Beni	36.8	
Rural		83.0
Urban		55.0
Type of School		
Public	29.4	
Private	8.7	
Mother's Schooling		
Incomplete Primary	29.9	74.3
Complete Primary +	18.5	46.0
Complete Secondary +	8.6	31.4

(Cont'd)

Table 2 (Cont'd)

Characteristic	Bolivia	Guatemala
Father's Schooling		
Incomplete Primary	34.4	74.5
Complete Primary +	23.2	55.2
Complete Secondary +	11.5	29.8
Family Income Quintile		
Bottom 20	28.5	84.1
Next 20	28.8	78.8
Middle 20	26.5	74.0
Next 20	23.4	66.3
Top 20	16.6	49.9
Household Head Gender		
Female	32.7	63.0
Male	24.2	72.4
Household Head Occupation		
Employer	12.2	61.3
Employee	18.6	
Self Employed	27.6	77.8
Laborer	35.1	
Public Sector Employee		49.2
Private Sector Employee		72.5
Siblings		
1 to 2	18.0	65.1
3 to 4	21.2	75.6
5 +	33.3	80.5
Number of Rooms		
1	36.6	86.7
2	27.3	78.7
3	25.1	71.9
4	18.4	64.0
5 or more	13.1	42.3
Kitchen		
No	31.6	76.1
Yes	23.0	64.6
Running Water		
No	29.9	80.7
Yes	18.7	62.7
Overall	24.8	71.2

Multivariate analysis

The results of a multivariate model controlling for the factors that simultaneously determine grade repetition appear in Annex 3. Since the "primary school repeater" is a 0-1 limited dependent variable, a logit model was fitted. The model expresses the probability (P) of someone being a primary school repeater, as a function of various characteristics (X), such as age, indigenous origin, gender, and so on.

$$P = \frac{1}{1 + e^{-\sum \beta_i X_i}}$$

The reported coefficients in the last column of Annex 3 are partial derivatives indicating the change in the probability of repeating a grade in primary education relative to a unit change in one of the independent variables,

$$\frac{\partial P}{\partial X_i} = \beta_i P (1 - P)$$

where P refers to the dependent variable-probability of the event, beta to the logit coefficient and X to the string of independent variables used in the regression. For example, every extra year of mother's education decreases the probability of the child repeating a school grade by more than six percentage points in Guatemala, relative to a mean repetition rate of 77.9 percent.

The results of the logit analysis are used to estimate probabilities of repetition against selected sample characteristics. Probabilities of repetition are simulated by varying one characteristic at a time, while holding other variables constant at their mean levels. The results of the simulations are presented in Table 3. Highlights are given in Figure 1.

As expected, the variables age and indigenous origin have a large, positive, and significant effect on being a repeater. The older the child is, the greater the probability of being a repeater; from 12 percent at age 8, to over 52 percent at age 14 in Bolivia, and from 55 percent at age 10, to 94 percent at age 14 in Guatemala. A child of indigenous origin has at least a five percent greater probability of being a repeater than does a non-indigenous child in Bolivia, and a more than nine percent chance of being a repeater in Guatemala.

Table 3. Predicted Probability of Repetition by Selected Sample Characteristics (%)

Characteristic	Bolivia	Guatemala
Age		
8	11.6	
10	21.0	55.3
12	35.0	81.3
14	52.2	93.9
Gender		
Male	21.8	78.2
Female	23.0	77.5
Ethnicity		
Indigenous	28.5	83.5
non-Indigenous	21.8	75.1
Type of School		
Private School	14.9	
Public School	25.3	
Mother's Schooling (Years)		
0	33.5	90.0
6	24.2	60.7
12	16.8	21.0
Family Income Quintile		
Bottom 20	22.3	79.0
Next 20	22.3	78.7
Middle 20	22.4	78.3
Next 20	22.4	77.8
Top 20	22.6	76.6
Household Head Gender		
Male	21.7	78.6
Female	30.2	73.0
Running Water		
Yes	19.8	75.1
No	24.9	80.8
Kitchen		
Yes	22.0	78.4
No	24.2	77.5

(Cont'd)

Table 3 (Cont'd)

Characteristic	Bolivia	Guatemala
Household Head Occupation		
Laborer	24.3	
Employee	18.8	
Self Employed	25.1	78.3
Employer	13.1	78.0
Private Sector Employee		79.3
Public Sector Employee		70.2
Region/*Departamento*		
Chuquisaca	12.8	
Cochabamba	14.9	
Oruro	16.0	
Potosi	18.3	
Tarija	18.5	
Santa Cruz	18.1	
Beni	31.4	
Urban		70.1
Rural		82.6
Number of Siblings		
0	16.0	62.4
2	19.0	74.0
4	22.4	83.0
6	26.2	89.3
Number of Rooms		
1	27.7	84.2
2	25.1	81.1
3	22.4	77.5
4	20.4	73.6
5	18.4	69.2
6	16.5	64.4
Repeater (overall probability)	24.2	77.9

The findings associated with indigenous people have been verified in previous analyses, especially for Guatemala. Rojas (1991) found that being "non-white" significantly affects educational attainment in Guatemala. Carvajal and Morris (1989/1990), analyzing 1986 data from Guatemala's *Programa Nacional de Educacion Bilingue* (PRONEBI) from 297 communities and from a questionnaire administered to the same communities, found sizable differences ***among*** indigenous groups[1] with respect to grade repetition and dropout, ranging from 30 to 46 percent repetition, and 6 to 16 percent drop out rates. The authors attempted to explain the differences with the use of community socioeconomic characteristics and differences among indigenous groups. It was found that bilingualism improves grade repetition and drop out rates, and that the opportunity cost of child labour should be taken into account when devising school schedules. In a country where more than 40 percent of the population begins school without knowledge of Spanish, there is a serious need for teachers with indigenous language knowledge. The promotion standards in Guatemala have been found to be unrealistic. It is usually necessary for first grade students to learn to read and write Spanish or else they repeat the grade; this, no doubt, is very difficult for those who do not know Spanish when they enter first grade. The Bilingual Education Project had a significant impact on promotion rates, more than nine percent higher for bilingual students relative to the control group in the first grade in 1983 (Townsend and Newman 1985).

Region of residence also has a significant and large impact on repetition rates. *Departamento* of residence in urban Bolivia showed great differences, as did rural/urban sector in Guatemala. The probability of repetition is considerably lower in urban Guatemala.

The number of brothers and sisters one has also has a positive and significant impact on being a repeater. The probability of being a repeater in Bolivia for those with no siblings is only 16 percent, while for those with 6 siblings the probability of repetition is over 26 percent. In Guatemala, this ranges from 62 to 89 percent.

Attendance in a private school has a very large, negative and significant impact on being a repeater in Bolivia. The difference between public and private school repetition probabilities is great, at only 14.9 percent for private school students, and over 25 percent for public school students. We do not have information on type of school attended for Guatemalan children.

In Bolivia, female headed households are associated with higher probabilities of repetition, compared with male headed households. The opposite relationship holds true in Guatemala, however, and the reasons are unclear at present. In addition, the probability of repetition was less for those Bolivian children where the household head was an employer, compared with the other occupational categories controlled for in the analysis. Mother's years of schooling also had a negative and significant impact on repetition, the probability of repetition in Bolivia declining from over 33 percent when the mother had no schooling, to less than 17 percent when the mother had 12 years of schooling. In Guatemala, the probability of repetition

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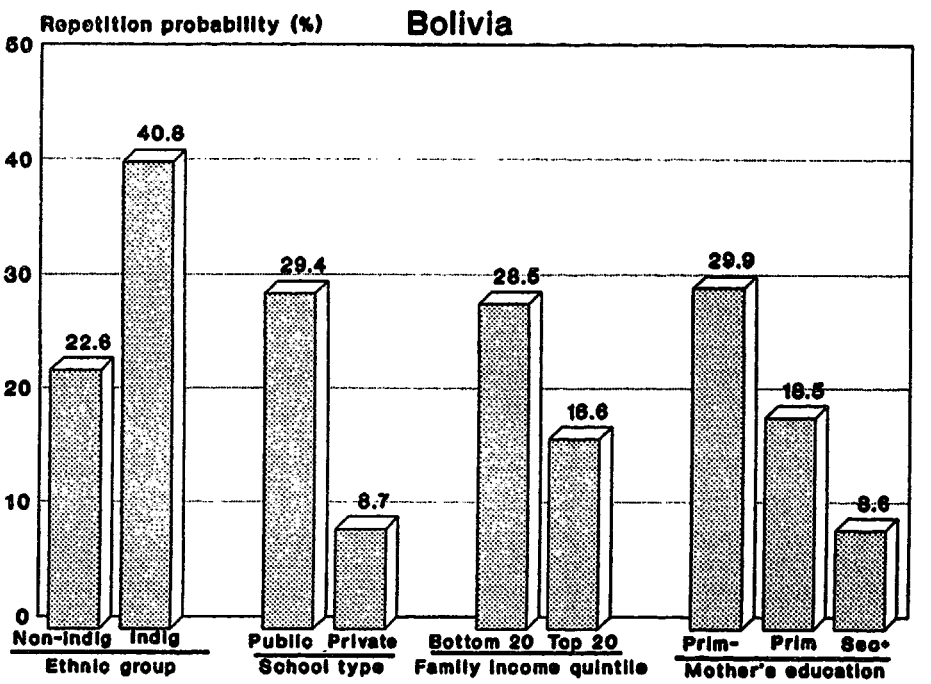
[1] There are 25 different indigenous languages spoken in Guatemala (Carvajal and Morris 1989/1990).



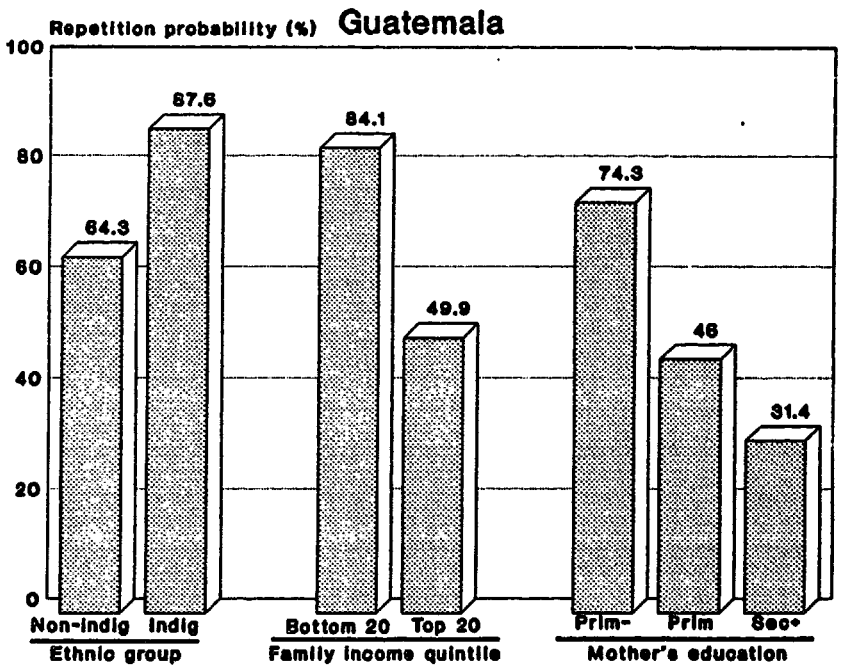


Figure 1. Repetition Probabilities by Socio-economic Characteristics

drops dramatically for those whose mother has 12 years of schooling (21 percent), from the high registered for those whose mother has no schooling (90 percent). Parental education was found to have a positive association with school attendance in Guatemala (Balderston 1989), where it was also found that the opportunity cost for child labour was negatively associated with school attendance. Child malnutrition, as measured by height, was also found to be significantly related to schooling (see Glewwe and Jacoby 1992 for a similar study on Ghana).

Interestingly, family income did not have much of an effect on repetition rates. The probability of repetition in both countries did not vary much among the five income categories presented in Table 3. This, however, shows that income is not a very good indicator of household wealth, this being reflected in the fact that other household wealth indicators did show significant and predicted differences in relation to repetition rates. For example, the presence of running water in the household was associated with a lower rate of repetition. Also, the more rooms in a house, the lower the rate of repetition, from 28 percent in a one room home, to 17 percent in a six room household in Bolivia, and from 84 percent (one room) to 64 percent (six rooms) in Guatemala.

V. Conclusion

An empirical investigation into the causes of grade repetition (or overage) in Bolivia and Guatemala, while limited to socioeconomic and household factors, led to the findings that certain populations are more likely to be affected. Children from less wealthy households are more likely to repeat grades. Students of indigenous origins also have higher probabilities of grade repetition, suggesting that any targeting activities should have an indigenous component. A very large difference in repetition rates was found between types of schools (in Bolivia), private versus public, favoring those students attending the private schools. While this may have much to do with the socioeconomic background of the students attending private schools, an investigation into the teaching and promotion practices of these schools is warranted.

One simple method of reducing repetition is to introduce mandatory promotion. This, however, ignores the fact that learning occurs through repetition, as is discussed by Gomes-Neto and Hanushek (1991). Continually high repetition rates, on the other hand, may also not be very efficient as they are associated with dropping out of school. The solution, therefore, rests in policies designed to get at repetition and overage by targeting the right population: the poor. Moreover, in countries such as Bolivia and Guatemala, with large indigenous populations, the provision of bilingual education could be implemented quickly and extensively.[2]

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[2] On bilingual education in Latin America, see: Amadio (1990), Lopez (1990), Lopez and d'Emilio (1992), Albo and d'Emilio (1990), Moya (1990), Varese (1990), Gurdian and Salamanca (1990), Zuniga (1990), Martinez (1990), and Cossio (1991).

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Annex 1. Mean Sample Characteristics, Bolivia 1989

Variable	Mean	s.d.	N
Individual Characteristics			
Repeater	.25	.43	6402
Age	10.28	2.18	6402
Years of Schooling	4.25	2.10	6402
Male	.51	.50	6402
Indian	.12	.33	6402
Private School	.22	.42	6402
Region (*Departamento*)			
Chuquisaca	.04	.18	6402
La Paz	.38	.48	6402
Cochabamba	.16	.37	6402
Oruro	.10	.30	6402
Potosi	.05	.22	6402
Tarija	.02	.15	6402
Santa Cruz	.23	.42	6402
Beni	.03	.17	6402
Household Characteristics			
Mother's Schooling	7.33	4.30	5616
Father's Schooling	8.54	4.39	5956
Family Income	675.75	1196.13	6402
Male Household Head	.92	.27	6402
Siblings	4.06	1.72	6402
Rooms (#)	3.07	1.99	6402
Kitchen	.79	.41	6402
Running Water	.45	.50	6402
Household Head Occupation			
Laborer	.14	.35	6402
Employee	.36	.48	6402
Self Employed	.33	.47	6402
Employer	.04	.20	6402
Other	.12	.32	6402

(Cont'd)

Annex 1 (Cont'd) Mean Sample Characteristics, Guatemala 1989

Variable	Mean	s.d.	N
Individual Characteristics			
Repeater	.71	.45	2974
Age	11.66	1.27	2974
Years of Schooling	3.22	1.54	2974
Male	.54	.50	2974
Indian	.29	.46	2974
Rural	.58	.49	2974
Household Characteristics			
Mother's Schooling	3.20	2.70	2974
Father's Schooling	3.55	2.70	2974
Family Income	400.57	522.29	2974
Male Household Head	.86	.34	2974
Siblings	2.78	1.37	2974
Rooms (#)	2.91	1.47	2974
Kitchen	.43	.49	2974
Running Water	.53	.50	2974
Household Head Occupation			
Private Sector Employee	.37	.48	2974
Public Sector Employee	.11	.31	2974
Self Employed	.41	.49	2974
Employer	.03	.17	2974

Annex 2 Zero-order Correlation Matrix (Selected Variables)

Variable	SF	SM	YFAM
Bolivia			
S	.063	.080	.056
REPEAT	-.243	-.231	-.057
SAGE	.215	.230	.061
OVERAGE	-.202	-.195	-.053
Guatemala			
S	.429	.475	.249
REPEAT	-.337	-.393	-.214
SAGE	.437	.504	.255
OVERAGE	.392	.458	.227

Note: All correlation coefficients are statistically significant at the 1% probability level or better.

Annex 3 Logistic Regression Results: The Determinants of Repetition in Bolivia (Dependent Variable: REPEAT)

Variable	Logit Coefficient	Variable Mean	Marginal Effect (%)
AGE	0.354	10.240	6.15
	(20.3)		
MALE	-0.071	.508	-1.23
	(1.0)		
INDIG	0.356	.101	6.21
	(3.3)		
Chuquisaca	-0.701	.032	-12.19
	(2.9)		
Cochabamba	-0.603	.166	-10.48
	(5.3)		
Oruro	-0.460	.099	-8.00
	(3.6)		
Potosi	-0.265	.046	-4.61
	(1.5)		
Tarija	-0.245	.024	-4.26
	(1.0)		
Santa Cruz	-0.352	.238	-6.14
	(3.6)		
Beni	0.473	.032	8.24
	(2.5)		
PRIVATE	-0.661	.245	-11.49
	(5.4)		
SM	-0.075	7.328	-1.32
	(7.0)		
YFAM(x1000)	0.009	.708	.16
	(0.3)		
MALEHHD	-0.443	.913	-7.72
	(3.7)		
OCCHHD			
LABORER	0.125	.138	2.17
	(0.9)		
EMPLOYEE	-0.355	.380	-6.17
	(3.0)		
SELFEMPLOYED	-0.217	.323	-3.77
	(1.8)		
EMPLOYER	-0.680	.042	-11.82
	(2.5)		
NSIBS	0.104	4.003	1.81
	(4.9)		
NROOMS	-0.132	3.125	-2.31
	(5.5)		
KITCHEN	-0.125	.796	-2.17
	(1.4)		
RUNWATER	-0.293	.467	-5.09
	(3.7)		
Constant	-3.425		
Chi-square	1058		
N	5614		

Note: Numbers in parentheses represent t-values.

(Cont'd)

Annex 3 (Cont'd) Logistic Regression Results: The Determinants of Repetition in Guatemala (Dependent Variable: REPEAT)

Variable	Logit Coefficient	Variable Mean	Marginal Effect (%)
AGE	0.629	11.660	14.31
	(14.3)		
MALE	0.037	.538	0.84
	(0.4)		
INDIG	0.515	.295	11.72
	(3.9)		
RURAL	0.708	.577	16.11
	(6.7)		
SM	-0.293	3.199	-6.67
	(12.3)		
YFAM(x1000)	-0.186	.401	-4.23
	(1.8)		
MALEHHD	0.304	.863	6.92
	(2.0)		
OCCHHD			
PRIVATE SECTOR	0.074	.369	1.68
	(0.4)		
PUBLIC SECTOR	-0.412	.105	-9.38
	(2.0)		
SELFEMPLOYED	0.017	.414	0.39
	(0.1)		
NSIBS	0.037	2.782	0.84
	(7.1)		
NROOMS	-0.215	2.912	-4.89
	(5.2)		
KITCHEN	0.052	.429	1.18
	(0.5)		
RUNWATER	-0.335	.532	-7.62
	(3.1)		
Constant	-5.859		
Chi-square	971		
N	2974		

Note: Numbers in parentheses represent t-values.

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