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Costs and Benefits of Bilingual Education in Guatemala

A Partial Analysis

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Costs and Benefits of Bilingual Education in Guatemala
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by
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The comments of Barry R. Chiswick are greatly appreciated.

Abstract

The benefits of compensatory bilingual education for a disadvantaged, poor indigenous population as an investment in human capital is significant. Students of bilingual schools in Guatemala have higher attendance and promotion rates and lower repetition and dropout rates. A very important finding is that bilingual students receive higher scores on all subject matters, including mastery of Spanish. The efficiency of bilingual education in Guatemala is confirmed by a crude cost-benefit exercise. A shift to bilingual schooling in Guatemala would result in considerable cost savings as a result of reduced repetition. The higher quality of education generating higher promotion rates will probably help students to complete the primary education cycle, and will substantially increase total educational levels at a lower cost. The costs saving due to bilingual education is estimated at over 31 million *quetzales* (US$5 million). The cost savings are equivalent to the cost of providing primary education to about 100,000 students per year.

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I know of no satisfactory analysis of the economics of languages....in low income areas, there are spoken languages or dialects that serve small local communities; it follows that relative to the cost of school instruction in such languages or dialects, the economic value of this class of specialized human capital must be very low....Would that we had a definitive treatise on the economics of languages.

T.W. Schultz, 1989. 'Investing in People: Schooling in Low Income Countries," *Economics of Education Review* 8(3): 219-223.

Introduction

Investing in indigenous people in Latin America through compensatory programs such as bilingual education is costly. The results are positive in terms of reducing repetition and dropout rates; increasing promotion rates; raising academic achievements in subjects such as reading, writing, math and learning Spanish. But the differences between those in bilingual programs and those not in bilingual programs are, in most cases, slight. For example, students in bilingual schools outperform students in regular schools by only a few percentage points. In other words, the costs of bilingual education may be high, but the benefits are positive and small.

Does it follow, then, that such compensatory programs can only be justified on equity grounds? In terms of cost-benefit analysis, and given the short time line of benefits (that is, results occur while the child is still in school), the answer would have to be in the affirmative. But if the benefits of schooling accrue over a long period of time beyond the first years of primary school—where the

program effects of most bilingual schools occur—then bilingual schooling may have positive efficiency gains.

Research has shown that increasing the human capital of indigenous people dramatically increases their earnings and significantly reduces the earnings disadvantage of indigenous workers vis-a-vis nonindigenous workers. Much of the inter-ethnic earnings differential is due to lower human capital endowments among indigenous people (Psacharopoulos and Patrinos, 1994). The equalization of human capital and other productive characteristics would result in a significant reduction in socioeconomic inequalities. The statistical decomposition of the earnings differential between indigenous and nonindigenous workers in Guatemala, for example, shows that the portion of the overall earnings differential due to disparities in the productive characteristics of indigenous and nonindigenous working males is about 50 percent. In other words, based on observed characteristics, the earnings differential between indigenous and nonindigenous workers would narrow by at least 50 percent if each group were endowed with the same measured productive characteristics. The remaining 50 percent difference in earnings is "unexplained," and reflects both measurement error and unaccounted factors such as disparities in ability, quality of education, past labor force participation, culture and labor market discrimination.

Language Capital

Bilingual education results in the accumulation of human capital, no doubt, and this goes a long way towards increasing earnings and decreasing the earnings differential. But if bilingual education leads to a further increase in educational attainment, then it is all the more important. In Guatemala,

bilingual education is available for only the first four years of schooling. Beyond that students enroll in regular, Spanish-only schools. The better they perform in bilingual schools, the more schooling they will attain; the more schooling they attain, the higher their earnings will be and so on. From the economics literature it is known that dominant language skills are human capital (Chiswick and Miller, 1992; Robinson, 1988; Grenier and Vaillancourt, 1983; Chiswick, 1978). Language skills are an important form of human capital, satisfying the three basic requirements for human capital. These skills are embodied in the person, they are productive in the labor market and/or in consumption, and they are created at a sacrifice of time and out-of-pocket resources.

Language capital is the speaking, reading and writing skills in one or more languages. Language capital, particularly spoken language, is partially developed during the course of a child's maturation—for example, the development of speaking fluency in one's "mother tongue". Skills in one's "mother tongue" are acquired as young children. At this stage the investments are made largely by the parents or care-givers. This is a time in the life cycle when the human mind is especially efficient in creating language capital. Among school-age children, language capital is acquired when other forms of human capital (physical maturation, schooling) are being acquired. Thus, their acquisition of spoken language skills in the mother tongue seems almost effortless (Chiswick and Miller, 1995). Perhaps the most important language environment is in the home. Language skills emerge in large part through the linguistic interaction of those living together. With age, however, this facility appears to diminish. Important investments are made in school and elsewhere in developing further one's language capital in the mother tongue. For most minority groups, however, their mother tongue is not the majority or dominant language spoken in the country. An ethnic minority group member who does

not know the dominant language might find a language-minority enclave within which mother-tongue skills can be fruitfully used. A language-minority enclave may, however, limit training opportunities and job mobility and thereby limit earnings opportunities. Furthermore, greater dominant-language skills would enhance productivity in the enclave and the nonenclave labor market by increasing efficiency in job search and through greater productivity on the job. There is, therefore, a labor market incentive to acquire dominant-language skills (Chiswick, 1991).

Bilingual education not only reduces repetition and dropout, it also improves Spanish language proficiency. The better command of the Spanish language indigenous children posses after they have completed their studies in bilingual schools (up to grade 4), the better they will perform in the Spanish-only schools (beyond grade 4).

There are reasons to believe that the social returns to bilingual schooling are higher than the social returns to regular primary schooling for indigenous children. This, of course, is an empirical question. Significant efficiency gains can be estimated by using the differential repetition and dropout rates registered for the bilingual and control student groups and the differential unit cost data.

The objectives of this paper are to provide an estimate of the costs and benefits, albeit crude, of bilingual education in one developing, multilingual Latin American country with a large indigenous population. First, an overview of education indicators in Guatemala is given, followed by a brief review of bilingual education in the region.

Poor Schooling Indicators In Guatemala

All coverage and quality indicators are especially poor for the indigenous population, which, according to most sources, accounts for one-third to one-half of the total population of Guatemala. Among the various indigenous communities, the proportion of those groups that speaks its native languages ranges from 35 to 96 percent.

In addition to being the poorest segment of the Guatemalan population, indigenous people have less schooling on average than do nonindigenous people. The level of educational attainment of the average indigenous adult worker is only 1.6 years of schooling, compared to 5 years of schooling for the average nonindigenous adult worker. Indigenous children are less likely to be enrolled in school, more likely to be over-aged and to repeat grades, and more likely to dropout of primary school without achieving literacy. While two-thirds of nonindigenous children aged 10-12 years are enrolled in primary school, only about half of the indigenous children aged 10-12 years are enrolled. Indigenous people have lower educational levels than do nonindigenous people, 60 percent of all indigenous people have no education. For those who do have some education, the highest level achieved is primary schooling. Among indigenous people, males attain higher education levels than do females. Although half of all indigenous males have no education, three-fourths of indigenous females have no education. Among nonindigenous people, the levels of education are higher than for indigenous people and the profiles for males and females are more similar (Psacharopoulos and Patrinos, 1994).

The low levels of education are also reflected in the illiteracy rates for indigenous people. Overall, 60 percent of all indigenous people are illiterate compared to 24 percent of all nonindigenous

people. For both indigenous and nonindigenous people, the rural illiteracy rate is well above the urban illiteracy rate. Illiteracy rates for indigenous people are lowest among the young, probably representing increased access to schooling. However, even among the young, illiteracy rates for indigenous people are higher than the rates for nonindigenous people.

The Guatemalan education system is characterized by high rates of failure at all grade levels, accompanied by grade repetition. 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 and Wolff, 1992), although higher in rural areas. Research shows that indigenous children are more likely to be over-aged in primary schools and to repeat grades (Patrinos and Psacharopoulos, 1996).

Language skills are very important in Guatemala, a country with many languages (at least 25), but where Spanish is the dominant language, or language of business. Knowing Spanish is key for access to jobs, further schooling and higher incomes. Economic well-being is dependent upon knowing Spanish. The point, however, is how are Spanish language skills attained most effectively and efficiently in Guatemala? Through expansion of regular Spanish-only schools? Or through innovative, compensatory bilingual schools that allow the pupil to use their mother tongue in the early years of primary schooling as a means of facilitating acquisition of the dominant language?

A number of studies show that investments in schooling, especially at the lower level, are a very good investment, both for the individual and for society (for a review and new analysis, see Patrinos and Velez, 1994). The most profitable investment is primary education, both for the

individual (private returns) and for society (social returns). The social returns for primary schooling are 19 percent, compared with 18 percent for secondary schooling and 10 percent for higher education (Psacharopoulos and Ng, 1994).

Bilingual Education in Latin America

Decades of research show that bilingual education has met with success in Latin America (Dutcher and Tucker, 1994). The bilingual approach produces better results in tests of reading comprehension. That is, reading comprehension is greater for those students taught in bilingual schools where they first learn to read in their native language and then transfer their reading skill to the second language: Spanish. Children in monolingual Spanish schools learned to read in their second language as they were learning to use their second language. This double burden is probably what accounts for their poorer performance in reading tests. Some advocate instructing students in their first language because the literacy skills acquired in one language can be transferred to other languages and developing these skills is easiest in the student's mother tongue. Others argue that teaching students in their first language places them at a disadvantage for further educational opportunities. It is not entirely clear whether indigenous children, located mainly in rural areas, are disadvantaged educationally because of the language of instruction or because of insufficient investment in physical facilities in school classrooms.

In Haiti, Creole-speaking students in both public and private schools who learned in their first language (Creole) for the first four years acquired about as much knowledge in the second language (French) as those who had been exposed only to the second language. In Nigeria, Yoruba-speaking

students in grades 1-6 in their first language outperformed their peers who had been learning in only grades 1-3 in that first language on all tests of achievement in the second language (English). In the Philippines, Tagalog-speaking students outperformed in the two languages of the bilingual education policy (Tagalog and English) those students who did not speak Tagalog in their homes. In Canada, students from the English-speaking majority language group in bilingual immersion programs outperform their peers in traditional programs in the learning of the second language (French). In the United States, Navajo students learning throughout their primary school in their first language (Navajo) as well as their second language (English) outperformed their Navajo-speaking peers who were educated only in English (Dutcher and Tucker, 1994; see also Dutcher, 1982).

Comprehensive View: *Pronebi*, Guatemala

Drawing on the success of a program employing bilingual promoters in 1965 during the *castellanizacion* campaign Guatemala established a national bilingual education system (Morren, 1988). Since 1979, the government of Guatemala and the United States Agency for International Development (USAID) have been working together to improve the quality of education for the indigenous population. The national curriculum was adapted and translated for the preprimary through grade four levels into four of the Mayan languages. The government instituted the use of the Mayan language in primary education and a national bilingual education program (*PRONEBI*) was created. Culturally relevant instruction in Spanish and Mayan languages is provided. This program has led to an increase in student comprehension, and has reduced failure, repetition and dropout rates.

The success of *PRONEBI* can be judged from the indicators derived from the evaluations. Attendance rates, dropouts rates and promotions have improved, compared to a control group of Mayan children being taught only in Spanish. The bilingual education project has had a significant impact on promotion rates, more than 9 percent higher for bilingual students relative to the control group in the first grade in 1983 (Townsend and Newman, 1985). *PRONEBI* students receive higher scores on all subject matters, including mastery of Spanish (Morren, 1988). Bilingual education also has the support of the parents of the indigenous children (Richards and Richards, 1990).

In an analysis of 1986 *PRONEBI* data from 297 communities and from a questionnaire administered to the same communities, Carvajal and Morris (1989/1990) find sizable differences among indigenous groups with respect to grade repetition and dropout, ranging from 30 to 46 percent repetition rates, and 6 to 16 percent dropout rates. The authors attempt to explain the differences with the use of community socioeconomic characteristics and differences among indigenous groups. They find that bilingualism reduces grade repetition and drop out rates (see also Carvajal, Morris and Davenport, 1993).

In another evaluation, second grade students in *PRONEBI* and control group schools were tested in a number of subjects. *PRONEBI* schools were divided into "complete" and "partial" schools samples. Complete refers to schools where the promoter and the teachers in the first and second grade are bilingual, the teachers have received training in the *PRONEBI* program, the schools have received *PRONEBI* textbooks and materials for preprimary to the second grade, the *PRONEBI* materials are applied regularly, and where the promoter and teachers of first and second grade accept the philosophy and methodology of *PRONEBI* and apply it conscientiously. Students were tested in mathematics,

Spanish language, science, Mayan language, and mathematics in the Mayan language. All tests, except in the Mayan language, were based on the national curriculum. The results are significantly different in all cases except in Spanish language. The conclusion is that the best results were achieved by students in complete *PRONEBI* schools. The implication, therefore, is that a complete *PRONEBI* curriculum is necessary for the best learning results. The incomplete use of *PRONEBI* leads to lower results (see Table 1).

Table 1: Achievement Scores of *PRONEBI* and Control Group Students, Second Grade, 1987

Subject	Schools	Students	Score (s.d.)
		PRONEBI "Complete"	
Mathematics	14	117	45.6 (14.3)
Spanish	18	231	32.4 (14.2)
Science	7	36	80.7 (14.0)
Mayan	15	165	46.6 (21.4)
Mayan Math	12	174	37.2 (18.5)
		PRONEBI "Partial"	
Mathematics	15	166	33.5 (15.9)
Spanish	22	263	31.7 (14.6)
Science	6	51	24.1 (14.7)
Mayan	16	155	36.4 (14.6)
Mayan Math	8	133	22.2 (12.1)
		Control Group	
Mathematics	28	292	40.1 (17.7)
Spanish	15	215	35.4 (16.5)
Science	16	108	36.3 (23.2)

Source: Scott and Simón Chuta, n.d.

An evaluation of USAID's (1993) Rural Primary Education Improvement Project (1984-1990), designed to provide relevant bilingual education to the indigenous children of the Guatemalan highlands and the creation of permanent capability in the Ministry of Education was recently evaluated. In terms of repetition, dropout and promotion rates, indigenous boys in *PRONEBI* schools perform as well as boys in non-*PRONEBI* schools. Indigenous girls in *PRONEBI* schools, however, perform better than do non-*PRONEBI* girls. But for both boys and girls in *PRONEBI* schools performance improved over time (1986-1991). In almost all cases the boys do better than girls. In terms of academic achievement, in seven of eight measures, *PRONEBI* students performed better than did non-*PRONEBI* students. One possible reason for this is that *PRONEBI* teachers spend more time with their students. Somewhat counterintuitively proficiency in Spanish among students is often better in *PRONEBI* schools.

Effective teaching materials have been developed for the bilingual schools. The teachers are adequately trained. Perhaps most important, the parents' attitudes are favorable, and although comments vary by community, they are positively related to their child's performance in Spanish. In other words, the parents support bilingual education as long as it does actually lead to fluency in the Spanish language.

In 1991, there were 96,194 indigenous children enrolled in *PRONEBI* schools. And there were 653,413 rural indigenous children in the primary school age category (5-14 years). The proportion in *PRONEBI* schools, therefore, was 14.7 percent, but only 239,249 indigenous children were actually enrolled in school. Therefore, *PRONEBI*'s coverage is actually 39 percent of available students.

Thus, there is considerable scope for expansion. First, *PRONEBI* could expand by taking the "incomplete" schools to a "complete" curriculum; at present, there are 400 schools that do not provide the full preschool to grade 4 *PRONEBI* curriculum. Second, *PRONEBI* could expand further into the communities using the four main languages; at present, *PRONEBI* only covers 20 percent of the communities where the four largest Mayan languages are spoken. Third, *PRONEBI* could expand into the next four largest indigenous languages; this would slightly increase their potential coverage of the indigenous population. The question remains whether it is a good social investment to expand the *PRONEBI* model.

Costs and Benefits

Using estimates of repetition and dropout rates and associated costs by curriculum type (*PRONEBI* and traditional schools), one can simulate the efficiency gains associated with a shift to bilingual schooling in Guatemala. Simulated cost savings as a result of reduced repetition due to *PRONEBI* are significant. Higher quality of education generating higher promotion rates will probably help students to complete the primary education cycle before dropping out, and will substantially increase total educational levels at a lower cost.

Given the current repetition rates, estimated at 47 percent for traditional schools and 25 percent for *PRONEBI* schools, unit costs by curriculum, and the number of indigenous students in 1991, both in traditional and PRONEBI schools, one can derive the number of repeaters and the total cost of repetition. This is provided in Table 2. Further, the simulated cost savings can be derived as:

$$C' = (N_T * r_P) UC_P$$

where C' represents the simulated costs of repetition associated with providing the PRONEBI education, with its associated repetition rate, r_P, to the students currently in the traditional schools, N_T, at the unit cost associated with PRONEBI schools. The result is a considerable cost saving, at over 31 million *quetzales* (US$5 million). The cost savings are equivalent to the cost of providing primary education to about 100,000 students annually.

TABLE 2: Simulated Cost Savings as a Result of Reduced Repetition Due to *PRONEBI*

		A	B
		PRONEBI	Traditional
1	Repetition Rates (1991)	.25	.47
2	Annual Unit Costs (*quetzales*)	246	235
3	Number of Indigenous Students (1991)	96,194	653,413
4	Number of Repeaters (1*3)	24,049	307,104
5	Total Cost of Repetition (2*4) (*quetzales*)	5,916,054	71,464,440
6	Simulated Cost of Repetition if *PRONEBI* Rate and Cost Structure Prevailed (3B*1A*2A) (*quetzales*)	-------	40,184,900
7	Simulated Savings due to *PRONEBI* (5B-6B) (*quetzales*)	-------	31,279,540

Sources: Repetition rates: Ministerio de Educacion, *PRONEBI en Cifras* and Schiefelbein and Wolff 1992. Unit Costs: Dutcher, 1994 and Haeussler, 1993. Number of students: USAID, 1993.
Note: 1 *quetzales* = US$5.6

Another simulation provides estimates of the private benefit associated with PRONEBI. This time the reduction in dropout and its effect on personal earnings is estimated. Given data on the

number of first grade students in primary schools by curriculum type, the associated dropout rates, which are slightly lower for PRONEBI schools at 13 versus 16 percent, one can derive the total number of dropouts associated with PRONEBI and traditional schools. Beyond being a waste for the education system, dropouts realize much lower earnings in the labor market. Assuming that there were fewer dropouts, but that they completed their schooling after the next year, these individuals would increase their labor market earnings by the average amount associated with an extra year of schooling (Patrinos and Velez, 1994). Estimates show that dropouts would decrease by 3,927 if the traditional school students had received a PRONEBI education for one year. Individual earnings would increase by an average amount of 186 *quetzales* (see Table 3).

TABLE 3: Simulated Benefits of Reduced Dropout Rates Due to *PRONEBI*

		A	B
		PRONEBI	Traditional
1	Number of Students (1991)	19,243	130,905
2	Dropout Rates (1991)	.13	.16
3	Number of Dropouts (1*2)	2,502	20,945
4	Simulated Decrease in Dropouts if *PRONEBI* rates prevail (3B-(2A*1B))		3,927
5	Incremental Earnings Associated with Extra Year of Schooling (1989) (*quetzales*)		186
6	Simulated Combined Annual Incremental Earnings due to *PRONEBI* (5B*4B) (quetzales)		730,422

Sources: Number of students: Ministerio de Educacion, *PRONEBI en Cifras*. Dropout rates: USAID, 1993. Incremental earnings: Patrinos and Velez, 1994.

Conclusion

The benefits of compensatory bilingual education for a disadvantaged, poor indigenous population as an investment in human capital is significant. Students of bilingual schools have higher attendance and promotion rates and lower repetition and dropout rates. A very important finding is that bilingual students receive higher scores on all subject matters, including mastery of Spanish. Therefore, bilingual education increases Spanish language proficiency, which in turn leads to an increase in the average educational attainment of Guatemala's large indigenous population.

Bilingual education in Guatemala is an efficient public investment. This is confirmed by a crude cost-benefit exercise. A shift to bilingual schooling in Guatemala would result in considerable cost savings as a result of reduced repetition. The higher quality of education generating higher promotion rates will probably help students to complete the primary education cycle, and will substantially increase total educational levels at a lower cost. The costs saving due to bilingual education is estimated at over 31 million *quetzales* (US$5 million). The cost savings are equivalent to the cost of providing primary education to about 100,000 students per year. A reduction in dropout and its effect on personal earnings is estimated as an increase in individual earnings of an average amount of 186 *quetzales*.

There are some caveats. The expansion of PRONEBI assumes a constant cost structure. However, expansion of PRONEBI means going deeper and deeper into remote rural communities to reach smaller and smaller catchment groups. This will lead to higher costs. The expansion into more Mayan languages will increase costs for teacher training and textbook production with less and less

potential for scale economies. But the efficiency savings can, to some extent, absorb the costs of further expansion.

Further expansion will also mean higher achievement levels and less dropout and repetition. This will require more secondary school places, which will require further resources. However, given the high returns (private and public) to schooling at the secondary level, the possibility of tapping into private sources given the demonstrated willingness to pay, and the low secondary enrollment levels (less than 20 percent), it would be a good investment for the public sector.

There is a need to further investigate the costs and benefits of bilingual education, both through more in-depth country studies and by looking at more countries. In order to investigate the long term effects of bilingual education one needs to conduct tracer studies of graduates of bilingual schools and compare to indigenous and nonindigenous children studying in traditional schools. There is a need to investigate the long term impacts of bilingual schooling on learning and earnings impacts. Another research question is whether parents learn Spanish more readily if their children attend bilingual schools rather than an immersion language program.

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