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Bolivia

Basic Education in Bolivia

Challenges for 2006–2010

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US\$1 = Bolivianos (Bs.) 7.99 (Exchange rate as of October 16, 2006)

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ACRONYMS AND ABBREVIATIONS

| | |
|--------------|---|
| CEPO | Indigenous Peoples Education Councils / <i>Consejos Educativos de Pueblos Originarios</i> |
| CEUB | Bolivian University Executive Committee / <i>Comité Ejecutivo de la Universidad Boliviana</i> |
| CONED | National Educational Council / <i>Consejo Nacional de Educación</i> |
| DHS | Demographic and Health Survey |
| EDSTATS | Education Statistics |
| EFA | Education for All Initiative |
| EIB | Intercultural Bilingual Education / <i>Educación Intercultural Bilingüe</i> |
| FPS | National Social Investment Fund / <i>Fondo Nacional de Inversión Productiva y Social</i> |
| GIS | Geographical Information System |
| GDP | Gross Domestic Product |
| GNI | Gross National Income |
| GTZ | German Technical Cooperation Agency / <i>Deutsche Gesellschaft für Technische Zusammenarbeit</i> |
| IAEP | International Assessment of Educational Progress |
| HIPC | Heavily Indebted Poor Countries Initiative |
| IAD | Incentive for Teacher Improvement / <i>Incentivo a la Actualización Docente</i> |
| ICE | Collective School Incentive / <i>Incentivo Colectivo a las Escuelas</i> |
| IDA | International Development Association |
| IMB | Bilingual Education Incentive / <i>Incentivo a la Modalidad Bilingüe</i> |
| INEP | National Institute for Education Studies and Research, Brazil / <i>Instituto Nacional de Estudos e Pesquisas Educacionais</i> |
| INS | Teacher Training Institutes / <i>Institutos Normales Superiores</i> |
| IP | Incentive for (Urban) Permanence / <i>Incentivo a la Permanencia</i> |
| IPR | Incentive for Rural Permanence / <i>Incentivo a la Permanencia en el Área Rural</i> |
| LLECE | Latin American Laboratory for Quality of Education Evaluation / <i>Laboratorio Latinoamericano de Evaluación de Calidad de la Educación</i> |
| MDG | Millennium Development Goals |
| MECOVI | Living Standards Measurement Survey / <i>Encuesta de Medición de las Condiciones de Vida</i> |
| MOE | Ministry of Education |
| MOF | Ministry of Finance |
| NBI | Unmet Basic Needs Index / <i>Necesidades Básicas Insatisfechas</i> |
| OECD | Organization for Economic Co-operation and Development |
| NER | Net Enrollment Ratio |
| PEI | Indigenous Education Project / <i>Proyecto Educativo Indígena</i> |
| PEN | Nucleus Education Project / <i>Proyecto Educativo de Núcleo</i> |
| PER | Network Education Project / <i>Proyecto Educativo de Red</i> |
| PIDI | Integral Childhood Development Program / <i>Programa Integral de Desarrollo Infantil</i> |
| PINS | Teacher Training School Transformation Project / <i>Proyecto de Institutos Normales Superiores</i> |
| PISA | Program for International Student Assessment |
| PNC | National Compensation Policy / <i>Política Nacional de Compensación</i> |
| PPP | Purchasing Power Parity |
| PROEIB Andes | Graduate program in bilingual studies / <i>Programa de Formación en Educación Intercultural Bilingüe para los países Andinos</i> |
| PROME | Municipal Education Projects / <i>Proyectos Educativos Municipales</i> |
| RDA | Administrative and Teaching Registry / <i>Registro Docente Administrativo</i> |
| SEDUCA | Departmental Education Service / <i>Servicio Departamental de Educación</i> |
| SEN | National Education System / <i>Sistema de Educación Nacional</i> |
| SIE | Education Information System / <i>Sistema de Información Educativo</i> |
| SIMECAL | Learning Assessment System / <i>Sistema de Medición de la Calidad</i> |
| SIP | Sociedad de Instrucción Primaria of Santiago |
| STR | Student Teacher Ratio |
| TGN | National Treasury / <i>Tesoro General de la Nación</i> |
| TIMSS | Trends in International Mathematics and Science Study |
| UMSS | San Simon University in Cochabamba / <i>Universidad Mayor de San Simón</i> |

UNESCO
UPF
WDI

United Nations Educational, Scientific and Cultural Organization
Fiscal Programming Unit / *Unidad de Programación Fiscal*
World Development Indicators

| | |
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BOLIVIA

BASIC EDUCATION IN BOLIVIA: CHALLENGES FOR 2006-2010

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EXECUTIVE SUMMARY

Bolivia, the poorest country in Latin America, has made great strides in expanding its education system over the past decade, and this is reflected in the educational attainment of the population. The average years of schooling have increased from 4.4 percent in 1992 to 7.9 in 2001. However, while education coverage has increased over time, universal coverage remains a challenge, especially among disadvantaged groups, whose dropout rates and repetition rates remain high and access to secondary education is critically low. Bolivia faces a serious set of challenges, including: low and inequitable access to upper grades of primary and secondary education; low quality of education, and thus, low levels of academic achievement; and an inefficient system. The critically low enrollment rates at the secondary level translate into large skill gaps in the Bolivian labor force, insufficient numbers of highly-trained individuals, and, ultimately, present significant barriers for achieving a sustained growth path in the near future.

Inequitable access to upper primary and secondary. Although access to schooling as measured by enrollment rates has become universal up to age 11 or 12, past that age, considerable gaps open up between indigenous and non-indigenous students, rural and urban, and rich and poor students. The decline in enrollment after age 12 is attributed to a variety of factors. The first and most obvious is lack of supply of schooling. Labor market participation is another factor keeping children out of school.

Low and uneven quality of education. Results from Bolivia's 1998 national exams for eighth graders reveal low quality of education: only half of the students achieve passing results in reading and less than one third achieve passing results in math. Analysis of the scores reveals large differences in learning achievement between children from lower and upper income percentiles. Secondary schools are characterized by outdated curricula and pedagogical materials, inadequate infrastructure, conventional teaching techniques with very limited pedagogic resources, and imbalanced classroom sizes (overcrowded classrooms in some schools and low student: teacher ratios in others). Moreover, the teaching force is unequipped and largely untrained. In addition, the returns to schooling for upper primary and secondary education are much lower than those for lower primary or higher education. Clearly, improving the quality of education is critical.

Inefficient education system. Despite the fact that a high share of GDP is invested in education, Bolivia is failing to produce the educated citizens and productive workers it needs to compete in the global economy. In 2002, education spending constituted 6.8 percent of GDP- exceeding what is spent by most of Bolivia's neighbors such as Ecuador (2.6 percent), Peru (3.3 percent), or Brazil (5.6 percent). However, resources are not allocated in an efficient manner that would improve learning outcomes. Indeed, spending on education materials is low and the share of administrative expenditures in the budget is exceedingly high. Many schools in Bolivia have significant shortages of basic learning supplies such as paper, pencil, and chalk since neither the directors nor the mayors accept responsibility for their provision. Moreover, infrastructure investments are not aligned

with pedagogical investments. And finally, the most serious problem facing Bolivia's education system today is the lack of transparent and objective criteria for the allocation of teachers, a process that is complicated by the division of decision-making among the different levels of education administration.

In order to accelerate human capital development in Bolivia, it will be important for the government to give priority to education by improving the quality and coverage of education and increasing the efficient and equitable use of resources allocated to the sector. Moreover, measures need to be taken to ensure secondary school enrollment and completion. To get more children in school, supply-side measures must be accompanied by demand-side financing interventions that will address short term poverty and ensure that children enroll and complete their basic education. Improving decentralization arrangements can also help in increasing the efficiency and effectiveness of the education system.

INTRODUCTION

The main objective of this report is to provide an update of the education situation in Bolivia, identify the challenges facing the Bolivian education system today, and present possible options to respond to the situation. Bolivia has made significant progress in expanding access to education. The primary net enrollment rate in Bolivia is 97 percent, and about 95 percent of children aged 7 to 14 are currently enrolled in schools, placing Bolivia on par with wealthier neighbors such as Brazil or Peru. Other countries with similar GDP per capita, such as Guatemala or Honduras, have considerably lower enrollment rates of 85 percent or less. In addition, primary dropout rates have fallen from 10 to 7 percent in rural areas and 10 to 6 percent in urban areas during the last six years. Repetition rates have equally been cut in half. Moreover, completion rates have increased from 56 percent in 1996 to 72 percent in 2001 and are estimated to reach 85 percent by 2010, placing Bolivia on track to achieve the Millennium Development Goal (MDG) of Universal Primary Completion.

However, while education coverage has increased over time, Bolivia still faces considerable challenges for its education system to improve. Universal coverage remains a challenge especially among disadvantaged groups, whose dropout rates and repetition rates remain high and access to secondary education are critically low. In contrast with high enrollments for primary education, as recent as 2001, net enrollment in secondary was only 51 percent. In addition, the quality of education has not kept pace as evidenced by Bolivia's participation in both national (SIMECAL) and international assessments (*Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación*). While Educational spending has been steadily climbing since 1995 from 5.3 percent to 6.8 percent of GDP, resources are not allocated in an efficient manner that would improve learning outcomes.

1. DESCRIPTION OF THE EDUCATION SECTOR

EDUCATION COVERAGE

1.1 Bolivia's National Educational System is composed of a formal and a non-formal sector. The non-formal system covers adult and special education. Formal education is divided into four cycles: initial, primary, secondary, and higher education. Initial, or preschool, education begins at age 5. Primary education, covering eight years of schooling is compulsory for children six to thirteen years of age. It is subdivided into three cycles: grades one through three, grades four to six, and grades seven and eight. Secondary education, subdivided into two cycles of two years each (grades 9 to 10 and 11 to 12), is offered to students fifteen to eighteen years of age.

1.2 During the 2002 school year, the education system provided services for an estimated 3,052,530 students (Table 1.1). The vast majority (86 percent) of students were enrolled in initial, primary and secondary education (*educación escolarizada*), 62 percent alone in primary. Higher and adult education account for 10 and 4 percent of enrollment, respectively. Special education enrollment is negligible.

Table 1.1: Enrollment by Levels in 2002

| Level | Enrollment | Percent of Total |
|----------------------|------------|------------------|
| Basic Education | 2,634,436 | 86% |
| Initial | 222,313 | 7% |
| Primary | 1,877,536 | 62% |
| Secondary | 534,587 | 18% |
| Higher Education | 290,423 | 10% |
| Non-formal Education | 127,671 | 4% |
| Adult education | 120,780 | 4% |
| Special education | 6,891 | 0% |
| TOTAL | 3,052,530 | 100.0% |

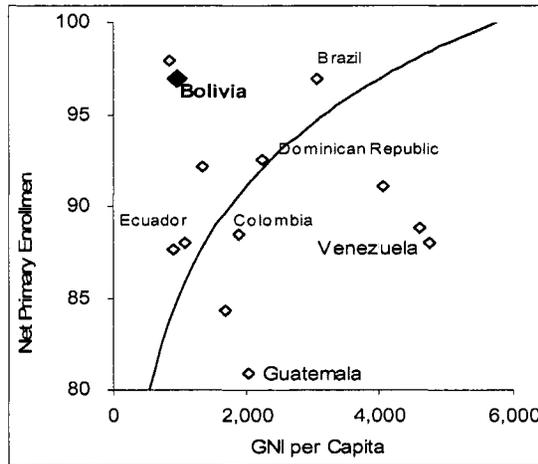
Source: Ministry of Education.

1.3 Formal education is far from achieving universal access. Initial education in Bolivia is both under-funded and inaccessible to the majority of children. Preschool enrollment among 5 to 6 year-olds is close to 30 percent and only 10 percent for 3 to 4 year-olds. Unfortunately, those who have the least access to preschool are exactly those who are most in need of its benefits. The rural and poor populations are particularly underserved. While 32 percent of urban 5 and 6 year-olds are in preschool, only 24 percent of their rural counterparts are in preschool. And 34 percent of 5 and 6 year-olds from non-poor households go to preschool, compared to only 27 percent of the poor.

1.4 The expansion of education during 1990's has helped the country reach important goals including high primary enrollment and completion rates, though much remains to be done to improve access to secondary school. Bolivia has a 97 percent net enrollment rate, placing it above Venezuela and the Dominican Republic and close to Brazil-all countries whose GNI per capita is much higher (Figure 1.1). In contrast, secondary

education in Bolivia is characterized by low and unequal access, especially for disadvantaged groups, and poor quality.

Figure 1.1: Enrollment Rates and GNI per Capita

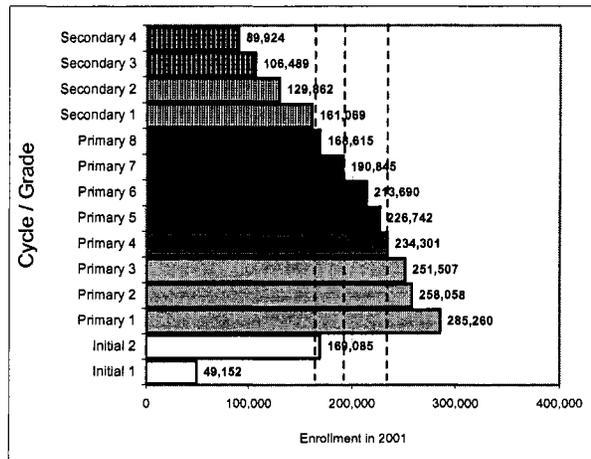


Source: Edstats. UNICEF, LLECE/OREALC.

1.5 Secondary education is comprised of four years and offered to students 14 to 18 years who have completed primary school. As recent as 2001, net enrollment in secondary was only 51 percent.

1.6 As Figure 1.2 shows, the vast majority of enrollment in non-higher education is at the primary level, particularly in the first three grades. In contrast to 300 thousand students in the first grade of primary, there are only 89 thousand students in the final grade of secondary school. The dashed lines show the size of the 1994, 1987, and 1983 cohorts, which should be in first grade, end of primary, and end of secondary, respectively. These figures show an excess of 63 thousand (22%) children in grade one and shortfall of 18 and 72 thousand children (11% and 81%) at the end of primary and secondary, respectively.

Figure 1.2: Enrollments by Grade

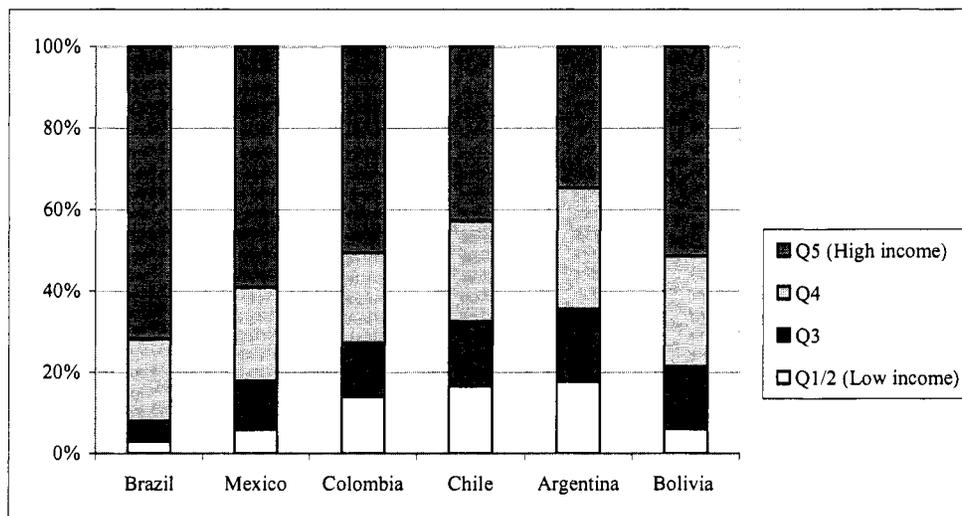


Source: Ministry of Education.

1.7 An alternative model within the formal sector is multi-grade education. Multi-grade schools are schools in rural areas where there are not enough students to justify a teacher for each grade. Students studying in these schools are assigned to a grade level, but study in classrooms together with students in other grade levels. About 60 percent of Bolivia's 14,827 schools are multi-grade and 31 percent of these are single-classroom schools. About 26 percent of Bolivia's primary school students study in multi-grade schools. Given the percentage of the Bolivian population living in rural areas, these figures are not surprising.¹

1.8 Gross tertiary enrollment is relatively high at 33 percent, much higher than university enrollment in Brazil and Jamaica (14 percent each) and almost as high as university enrollment in Argentina (36 percent) and Chile (37 percent). However, equitable access is a problem: over half of tertiary enrollment is captured by the richest 25 percent of the population, compared to less than 10 percent for the poorest 25 percent (Figure 1.3). In addition, the system is characterized by low quality and internal efficiency.

Figure 1.3: Access to Higher Education by Quintiles



Source: Household surveys.

¹ Traditionally, multigrade schools have been regarded by policy makers as being unable to provide children with the same quality of education as larger schools where children are separated into single grades. More recent work suggests that the performance of multigrade schools may be largely due to lack of adequate adaptation of teaching methods to the multigrade setting. When appropriate teaching methods are developed and used, as in the case of *Escuela Nueva* in Colombia, multigrade schools may outperform their urban counterparts. In Bolivia, the official methodology for multigrade teaching follows that of *Escuela Nueva*. However, multigrade teaching has not been given the attention that, for example, bilingual education has been given, and leaves room for improvement. Furthermore, the relations between multigrade schools and bilingual education have not been adequately explored. Further information on effectiveness of multigrade teaching can be found in McEwan (1998) and Psacharopoulos, Rojas and Velez (1993).

ADMINISTRATIVE ORGANIZATION

1.9 After the adoption of the Popular Participation Law in 1994, the education sector in Bolivia has become gradually more decentralized. The delivery of education in Bolivia is covered by several different levels of administration: the Ministry of Education, nine departmental level education ministries, called SEDUCAs (*Servicio Departamental de Educación*), 327 municipalities, and 275 school districts.

1.10 *Ministry of Education.* The central Ministry of Education has a technically competent and permanent technical team; but its sustainability is at risk because many of these technicians are not financed by the state. There is a good information system at the national level. The curricular approaches and materials are adequate. The main responsibilities of the Ministry of Education at the central level include: budget allocation to departments, monitoring and evaluation, and planning.

1.11 *SEDUCAs.* The internal organization of the Ministry of Education mirrors that of the Bolivian state. In addition to the Ministry of Education at the central level, there are nine deconcentrated units, called SEDUCAs (*Servicio Departamental de Educación*), which coincide with the nine departments. The SEDUCAs are hybrid organizations; they simultaneously report to the Departmental Prefect and to the Ministry of Education. The SEDUCAs have become highly political and partisan institutions and have a low level of administrative and technical competence. This lack of competence is most apparent in the poor distribution of teachers among districts. The SEDUCAs are responsible for allocating teachers among districts.² At the district level, the process is less partisan, but low technical capacity and local politics often make for ineffective teacher allocation also within districts. The selection of individuals to fill each position is also left to the decentralized units following national law.

1.12 *Municipalities.* With their varied source of income—from own taxes, revenue-sharing and HIPC resources—municipalities are responsible for providing educational infrastructure and supplies. However, decisions relative to education are still centralized, with 89 percent of the education budget still allocated by the central government. Municipalities spend most of their resources (81 percent) on physical infrastructure and only 19 percent on pedagogical materials or training. Municipal mayors are now responsible for provision of educational infrastructure and the consequence is that there is some overlap of power between the mayor and the district director. They are also responsible for school maintenance and provision of basic necessities such as electricity, and water.

1.13 *Districts.* Most of the day-to-day administration is done at the Educational District level, which are headed by district directors. Under the Educational District are the Education Nuclei, which consist of groups of six to nine schools that share resources.³

² As opposed to the central Ministry, the SEDUCAs do not have optimization models and generally do not assign teachers based on empirical data. SEDUCA heads have until recently been chosen by departmental prefects, which are highly political and partisan, non-elected, posts. While the selection process for SEDUCAs has recently been changed to merit, they are still staffed by a mix of individuals chosen basically through political connections. Because of this, teaching posts are frequently also assigned to districts by a largely political process.

³ Urban nuclei are called *redes* (networks).

Nuclei often have a core school with a pedagogical resource center to support the other schools. Educational districts usually coincide with municipalities, but there are 327 municipalities and only 275 districts, as smaller municipalities are sometimes grouped together into one educational district. The district director is responsible for basic functions such as distributing textbooks and pedagogical materials (provided by the center), selecting of school directors based on competency tests, and assigning teachers among schools.

INSTITUTIONAL DEVELOPMENT

1.14 Information Systems. The MOE benefits from well-functioning and useful information systems. The *Sistema de Información Educativa* (SIE) is an accurate and timely system for providing basic statistics on enrollment, physical characteristics of schools, characteristics of teachers, and diverse administrative data. SIE data is used regularly by the analysis unit to make enrollment projections, teacher surplus or deficit calculations, and various other calculations. MOE administrative systems are also adequate and teachers are paid in a timely fashion. The MOE knows, in theory, in which school each teacher is working and what materials each school has received. Of course, these information systems can be improved. The SIE suffers from all the inaccuracies of an information system that is not child-based⁴. Flow statistics are poor at the school level and the system does not provide basic information such as a child's age and ethnicity. In addition, the different information systems are not well integrated. Although teachers and schools have unique identifiers that can be used to combine the data, this is not easily done and usually requires hiring of an external consultant. Anecdotal evidence points to high reliability of enrollment data but less reliability of data in areas such as de facto teacher allocation and school material distribution.

1.15 Learning Assessment. Bolivia established a comprehensive evaluation system, SIMECAL, with the original idea of making systematic use of available information. Methodologically, SIMECAL ranks among the best international learning assessment systems. It is based on Item Response Theory with endogenously developed test items that reflect Bolivia's cultural values. It has developed tests in language and mathematics in both Spanish and indigenous languages, a feat few other Latin American assessment systems have matched. Because of their expertise, SIMECAL staff have designed and administered tests for other national institutions such as the Armed Forces and the Police Academy. Despite its technical excellence, limited budget has meant that testing has been conducted sporadically (1997, 1999, and 2000), each time in different grade levels,

⁴ The difficulties of calculating student flow rates arise from the fact that children are not individually counted in educational statistics. Educational statistics in Bolivia are classroom-based. In the presence of non-standard educational trajectories, such as cyclical dropout and re-entry patterns, "true" flow rates are impossible to calculate. Even when making certain strong hypotheses (in particular the hypothesis that once a child exits the educational system for more than one year, he or she never returns), the calculation of flow rates involves complex and imperfect statistical models. A solution to this problem is to base educational statistics on the most important unit of the educational system: the individual student. It has been argued that poor countries such as Bolivia cannot afford a child-based statistical system, but Peru, for example, has successfully experimented with the concept in selected rural regions. With the drop in data processing costs, statistical systems that follow children from grade to grade are increasingly feasible. Fundamentally, this type of system involves assigning each child an individual identification number and asking schools to report the ID numbers of enrolled students.

and only for small, though representative, samples. These characteristics limit the usefulness of findings and make rigorous comparisons difficult.

1.16 In addition, the establishment of SIMECAL as a semi-autonomous institution has prevented it from having the legitimacy of a fully independent institution and from being fully integrated into MOE's other information and planning systems. As a result, SIMECAL evaluations have not provided evaluative feedback in critical areas of interest to the MOE such as, pedagogy, teacher training, and curriculum. Of great concern is the fact that SIMECAL evaluations have not continued to take place. The last evaluation at the primary level took place in 2000. In August 2004, SIMECAL activities were suspended with the purpose of carrying out an assessment of the results and restructuring the process of evaluations.

1.17 Pedagogic Support to Teachers. Bolivia does not have an adequate pedagogic support system for teachers. Many approaches have been tried but none have proven wholly successful. Perhaps the most significant effort was the system of *asesoría pedagógica*—pedagogical advisory system— which operated officially from 1996 until April 2003. Later on, there was a reorganization of the pedagogic advisors within the Public Education Service, and in January 2004 the position of pedagogic advisor was eliminated.

1.18 Another attempt to improve classroom teaching was the *Incentivo a la Actualización Docente* (IAD). The IAD was a bonus of Bs. 2,400 (roughly US\$350) to teachers who successfully passed a level-specific test. This teacher incentive was also abandoned due to budgetary implications⁵, lack of support from the Ministry of Education and international donors, as well as some opposition from teacher unions to attempts at diversifying teacher pay according to measures of performance or achievement (Contreras and Talavera 2004).⁶

1.19 Today, district directors are expected to provide pedagogical support for teachers, but their administrative responsibilities do not allow them the time to fulfill this role. Interviews with district directors indicate that they are acutely aware of this problem but have no means of addressing it. All district directors interviewed stated that lack of pedagogical support for teachers was one of the main problems for achieving higher quality of education.

1.20 Initial Teacher Training. In Bolivia, teachers are trained in specialized institutes called *Institutos Normales Superiores* (INS). There are a total of 18 INS in Bolivia, 10 of which are run by universities and the remaining eight directly by the MOE. It is important to note that half of these institutes train teachers in Intercultural Bilingual Education (EIB). There has been a consistent effort to modernize and improve INS as education planners realize that it is easier to train new teachers than the ones that are already teaching. Rojas (2004) and others state that the INS are producing better trained teachers

⁵ The IAD represented 2 percent of the ministry's wage bill, almost twice the amount spent on IPR (*Incentivo a la Permanencia en el Area Rural*).

⁶ The *Incentivo Colectivo de Escuelas*, rewarding schools displaying good administration, cooperation and educational quality, was also abandoned after a short period of time. Finally, the IPR incentive lost much of its meaning when the IP (*incentivo de permanencia*) was introduced for urban teachers.

as measured by both standardized tests and classroom observation. The intake of the INS system varies from 2,000 to 6,000 students, and at any given time 4,000 to 10,000 are studying to become teachers with the number of teachers completing training at the normal schools varying from 1,000 to 4,000 per year. Since there are roughly 92,000 teachers in basic education in Bolivia, this means that the INS graduates represent 4 percent of the total teaching force per year. At this rate, the impact of improvements in initial teacher training will take some time to reach the classroom.

1.21 Bilingual Primary Education. Intercultural Bilingual Education (EIB) was institutionalized in 1994. This initiative has resulted in an unprecedented number of children receiving bilingual education (see Table 1.2). The bilingual approach consists of teaching children to read and write first in their native language, using this as a language of communication and in parallel introducing them to Spanish. In Bolivia, EIB schools offer grades 1 to 3 in the indigenous language with Spanish as a subject matter, grades 4 to 6 in both Spanish and the indigenous language, and grade 7 onwards in Spanish in principle with the indigenous language as a subject matter.

Table 1.2: EIB from 1997 to 2002

| Year | Schools | Students |
|------|---------|----------|
| 1997 | 1,074 | 24,231 |
| 1998 | 1,291 | 38,383 |
| 1999 | 1,823 | 57,776 |
| 2000 | 2,037 | 87,603 |
| 2001 | 2,725 | 114,868 |
| 2002 | 2,899 | 192,238 |

Source: Albó and Anaya (2003) and Nucinkis (2004).

1.22 Today, almost all one third of indigenous (Guaraní, Quechua and Aymara speaking) rural students are enrolled in bilingual education. In total, about 30 percent of rural schools are implementing the EIB approach. No other country in Latin America has come close to such achievements in access to bilingual education.

1.23 The MOE along with other organizations has introduced a variety of complementary measures in support of the EIB policy (see Box 1.1).

Box 1.1: Complementary Measures to Support EIB

Consejos Educativos de Pueblos Originarios (CEPOs). In addition to the pyramidal system of educational councils, explained below, in 1998, three *CEPOs* -transversal Indigenous Peoples Education Councils were created for the Aymara, Quechua, and Guaraní speakers and a fourth for speakers of other various Amazonian languages. These councils were chosen by their respective ethnic groups and today play an important role in civil society in support of bilingual education.

Proyecto de Institutos Normales Superiores-EIB (PINS-EIB). This was probably one of the most important actions of the Bolivian EIB policy. In some other countries where bilingual education is provided, bilingual teachers are usually teachers who happen to speak an indigenous language and are at best given a quick course on how to teach in a bilingual and intercultural setting. In contrast, Bolivia invested heavily in initial training of EIB teachers. Nine of Bolivia's 18 Superior Normal Institutes (teacher training institutes) train EIB teachers: two in Aymara-Castellano, three in Quechua-Castellano, one is a trilingual Quechua-Aymara-Castellano school, and one specialized in Guaraní and the other low land languages. Bolivia has a growing supply of teachers with three years of training in bilingual education. To date, more than 6000 teachers have graduated from EIB institutes and the pool of teachers is rapidly increasing, which will make it easier to scale up bilingual education.

Proyectos Educativos Indígenas (PEIs). A specific popular participation mechanism was set up in indigenous areas to allow indigenous educational projects to transcend municipal frontiers, and follow the distribution of a particular ethnic group.

Programa de Formación en Educación Intercultural Bilingüe para los países andinos (PROEIB Ande). In addition to EIB training at the higher education level, a graduate program in bilingual studies called PROEIB Andes was set up in Cochabamba in 1998. The program is the result of a joint effort between German Cooperation GTZ, the MOE, and the Universidad Mayor de San Simón (UMSS-Cochabamba). The two year masters program of PROEIB Andes has been attended by 50 students of 6 nationalities whose dissertations have been defended in the areas of bilingual educational planning and bilingual teacher training. The PROEIB Andes was fundamental in training many of the PINS-EIB teachers.

Standardized Testing in Indigenous Languages. Bolivia was the first Latin American nation to produce modern Item Response Theory learning assessments in indigenous languages. Evidently, tests in indigenous languages had been produced before, but the effort had never been made to evaluate EIB learning with instruments comparable to international assessments such as PISA or LLECE.

1.24 Rigorous evaluation of the impacts of EIB on student attainment has shown positive results⁷. If two otherwise identical groups of schools catering to identical student populations differ only in that one group applies the bilingual methodology and the other

⁷ More information on EIB and its impacts can also be found in Albó and Anaya (2003), Nucinkis (2004), and Landa and Jimenez (2004), among others.

does not, then any differences in the evolution of educational indicators will be due to EIB. For example, Sanjinez et al. (2005), using propensity score matching to generate EIB treatment and control groups of schools in rural indigenous areas and measure success using age-grade lag as their impact variable, find positive results for both Quechua and Aymara communities. However it is noteworthy that among these results, the data pertaining to the Quechua are the most reliable. The results (Table 1.3) show an important improvement in age-grade lag over a relatively short period (three years).

Table 1.3: Impact of EIB on Age Grade Lag

| | 1999 | 2002 | 2002-1999 |
|-----------------------------------|-------|-------|-----------|
| Highly Monolingual Quechua | | | |
| Treatment | 44.65 | 31.26 | -13.38 |
| Comparison | 45.53 | 38.94 | -6.59 |
| T - C | -0.89 | -7.68 | -6.79 |
| Low Monolingual Quechua | | | |
| Treatment | 22.78 | 16.05 | -6.74 |
| Comparison | 22.18 | 19.51 | -2.68 |
| T - C | 0.60 | -3.46 | -4.06 |

Note: Age Grade Lag in Percent of Children with Two or More Years of Lag.

1.25 Notwithstanding its many merits, several criticisms have been leveled against EIB. One is that implementation has been far from perfect. Pedagogic text production suffered from considerable delays. The learning modules for the second cycle (for grades four to six), crucial to the transition towards the last years of primary school, were not produced during the three years following the modules for the first cycle of the primary level. Due to implementation delays, the transition modules took longer and some cohorts of children that started with the EIB approach did not have pedagogic materials to continue with the EIB approach.

1.26 Another failure of bilingual education was that it was often applied against the wishes of parents and students. This created unnecessary resistance among those who were anxious to see their children learn Spanish and possibly excluded many who wanted the bilingual approach. One of the criticisms of EIB is that it has emphasized one aspect of bilingualism, but has done much less to develop interculturality. In addition, the emphasis has been in teaching native language speakers in their own language and later teaching them in Spanish, but no similar effort has been made to teach native languages to urban or Spanish speaking children (two-way approach).

POPULAR PARTICIPATION IN EDUCATION

1.27 Both the Education Reform and Popular Participation Laws of 1994 have resulted in a series of mechanisms for popular participation in educational decision-making. An educational council was created at each level of the educational system. The most basic of these mechanisms was the school council that includes parents involved in decision-making regarding the school and school nucleus. Additionally, there are municipal education councils, nine departmental education councils, four CEPOs (Indigenous

Peoples Education Councils to facilitate the participation of the major indigenous groups), as well as a national education council, the CONED (*Consejo Nacional de Educación*).

1.28 Although all these councils are legally established, many of them have been slow to function properly. As with most other aspects of the reform, these councils were implemented against teacher union wishes. While in some places, these councils are working well, in others, such as in the municipality of *El Alto*, the education councils have usurped functions which do not legally belong to them, such as assignment of students to schools. At the higher levels the councils have taken a long time to materialize because while MOE authorities saw them as desirable, the political environment was never entirely favorable. The CONED was the last council to be created and met for the first time in January 2004.

1.29 Perhaps the biggest challenge that has come from the creation of these councils is that they have added to the complicated relationships between all the various educational decision-making bodies and stakeholders in Bolivia. The plethora of councils that now exists alongside the various management authorities at the national, departmental, municipal, nucleus and school levels has, at times, generated further confusion, and considerable communication difficulties. In this context, *Proyectos Educativos*, (Education Projects) were developed to support decentralized management at the local level and also contribute to coordination among these levels. These Education Projects begin with School Plans or PEU (*Proyecto Educativo de Unidad Escolar*), which are in turn aggregated into PEN (*Proyecto Educativo de Núcleo* – in rural areas), PER (*Proyecto Educativo de Red* - in urban areas) or PEI (*Proyecto Educativo Indígena* – in indigenous districts), depending on which of these networks the school is a part of. These projects are then included in the Municipal Educational Plans or PROMEs (*Proyectos Municipales de Educación*) and thereby are officially acknowledged as a part of the municipal annual operational program. These projects and plans allow for both popular participation in educational decision making and facilitate the articulation of the different educational actors (See Table 1.4 for number of projects, schools, and students involved in this planning process in 2002). In total, 72 percent of Bolivian students were in schools that participated in this participatory planning process.

Table 1.4: Education Projects in 2002

| Type | Projects | Schools | Students |
|-------|----------|---------|-----------|
| PEN | 832 | 6,151 | 611,172 |
| PER | 143 | 1,271 | 600,758 |
| PEI | 31 | 314 | 19,986 |
| Total | 1,006 | 7,736 | 1,231,916 |

Source: Ministry of Education / UDI.

1.30 In addition these projects leverage resources as municipal, deconcentrated, and centralized funds can be combined. Municipal mayors, for example, contribute with resources from HIPC, their own taxes, and *co-participaciones*. Although the potential has not been fully used by the Ministry of Education, the educational projects remain a

promising instrument to improve educational planning at all levels and increase funding for education.

PUBLIC EXPENDITURE IN EDUCATION

1.31 Despite its low per capita Gross Domestic Product (GDP) and particularly its limited tax revenues, Bolivia has a large public sector. Total government expenditure averaged 30 percent of GDP between 1997 and 2003 and reached 34 percent in 2002. In 2002, these expenditures were undertaken with a tax base of merely 18 percent of GDP, leaving the remaining public sector expenditures (equivalent to 16 percent of GDP) to be financed by foreign assistance and increasing debt. This contrasts with other countries with similar or only slightly higher GDP per capita such as Ecuador, where public sector expenditures and tax revenues both represent 27 percent of GDP, and Guatemala, where public expenditure is 11 percent and tax revenues are 10 percent of GDP. The weighted average of public expenditure in Latin America is 23 percent of GDP and the weighted average for tax revenues is 22 percent of GDP.⁸ It is within this troubling fiscal context that Bolivia's educational expenditures have been steadily climbing, from 5.3 percent in 1995 to 6.8 percent of GDP- exceeding what is spent by most of Bolivia's neighbors such as Ecuador (2.6 percent), Peru (3.3 percent), or Brazil (5.6 percent). This climb is partially due to the stagnation of GDP since 1998. However, there is no doubt that education has also gained priority in public spending in recent years (Table 1.5).

Table 1.5: Education Expenditures as Percentage of GDP 1995 -2002

| Year | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|-------------------------------------|------|------|------|------|------|------|------|------|
| Recurrent Expenditures in Education | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 6% |
| Ministry of Education | 3% | 3% | 4% | 4% | 4% | 4% | 3% | 4% |
| Universities | 1% | 1% | 1% | 1% | 2% | 2% | 2% | 2% |
| Municipalities | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Prefectures | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Investment in Education | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| Total Education Expenditures | 5% | 6% | 6% | 6% | 6% | 6% | 7% | 7% |

Source: UDAPE.

1.32 Since 1994, when the Popular Participation Law was passed, these resources have not all been concentrated at the central level. Although Bolivia is a unitary republic, it is subdivided into nine departments, whose administration is run by centrally and politically appointed prefects, and 327 municipalities, run by elected mayors. Municipal governments receive revenue-sharing transfers, called *Co-participaciones*, as well as Highly Indebted Poor Country (HIPC) resources. The departmental level has been somewhat neglected in the present arrangement and there is considerable pressure for decentralization of resources and political power to this level.

⁸ These figures underestimate both revenues and expenditures, as subnational governments in Brazil and Argentina are not included.

1.33 *Co-participaciones* are comprised of 20 percent of central government tax income to municipalities and 5 percent to universities. The pie from which these *Co-participaciones* are cut is relatively large, amounting to about 17 percent of GDP⁹ - about Bs. 9 billion (US\$1.1 million), which means that the *Co-participaciones* amount to about 3.4 percent of GDP for municipalities and 0.85 percent to universities. The HIPC pie is smaller than that of *Co-participaciones* - about 1 percent of GDP -Bs. 582 million (US\$7.2 million). HIPC resources, however, go entirely to municipalities and 20 percent of the funds are earmarked for education. However, HIPC resources have not been used at the rate that they are transferred to municipalities and are accumulating in their Bank accounts.

1.34 In terms of expenditures by educational level, it is clear from Table 1.6 that the MOE has targeted primary education as its priority. With the exception of higher education, per pupil expenditures are the highest at this level (Bs. 774). Expenditures on primary education comprise almost 70 percent of total expenditures, and secondary education is largely under-funded.

Table 1.6: Education Expenditures as Percentage of GDP in 2002

| Level or Item | Percent of Non-Higher Education Ministry Expenditures | Percent of Central Government Recurrent Education Expenditures | Per Pupil Expenditures (Recurrent) in Bs |
|---|---|--|--|
| Administration (central and departmental) | 4.0 | 2.9 | |
| Initial | 4.7 | 3.4 | 446 |
| Primary | 69.4 | 50.6 | 774 |
| Secondary | 15.5 | 11.3 | 669 |
| Others* | 6.4 | 4.7 | |
| Non- Higher Total | 100.0 | 73.0 | |
| Public University System | | 27.0 | 3,342 |
| Ministry Total | | 100.0 | 1,019 |

Source: Ministry of Education/UDI.

Note: * Others include alternative education, special education, technical education, and non-university higher education.

1.35 Despite the growing evidence of the long term benefits of initial education, particularly for the poor, it is clear from the table above that this level is not a budgetary priority for the Bolivian Ministry of Education. Per pupil expenditures at the initial education level are very low (Bs. 446). On the other end of the education spectrum, higher education receives a large budget share. At 27 percent of all educational expenditures, higher education funding is quite high by Latin American standards. Per pupil expenditures at the higher education level, however (Bs. 3,342) are low by Latin American standards. This combination of high total and low per pupil expenditures is due to Bolivia's exceptionally high university enrollment.

⁹ The values for education financing all refer to 2002.

1.36 **Higher Education Financing.** The budget of the public university system has increased 62 percent between 1995 and 2002, from 1.24 percent to 1.71 percent of GDP (3.6 percent to 4.5 percent of public expenditures). Over the same time period there has been a large increase in higher education enrollment, indicating that the increase in expenditure was used largely to expand higher education coverage. While this is a more equitable and progressive use of funds than if higher education enrollment had remained constant and instead per student expenditure had increased, it does raise concerns since public universities are not held to high standards of accountability.¹⁰

1.37 Universities are all funded centrally through *co-participaciones* and other treasury resources, but have almost total administrative and pedagogical autonomy. Higher education administration is a black box for the MOE since the law defines university autonomy very broadly. Information provided by universities is composed of basically what they wish to present. This means that, in contrast to the excellent information system for initial, primary, and secondary education (SIE), data on universities is neither abundant nor trustworthy. Only recently has gender aggregated data on enrollment been provided and to this day, information on enrollment by ethnicity is still only partially available.

1.38 A Vice-Ministry for Higher Education, Science, and Technology exists but has limited leverage over the public university system. Public universities are represented by the CEUB (*Comité Ejecutivo de la Universidad Boliviana*) which maintains a dialogue with the Vice-Ministry. In the last few years the situation has improved somewhat through this communication mechanism. A computerized management system called COIMATA¹¹ has been offered to the universities and has been accepted by the smaller ones with much success. The larger universities are now showing interest in implementing it. In addition to helping universities in their internal management, COIMATA passes basic information on to the Vice-Ministry. The Vice-Ministry has also established *FOMCALIDAD*, a competitive fund for research projects which has improved communication and led to an incipient culture of accountability within the university system. In spite of these advances, higher education in Bolivia remains poorly managed and lacks accountability.

1.39 **Municipal Finance Expenditure in Education.** Municipal governments (*alcaldías*) have gone from being virtually absent in education funding to being responsible for 7 percent of recurrent education expenditures and 1 percent of total non financial public sector expenditures. While these figures are still modest, they show a trend towards decentralization of education finance. In 2003, the total amount of the *Co-participaciones* mentioned above was Bs. 1.32 billion (US\$163 million), which amounts to Bs. 161 (US\$20) per person per year. All municipalities in Bolivia have a bank account in which these funds are deposited on an almost daily basis. If not spent, the funds remain in the bank account, just as own tax revenues would. Municipalities may

¹⁰ Due to the autonomy law, public universities do not have to report their expenditures to anyone. Neither the MOE to whom they are subordinated in theory, nor the Ministry of Finance that pays for their expenditures, has a right to know how they spend most of their funds.

¹¹ COIMATA is named after a waterfall in the Department of Tarija since it was developed by the University of this same Department.

spend these resources, which are considered their own revenues, as they see fit and are accountable only to the controller's office (*Contaduría*).

1.40 The following table shows education expenditures by level of government. Most expenditures are still made through the Ministry of Education. Only a small share of the Ministry's expenditures is executed by the SEDUCAs. Municipalities are initiating an increasing share of education investments (Table 1.7).

**Table 1.7: Education Expenditures on Primary and Secondary Education
(In % GDP), 2005**

| | |
|------------------------------|------------|
| Ministry of Education | 4.2 |
| Current Expenditures | 4.2 |
| <i>of which: payroll</i> | 3.9 |
| Capital Expenditures | 0 |
| SEDUCA | 0.1 |
| Current Expenditures | 0.1 |
| Capital Expenditures | 0 |
| Municipalities | 0.8 |
| Current Expenditures | 0.2 |
| Capital Expenditures | 0.6 |
| Total Expenditures | 5.1 |
| Source: World Bank estimate. | |

1.41 With these new sources of income, municipalities also received more responsibilities, particularly in terms of the provision of education infrastructure and the responsibility to administer and provide necessary education supplies. However, there has been relatively little cooperation between municipalities and the Ministry of Education for the use of these funds in education. For example, one of the most common expenditures is the construction of walls around schools, which have no pedagogical value.

1.42 In addition, the *Ley del Diálogo* of 2000 (Dialogue Law) assigned a large but declining percentage of HIPC funds to municipalities. Table 1.8 shows the percentage of total HIPC II funds received by municipalities. The municipal totals for HIPC II amount to about 28 percent of *co-participaciones*. Like *co-participaciones*, HIPC II funds are considered their own revenues and accumulate in municipal bank accounts if not used. Unlike *co-participaciones*, municipalities are not free to use these funds any way they see fit and they are accountable for their use to the *Unidad de Programación Fiscal* (Unit for Fiscal Programming or UPF).

Table 1.8: HIPC II Funds and the *Ley del Diálogo* (in USD 1,000)

| Year | Dialogo | Total HIPC II | % |
|-----------------|---------|---------------|-----|
| 2001 (Aug-Dec) | 32,652 | 37,652 | 87% |
| 2002 | 80,478 | 107,478 | 75% |
| 2003 | 47,182 | 77,792 | 61% |
| 2004 (Jan-June) | 19,464 | 34,683 | 56% |

Source: UPF/ Ministry of Finance.

1.43 The UPF directly oversees the monthly execution of the 111 largest municipalities in Bolivia, but in theory all are accountable to the central government for HIPC II expenditures. This has led municipalities to become more hesitant in spending these monies. As of June 2004, there were Bs. 34 million unused for education and another Bs. 117 million for productive infrastructure. Visits to municipalities indicated that this is not only due to the very strict oversight by UPF but also to the weak coordination between municipalities and the MOE, which leaves mayors unsure of the best way to spend HIPC funds.

1.44 Finally, the *Política Nacional de Compensación* (National Compensation Policy) established funds for investment in social infrastructure at the municipal level that are negotiated with the central Government. These are channeled through the *Fondo Nacional de Inversión Productiva y Social* (National Fund for Social and Productive Investment- FPS) and may be used for building educational infrastructure. The FPS provides a means of channeling resources to smaller municipalities with less managerial capacity.

1.45 From all sources, municipalities spent Bs. 216 million (US\$27 million) in education in 2002, which amounts to Bs. 71 per student (US\$9). Evidently, since funds are partially fungible and the *co-participaciones*, *Ley del Diálogo*, and the National Compensation Policy (PNC) all pay for more or less the same things, investment from one source may only be crowding out investment from another one.

1.46 As noted above, education investments have increased 145 percent from 1995 to 2002 (from 0.56 to 1.16 percent of GDP and from 1.6 to 3.0 percent of public sector expenditures). Much of this increase occurred in a difficult fiscal environment from 1998 onwards and reflects a long-term national budgetary commitment to education as well as strong donor support and HIPC support. External financing, whether entirely concessional funding by bilateral donors and multilateral agencies or subsidized interest loans from development funds such as IDA, was responsible for 69 percent of MOE investment between 1995 and 2001. In addition, external financing has paid for some recurrent expenditures such that the total volume of external financing in education is roughly equivalent to the total volume of MOE investments.

TEACHER COMPENSATION

1.47 Bolivia's *escalafón docente* is a pay scale determined by three factors: location, initial training (*haber básico*) and incentives and bonuses (designed to reward positive performance and compensate for hardships). They are independent of the *haber básico* and the *categoría* and they differ solely by the budget from which they are drawn. All public school teachers are paid by the central Government according to this scale. Payments are usually made in a timely and accurate fashion—as opposed to some other countries in which teacher pay is used to regulate cash flow by the Ministry of Finance. Table 1.9 below shows the three dimensions of the *escalafón* for 2003 for the standard work week of 18 teaching hours. There are four teacher training categories, and teachers are paid more for having received higher training. These categories are *normalistas*, *egresados titulados por antigüedad*, and *interinos*. *Normalistas* refer to those individuals who successfully concluded their teacher training at teacher training schools; *egresados* are those who attended teacher training schools but have not yet received their official diplomas (usually due to pending requirements); *titulados por antigüedad* are teachers whose years on the job are recognized as almost equivalent to a teaching degree; and *interinos* are teachers with no formal training in education.

Table 1.9: Three Dimensions of the *Escalafón Docente*, 2003
Bolivianos for 18 Teaching Hour Work Week, in 2003

| Location and initial | Category in the <i>Escalafón Docente</i> | | | | | | | | |
|----------------------|--|----------|------------|------------|-------------|-------------|-------------|----------|--------|
| Category | Sin Categoría | Interino | Quinta (5) | Cuarta (4) | Tercera (3) | Segunda (2) | Primera (1) | Cero (0) | Mérito |
| Capital | | | | | | | | | |
| <i>Interino</i> | 490 | 539 | | | | | | | |
| <i>Tit. Por ant</i> | 540 | 594 | 702 | 783 | 864 | 945 | 1,080 | 1,215 | 1,350 |
| <i>Egresado</i> | 591 | 650 | 768 | 857 | 946 | 1,034 | 1,182 | 1,330 | 1,478 |
| <i>Normalista</i> | 650 | | 845 | 943 | 1,040 | 1,138 | 1,300 | 1,463 | 1,625 |
| Provincia | | | | | | | | | |
| <i>Interino</i> | 543 | 597 | | | | | | | |
| <i>Tit. Por ant</i> | 561 | 617 | 729 | 813 | 898 | 982 | 1,122 | 1,262 | 1,403 |
| <i>Egresado</i> | 658 | 724 | 855 | 954 | 1,053 | 1,152 | 1,316 | 1,481 | 1,645 |
| <i>Normalista</i> | 714 | | 928 | 1,035 | 1,142 | 1,250 | 1,428 | 1,607 | 1,785 |
| Rural | | | | | | | | | |
| <i>Interino</i> | 588 | 647 | | | | | | | |
| <i>Tit. Por ant</i> | 645 | 710 | 839 | 935 | 1,032 | 1,129 | 1,290 | 1,451 | 1,613 |
| <i>Egresado</i> | 712 | 783 | 926 | 1,032 | 1,139 | 1,246 | 1,424 | 1,602 | 1,780 |
| <i>Normalista</i> | 778 | | 1,011 | 1,128 | 1,245 | 1,362 | 1,556 | 1,751 | 1,945 |

Source: Ministry of Education, 2004.

1.48 Finally, the three categories related to location correspond to the degree of urbanization of the area where the school is located. The first category includes the nine

departmental capitals (*Capital*); the second encompasses other urban locations (*Provincia*); and the third is all the remaining rural areas (*Rural*), which generally include very isolated locations made almost inaccessible by mountains or forests. Teachers are paid more for working in less urban areas. For example, a teacher training school graduate working in a small town enters the teaching profession making Bs. 714, but as soon as he or she is confirmed as a permanent teacher the salary will automatically rise to Bs. 928. Thereafter, ascension through the pay scale will not be automatic but will depend on tenure and performance on tests which will gradually increase the salary to Bs. 1,785. If the same teacher decides to move to a departmental capital such as Potosí when at category (3) his or her salary will drop from Bs. 1,142 to Bs. 1,040.

1.49 Table 1.10 shows the distribution of teachers by category. The large number of *interinos*—almost 20 percent of the total number of teachers—is alarming. *Interinos* have diverse educational backgrounds. Some are individuals with very little formal education while others are individuals with university degrees but no formal *teacher* training. An important challenge in improving education quality in Bolivia is to ascertain the impact of having untrained teachers and if the impact is negative, to provide a solution to the 20 percent of teachers who are currently *interinos*.

Table 1.10: Teachers by Category, 2003

| Category | Capital | Provincia | Rural | TOTAL | Total (%) |
|-----------------------|---------|-----------|-------|--------|-----------|
| <i>Normalista</i> | 50% | 17% | 33% | 43,409 | 47% |
| <i>Egresado</i> | 23% | 32% | 45% | 26,959 | 29% |
| <i>Tit Antigüedad</i> | 44% | 25% | 31% | 4,260 | 5% |
| <i>Interino</i> | 21% | 23% | 56% | 17,826 | 19% |
| Total Teachers | 36% | 23% | 41% | 92,454 | 100% |

Source: Ministry of Education, 2004.

1.50 The third dimension of the basic pay scale is experience. Tenure is contingent on passing an exam as well as budget approval by the Ministry of Finance (MOF). The pay increments based on this dimension are quite large and if teachers progressed upwards automatically, the already large education wage bill would become impossible for the Government to pay. For this reason, the MOF can only authorize promotions once the MOE approves the budget to pay for the increases.¹²

1.51 Previously, promotions were automatically given to teachers based on their years of experience (i.e., when the MOF authorized new positions, they were filled by the most experienced teachers), but are now based on a test. Teachers have the option of taking this test every four years and failing candidates have the possibility of taking the test the following year, as the Ministry holds the exam every year. In 2003 and 2004, the pass rates were 41.2 percent and 59.9 percent, respectively. In practice, not all teachers who are eligible for the test take it, either due to lack of adequate documentation or due to anxiety about failing. Until the last year, budgetary considerations influenced the threshold score at which teachers passed the exam and the bar was set a posteriori. This

¹² This negotiation period is always a tense period and is accompanied by strikes and manifestations by the unions and difficult negotiations between the ministries of Education and Finance.

created concerns over transparency particularly from teacher unions and, as a result, a fixed passing grade was set in advance beginning in 2004. This led to a 22 percent increase in the number of teachers taking the exam and almost double the number of those passing it. If not adequately monitored and planned, this may lead either to financially unsustainable commitments or to politically costly broken promises. As previously mentioned, the Education Reform of 1994 introduced a number of incentives to make up for the lack of success in reforming the basic *escalafón* (Table 1.11)

Table 1.11: Bonos and Incentivos

| Incentive | Description | Value |
|--|---|--------------------------------------|
| <i>Bono frontera</i> | Monthly bonus paid to teachers who work within 50km of the country's frontiers. | 20% of <i>haber básico</i> (monthly) |
| <i>Bono zona</i> | An additional monthly incentive to teachers in highly inaccessible regions. | 20% of <i>haber básico</i> (monthly) |
| <i>Bono pro libro</i> | An annual stipend for buying books. | Bs. 440 (annual) |
| <i>Bono económico</i> | An annual stipend that all teachers receive, unlinked to any specific behavior. | Bs. 744 (annual) |
| <i>Bono cumplimiento</i> | An annual prize for teaching at least 200 days, that has no verification mechanism. | Bs. 621 (annual) |
| <i>Bono jerárquico</i> | Additional pay for school directors. | Varies with base pay |
| Other bonos | An annual stipend to all teachers who do not receive the IPR (explained below). | Bs. 400 (annual) |
| <i>Incentivo a la Permanencia en el Area Rural Pobre (IPR)</i> | Annual incentive given to teachers working in areas where NBI) (umet basic needs index) is superior to 75%. | US\$100 |
| <i>Incentivo Colectivo a las Escuelas (ICE)</i> | Incentive given only in 2001 to 1100 schools whose performance on an index calculated from SIE data was the best in the nation. | US\$354 |
| <i>Incentivo a la Modalidad Bilingue (IMB)</i> | Incentive given only in 2001 to bilingual teachers. | US\$200 |
| <i>Incentivo a la Actualización Docente (IAD)</i> | One time annual Incentive given only in 2002 | US\$350 |

Source: Ministry of Education, 2004.

1.52 The main difference between *bonos* and *incentivos* is that *bonos* are provided by the Treasury and *incentivos* are supported by donors, which is why their value is expressed and calculated in U.S. dollars rather than Bolivianos (Bs). A clear negative aspect of the *incentivos* is their inconsistency. Contrary to MOE's original intention, the IMB and ICE were paid only once, in 2001. As for the IPR, it has been paid regularly since 2000; but may soon be devoid of funding due to the closing of the externally-financed projects that support them. An incentive that is paid only occasionally and seemingly at random is a weak incentive that is likely to cause more political dissent than result in positive changes in teaching practice and placement.

2. ISSUES IN THE EDUCATION SECTOR

2.1 As described above, Bolivia has made great strides in expanding its education system over the past decade. An examination of the current status indicates that Bolivia faces a wide set of challenges, including: low and inequitable access to upper grades of primary and secondary education, low levels of academic achievement, and an inefficient education system. Two final challenges that will not be discussed in depth include: low access to early childhood education and low internal efficiency in higher education.¹³

LOW AND INEQUITABLE ACCESS TO UPPER PRIMARY AND SECONDARY EDUCATION.

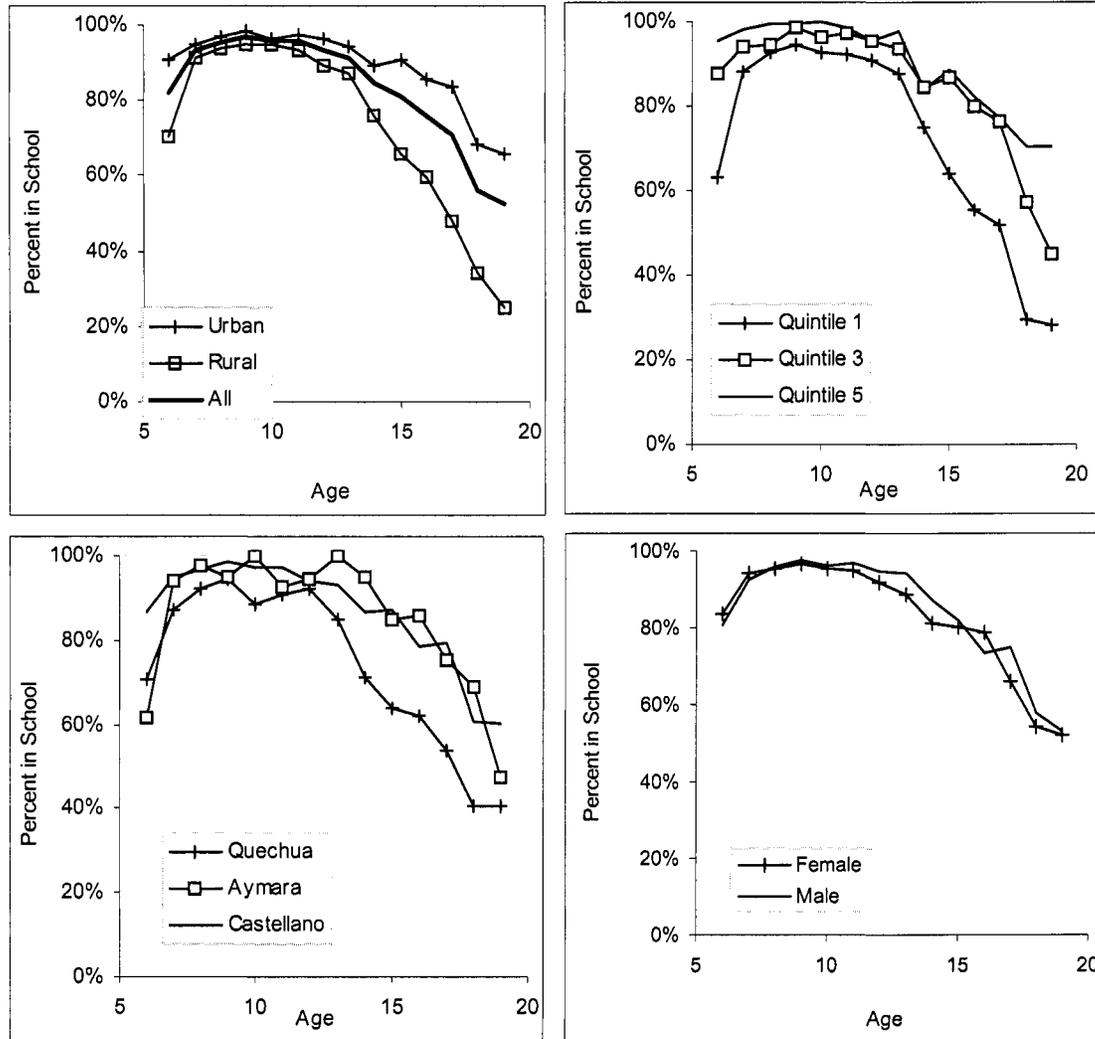
2.2 Although access to schooling as measured by enrollment rates has become universal up to age 11 or 12, considerable gaps open up between indigenous and non-indigenous students, rural and urban, and rich and poor students beyond that age. The four panels of Figure 1.4 clearly show that from the ages of seven to about eleven, almost all children are in school. Even attendance rates in rural areas, in the lowest quintiles or among the Quechua-speaking population are well above 90 percent. However, from ages 12 onwards, enrollment drops significantly and the gap grows larger. At that age, students in urban areas, Spanish-speakers and from higher income families have a greater chance of being enrolled in school. Enrollment rates for 14 year-olds in the top income quintile are 14 percentage points higher than those of their cohorts in the bottom income quintile. Quechua 14-year-olds are 16 percentage points behind their Spanish-speaking counterparts, and the difference between urban and rural is 14 percentage points. At age 15, when children should be entering secondary school, the difference grows larger and enrollment plummets. Indeed at age 16, the difference in attendance rates between urban and rural is 27 percentage points, 26 points between the richest and poorest quintile, and 17 points between Quechua and Spanish speakers. This suggests that access to the last cycle of primary, and particularly to secondary schooling, is especially low among disadvantaged groups.

Lack of Supply

2.3 The decline in enrollment after age 12 is attributed to a variety of factors. The first and most obvious is lack of supply of schooling. While there are close to 13 thousand schools offering grades 1 to 3, only 8 thousand schools offer grades 4 to 5, less than 5 thousand schools offer the last cycle of primary school and less than 2,500 schools offer secondary education. This suggests that schools offering higher grades become sparser, and distances between schools increase as students progress to higher grades. Geographical Information System (GIS) data show that children who do not attend school live on average twice as far from the nearest school as those who do. It is not surprising that, other things being equal, children who must walk long distances have a significantly higher chance of dropping out.

¹³ In depth analysis of initial education and higher education are beyond the scope of this report.

Figure 1.4: School Attendance by Ethnicity, Income Quintile, Gender and Urban or Rural Residence



Source: Mecovi 2002.

2.4 Children not enrolled in school live, on average, twice as far from school as those who are enrolled. While some of this is due to other factors that happen to be correlated with distance, econometric analysis shows that distance is causal and each additional kilometer between the home and the closest school reduces the probability of being enrolled in school by 1.3 percentage points. Individuals who live further from schools are also poorer, indigenous, and have less educated parents. In conclusion, lack of supply of schools is a problem for grade 4 and above. While the possibility of reverse causality, such as families valuing education migrating closer to schools, cannot be ruled out, the evidence is strong that lack of schools offering high grades is a barrier to increasing access to higher grades.

2.5 An important challenge that Bolivia faces is that of expanding school supply at the upper primary and secondary level. As explained above, Bolivia's growing population and improvements in internal efficiency have led to higher primary completion rates, from 56.1 percent in 1996 to 71.5 percent in 2001 and are estimated to reach 85 percent by 2010 (Table 1.12). It is estimated that demand for secondary education would increase by roughly 26 percent over a 10-year period. This increase in completion rates, compounded with the increase in size of entry cohorts by about 5.5 percent each year, will place Bolivia in a situation in which secondary enrollment doubles every 10 years. In the last ten years, most of the increase in secondary enrollment was concentrated in the urban secondary schools which are characterized by overcrowding, outdated curriculum and untrained teachers.

2.6 If repetition and dropout rates remain the same as in 2001, demand for rural enrollment will follow the pattern shown in Panel 2 of Figure 1.5. The increases during the next 10 years will be concentrated in rural areas. Panel 1 of Figure 1.5 shows the distribution of students in rural and urban areas by grade. While urban enrollment is relatively steady until secondary, rural enrollment is much more heavily backed up due to past repetition.

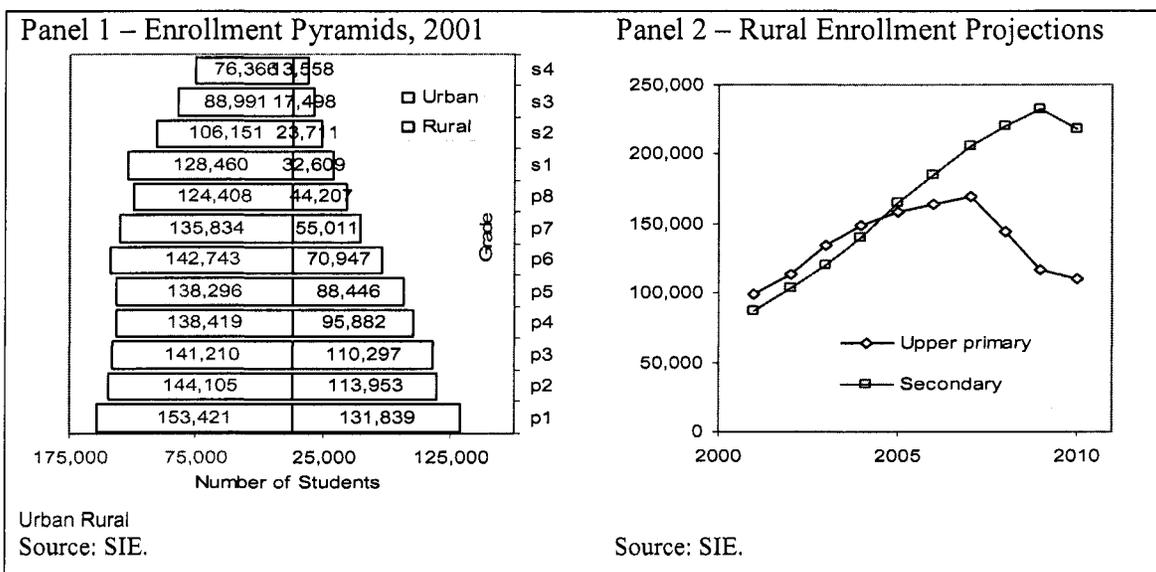
This means that as these children progress through primary school and completion rates increase, demand for secondary will follow.

Table 1.12: Internal Efficiency and Demographic Pressure

| Year | Gross | Demographics | |
|------|-------------------------|----------------------------|-------------|
| | Primary Completion Rate | Size of 15 Year Old Cohort | Growth Rate |
| 1996 | 56.1 | 121,881 | 6.6% |
| 1997 | 58.5 | 122,681 | 1.4% |
| 1998 | 60.3 | 140,161 | 7.5% |
| 1999 | 66.5 | 140,663 | 7.3% |
| 2000 | 71.8 | 154,959 | 5.3% |
| 2001 | 71.5 | 154,533 | 4.9% |

Source: SIE and Demographic Census

Figure 1.5: Enrollment Pyramids and Rural Enrollment Projections



2.7 While the increase in completion rates is indeed good news, this situation does create an important fiscal challenge. If pressure on secondary enrollment follows the path shown in Figure 1.5, an additional 130,000 new school places must be created over the next seven years. At today's rural secondary student-teacher ratio of 23:1, 5,600 new teachers will be needed. With initial, primary, and secondary teacher pay constituting nearly 3 percent of GDP, this poses a difficult fiscal challenge.

2.8 In addition, the quality of secondary education cannot be overlooked as access to this level expands. While primary schools were the recipients of major attention and reform in the last decade due to the Education Reform Program, secondary schools were neglected and to date continue to offer outdated curricula and pedagogical materials, inadequate infrastructure, conventional teaching techniques with very limited pedagogic resources, and imbalanced classroom sizes (overcrowded classrooms in some schools and low student: teacher ratios in others). Moreover, the teaching force is unequipped. It is estimated that approximately 45 percent of secondary school teachers are not trained to teach this level with this number increasing to 70 percent in rural areas.

2.9 Another factor that points to the urgent need to address quality at the upper primary and secondary education level are the low external benefits of this level of education. As shown in Table 1.13, the rates of return to upper primary and secondary education are low when compared to those of primary or higher education. Eleven percent of secondary graduates aged 18 to 25 are unemployed. Of those who do work, 53 percent are underemployed with no labor contract. With the number of secondary school graduates increasing in the next few years, it is likely that the rates of return will be further depressed due to more supply. If immediate actions to improve quality are not taken, there will be no incentive for youth to complete upper primary and secondary education.

Table 1.13: Education Rates of Return (Private)

| Educational Cycle | Average Yearly Rates of Return |
|------------------------|--------------------------------|
| Primary Grades 1-6 | 12.4% |
| Primary Grades 7 and 8 | 4.9% |
| Secondary | 9.1% |
| Higher | 17.5% |

Source: MECOVI.

Labor Market Participation

2.10 Labor market participation is another factor keeping children out of school especially in rural areas with high poverty rates. Indeed, as Table 1.14 reveals, close to 20 percent of children aged 10 to 14 works and this is consistent with the age that children start to drop out (see discussion above). Results using the bivariate probit method are presented in Table 1.15¹⁴. These findings reveal that there is a significant and negative correlation between work and schooling.¹⁵ Results show that each additional *exogenous* percentage point in the probability of working reduces the probability of enrolling in school by 0.75 percentage points for children and youth aged 13 to 18. For children aged 9 to 12, the probability increases to 0.95 percentage points. These results, as well as the broader literature on child labor, support the assumption that child labor market participation significantly impacts school enrollment and completion. There are, of course, other factors affecting the decision to drop out of school that are not captured and not measured in typical household surveys which will need to be addressed in future work.

Table 1.14: School Enrollment and Labor Market Participation by Age

| Age | Work, no school | No work, no school | No work, school | Work, school |
|-----|-----------------|--------------------|-----------------|--------------|
| 7 | 1% | 6% | 87% | 7% |
| 8 | 1% | 3% | 86% | 10% |
| 9 | 1% | 2% | 84% | 13% |
| 10 | 1% | 3% | 80% | 16% |
| 11 | 2% | 2% | 80% | 16% |
| 12 | 3% | 3% | 74% | 19% |
| 13 | 5% | 3% | 77% | 14% |
| 14 | 9% | 7% | 67% | 17% |
| 15 | 12% | 7% | 61% | 20% |
| 16 | 16% | 8% | 61% | 16% |
| 17 | 19% | 10% | 53% | 17% |

Source: 2002 MECOVI.

¹⁴ An econometric model was estimated in which the two explained variables are school enrollment and labor market participation and the explanatory variables are the dependency ratio of the household, the schooling level of the most educated adult in the household, ethnicity, household per capita income, age, and household survey geographic sampling stratum.

¹⁵ This means that the negative “true” relation between schooling and work will be influenced both by the effects of other variables and by reverse causality. In order to net out these effects, we use instrumental variables—variables that have a causal relationship with work but not with schooling, to explain the effect. We use the average value of wages for workers aged 19-24, which is the age category just above 13-18, in each of the nine departments for three consecutive years as a proxy for labor demand. This instrument is imperfect as intra-family allocation of effort and time may lead the behavior of those aged 13-18 to be influenced by that of those aged 19-24 through a mechanism outside the labor market.

Table 1.15: Bi-variate Enrollment Work Probit

| Variable | School enrollment | | Work | |
|--------------------------|-------------------|---------|-------------|---------|
| | Coefficient | p-value | Coefficient | p-value |
| Dependency Ratio | -0.613 | 0% | 1.550 | 0% |
| Highest Adult Schooling | 0.045 | 0% | -0.018 | 0% |
| Quechua | Base | | base | |
| Aymara | 0.537 | 0% | -0.065 | 25% |
| Castellano | 0.364 | 0% | -0.399 | 0% |
| Guaraní | -0.075 | 47% | -0.410 | 0% |
| Capital | base | | base | |
| Urban | 0.020 | 72% | 0.080 | 7% |
| Metropolitan | -0.614 | 0% | 0.746 | 0% |
| Per capita family income | 0.292 | 0% | -0.390 | 0% |
| Age | -0.249 | 0% | 0.111 | 0% |
| Constant | 4.460 | 0% | -2.599 | 0% |
| p | -0.483 | 0% | | |

Source: MECOVI 2000, 2001, 2002 microdata.

LOW AND UNEVEN QUALITY OF EDUCATION

2.11 Bolivia has participated in only one international achievement evaluation, the *Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación* (LLECE).¹⁶ Table 1.16 shows that Bolivia scored close to the median of achievement results and given its per capita income, it performs somewhat better than predicted; however, in depth analysis shows this can be misinterpreted.

¹⁶ The LLECE evaluation was undertaken from June to November 1997 in Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Dominican Republic, Honduras, Mexico, Paraguay, and Venezuela. Third and fourth grade students were tested in math and writing. Bolivia did not participate in the more modern PISA, TIMSS, or IALS evaluations. LLECE is based on Classical Test Theory and not Item Response Theory and relies on identical questions to compare different countries or groups. The number of items is relatively small and the orientation is not on problem solving as with PISA or other more modern evaluations.

Table 1.16: Average Language and Math Scores in LLECE for Grade 3

(Position in Parenthesis)

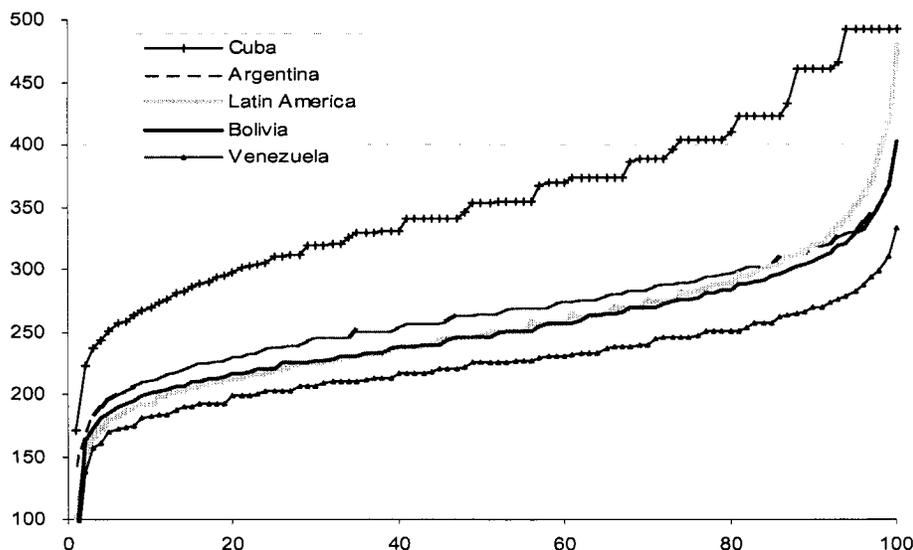
| Country | Language | Math |
|--------------------|----------------|----------------|
| Argentina | 263 (2) | 251 (2) |
| Bolivia | 232 (7) | 240 (6) |
| Brazil | 256 (4) | 247 (3) |
| Chile | 259 (3) | 242 (4) |
| Colombia | 238 (6) | 240 (5) |
| Cuba | 343 (1) | 351 (1) |
| Dominican Republic | 220 (10) | 225 (9) |
| Honduras | 216 (11) | 218 (11) |
| Mexico | 224 (9) | 236 (7) |
| Paraguay | 229 (8) | 232 (8) |
| Venezuela | 242 (5) | 220 (10) |

Source: LLECE published results.

2.12 The LLECE results in mathematics achievement are especially striking as Bolivia is tied with Colombia for fifth place out of eleven participating countries. Not only does Bolivia do much better than Honduras, the only other country with comparable income per capita in the sample, it also does much better than far wealthier countries such as Venezuela and the Dominican Republic. In language however, Bolivia fares slightly worse in seven out of eleven countries.

2.13 Figure 1.6 shows the distribution of LLECE mathematics results for Cuba, Argentina, Bolivia, Venezuela, and the mean of all participating countries by achievement percentile. Apart from Cuba, which is a positive outlier—and is shown only to illustrate that even a poor country with very limited resources can achieve educational excellence—the figure shows Argentina as an upper bound and Venezuela as a lower bound for achievement in Latin America. Bolivia is about half-way between these two extremes and very close to the regional average. It is also slightly more equitable than Latin America with Bolivia's lowest performers (those towards the left of the distribution) doing better than their Latin American equivalents and Bolivia's highest performers (those towards the right) doing worse. Achievement results, however, can be misleading if only averages are considered. A more in depth analysis of the international LLECE and the Bolivian SIMECAL evaluations reveal large differences in learning achievement between children from the lower and upper percentiles. The LLECE scores of students in the ninetieth achievement percentile in Bolivia are less than half the scores of those students in the tenth achievement percentile.

Figure 1.6: Distribution of LLECE Mathematics Results



Source: LLECE microdata.

2.14 Bolivia's national assessment results provide more conclusive evidence of low quality. Results for eighth graders in 1998 are shown in Table 1.17. Only half of the students achieve passing results in reading and less than one third achieve passing results in math. Clearly, improving the quality of education is critical.

Table 1.17: Achievement as Measured by SIMECAL – Eight Grade (1998)

| Achievement Level | Language | | Mathematics | |
|-------------------|---|---------------------|--|---------------------|
| | Description | Percent of Students | Description | Percent of Students |
| None | Language understanding is insufficient for taking the test. | 5.1 | No capacity for problem solving. | 8.7 |
| A | Fragmented understating of a text. | 13.9 | Simple problems with only one operation can be solved. | 27.1 |
| B | Capacity to establish relations. | 31.4 | Combined operations problems. | 33.7 |
| C | Global text comprehension. | 49.7 | Complex problems are solved. | 30.6 |

Note that C is the only achievement level that Bolivia defines as "passing."

2.15 Regression analysis shows that much of this difference is either unexplained or related to household variables such as parental schooling; but analysis also suggests that accountability and school management improves performance. An education production function estimated by Urquiola et al. (2000)¹⁷ suggests that test scores increase when the

¹⁷ The full specification also included individual, household, and other socioeconomic controls.

teacher is a *normalista*, although this result is weak and non-significant for public schools (Table 1.18). In addition, there may be some reverse causality as *normalistas* may choose to teach at the best schools. However, the evidence is strong and significant for private schools. The fact that private schools do better (even when controlling for observed student characteristics), suggests that some characteristics of private schools in Bolivia may be important determinants of learning achievement. Selection, sorting and unobserved characteristics are likely to be important determinants of private school success in the case of paid private schools for the wealthy. However, in charter schools such as *Fe y Alegria*, both selection and unobserved characteristics only play a limited role. This suggests that management characteristics, such as greater pedagogical support for teachers, more supervision of teachers, and overall accountability, may have an impact.

Table 1.18: Factors Associated to High Quality as Measured by SIMECAL

| Variable | Full Sample | | Private | Public | Rural |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|
| | 1 | 2 | 3 | 4 | 5 |
| Constant | 49.08 | 54.28 | 47.64 | 48.49 | 50.07 |
| | <i>1.02</i> | <i>1.35</i> | <i>4.68</i> | <i>1.26</i> | <i>1.67</i> |
| Teacher <i>Normalista</i> | 0.41 | 0.23 | 1.96 | 0.82 | -0.26 |
| | <i>0.89</i> | <i>0.90</i> | <i>0.71</i> | <i>1.09</i> | <i>1.41</i> |
| Teacher <i>Tit. Antigüedad</i> | -1.00 | -0.89 | | 0.11 | -1.73 |
| | <i>1.49</i> | <i>1.53</i> | | <i>2.22</i> | <i>2.15</i> |
| Urban Public School | | -4.22 | | | |
| | | <i>0.84</i> | | | |
| Rural School | | -4.79 | | | |
| | | <i>1.00</i> | | | |
| R2 | 0.157 | 0.173 | 0.176 | 0.075 | 0.032 |
| N | 7708 | 7708 | 946 | 3939 | 2823 |

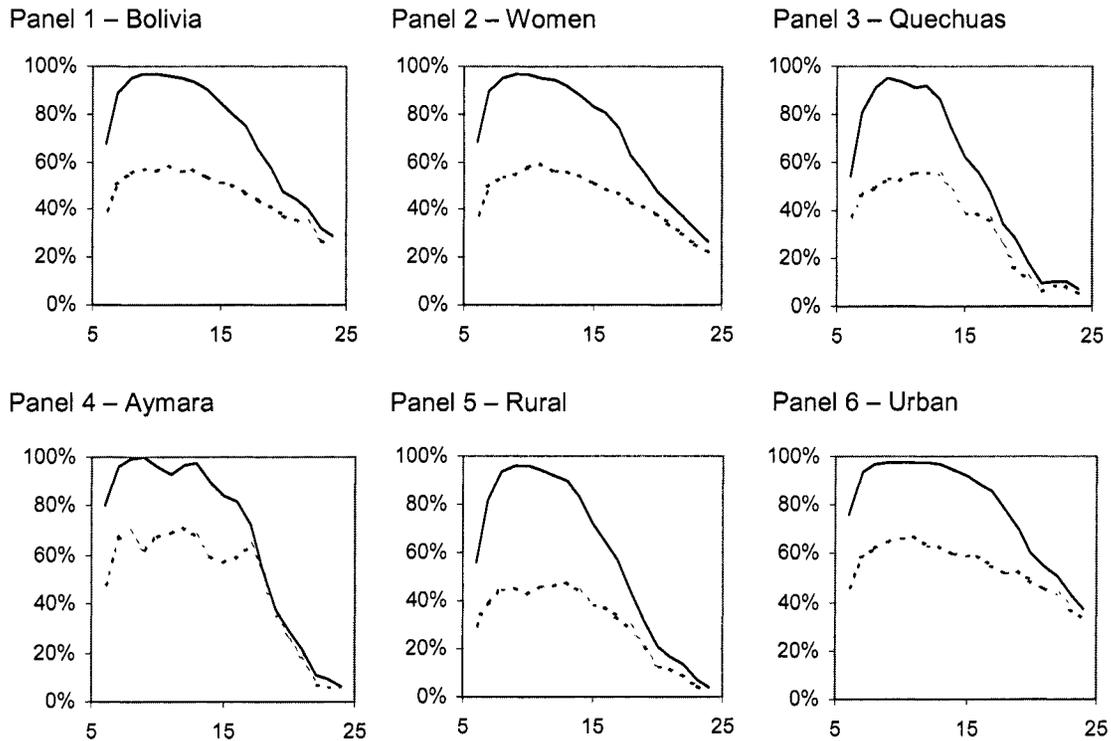
Source: Urquiola et al.

Note: Standard errors in italics.

2.16 In addition to the lack of better teachers and effective school management, the low results may be explained by an important factor: nonattendance or absenteeism of both students and teachers. While 95 percent of primary school aged children are enrolled in school, household survey data reveal that on any given day, close to 40 percent of them are not attending. While this remains an insufficiently understood phenomenon, institutional reasons may be at play. Work on *teacher* absenteeism by Kremer et al. (2004) has shown that school directors report considerable teacher absenteeism due to institutional reasons such as training, planning, and other time-consuming activities that could be scheduled for non-instructional time. The six panels in Figure 1.7 below show enrollment (solid line) and attendance (broken line) by age for all Bolivian students, females, Quechua and Aymara speakers, and urban and rural residents. The panels are

constructed using the attendance question in the MECOVI surveys.¹⁸ Figure 1.7 shows a large gap between enrollment and attendance especially for those students in rural areas. The difference for all students is 40 percentage points for ages 8, 9, and 10. In the case of rural inhabitants, the number goes up to 50 percentage points for ages 9 and 10. Quechuas do especially poorly while Aymaras do slightly better. The attendance-enrollment gap is less for urban inhabitants than it is for rural inhabitants while there appears to be no gender difference.

Figure 1.7: Enrollment (solid line) and Attendance (broken line) by Age, According to Demographic Group



Source: 2002 MECOVI.

INEFFICIENT EDUCATION SYSTEM

2.17 Despite the fact that a high share of GDP is invested in education, Bolivia is failing to produce the educated citizens and productive workers it needs to compete in the global economy. In 2002, education spending constituted 6.8 percent of GDP—the highest level in the past ten years. However, resources are not allocated in an efficient manner that would improve learning outcomes. Indeed, spending on education materials is low and the share of administrative expenditures in the budget is exceedingly high. Many schools in Bolivia have significant shortages of basic learning supplies such as

¹⁸ The question is relatively new in household surveys and it is not totally clear how respondents are interpreting it, but the results are nevertheless quite troubling.

paper, pencil, and chalk since neither the directors nor the mayors accept responsibility for their provision. Moreover, infrastructure investments are not aligned with pedagogical investments.

Decentralization

2.18 As discussed in chapter 1, the delivery of education is covered by many different levels of administration. The recent decentralization process, while positive in many aspects, has led to some misalignment of responsibilities and resources. As in many other countries, some functions were decentralized but the control of everything that mattered was kept in the center. Today, the education sector is characterized by a disjointed and fragmented decision-making process. The result is a “middle-of-the-road” between a top-down approach—in which schools are created and staffed according to demographic and student flow factors calculated by a competent central bureaucracy—and a bottom-up approach—in which decentralized bodies are responsible for hiring decisions. The present decentralization and accountability arrangement does not allow for adequate articulation between the central and municipal levels, leading to waste of municipal resources and lack of interest on the part of mayors in increasing their share of educational investment. This leads to considerable communication difficulties and inefficient use of education resources. Particularly evident are overlaps in responsibilities among different levels of government. These ambiguities and blurred responsibilities are particularly severe between the district directors, mayors, and departmental governments¹⁹. These overlaps are evident in responsibilities for learning supplies, teaching positions, and infrastructure.

| Percentile \ Year | 1991 | 1996 | 2001 |
|-------------------|-------------|-------------|-------------|
| 5% | 16.9 | 18.8 | 17.9 |
| 30% | 22.0 | 23.7 | 23.0 |
| 50% | 26.4 | 23.9 | 28.3 |
| 70% | 30.0 | 30.8 | 39.8 |
| 95% | 44.9 | 40.4 | 56.8 |
| Mean | 27.6 | 27.4 | 33.0 |
| Bolivia | 25.2 | 26.4 | 24.4 |

2.19 Inefficient allocation of teachers is a major problem in Bolivia, complicated by the division of decision-making among the different levels of education administration. Teachers are paid by the central government, the department level education administrators

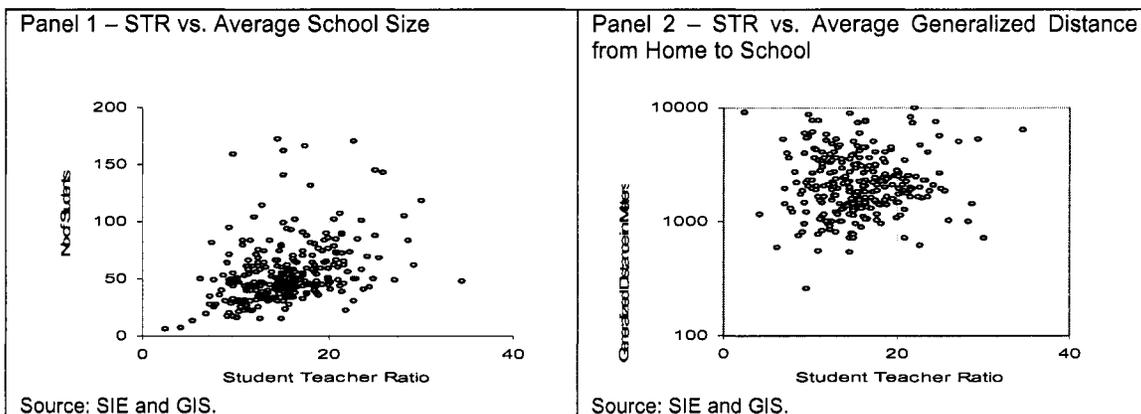
determine the allocation of teachers to the municipalities, and the district directors assign teachers to individual schools. Once distributed, teaching positions become an acquired right of the departments and districts and are difficult to change even if demographic shifts necessitate the re-allocation of teachers.

2.20 Improving teacher allocation remains one of the most critical elements for improving the quality of education. Indeed, the student-teacher ratio has a weak relation with the number of students in educational districts and almost none with the rural nature of the districts (the distance in meters students must walk to get to the school). A simple optimization algorithm suggests that 9,000 teachers are not needed in the schools in

¹⁹ It is worth noting that one of the problems of coordination is related to the fact that Educational Districts usually coincide with the territorial jurisdiction of municipalities, but there are 327 municipalities and only 275 districts, as smaller municipalities are sometimes grouped together into one educational district.

which they work as evidenced by low student-teacher ratios. Figure 1.8 below shows that teacher distribution among districts is quite poor. Even when characteristics such as the rural nature of the country are taken into account the expected student-teacher ratio in Bolivia should be about 29:1, which is slightly more than the observed ratio of 24:1 (Table 1.19). If the large student concentrations in the departmental capitals of Santa Cruz and La Paz are not considered, the student-teacher ratio falls to 16.5:1²⁰. Therefore, the large intra-departmental variance is not due to extreme isolation of some municipalities. Once again, if Santa Cruz and La Paz are excluded, 41.1 percent of Bolivian schools have less than 12 students per teacher. The figures indicate that while average school size is reasonably correlated with the student-teacher ratio (0.87), distance from households to schools is not (0.04). Distance from school to households does not have a high correlation with school size either (0.01). If the same graphs were to be made using school nuclei or individual schools, the differences would be even greater. This points to the need for improving efficiency as substantial gains can be made from better teacher allocation.

Figure 1.8: Student Teacher Ratio vs. Number of Students and Distance from Home



2.21 Finally many schools in Bolivia have significant shortages of basic learning supplies such as paper, pencil, and chalk since neither the directors nor the mayors accept responsibility for their provision. In addition, there is not an adequate budget for these types of expenditure.

LOW ACCESS TO EARLY CHILDHOOD EDUCATION

2.22 While in depth analysis of the challenge in expanding initial education is beyond the scope of this report, it is important to note that expanding access to initial (pre-school) education is crucial, especially to improve educational performance of children from disadvantaged backgrounds. International experience has shown that access to early

²⁰ The standard deviation of their distribution is 18.7, which corresponds to a variance of 348.3. This variance is distributed as follows: 1 percent between departments, 20 percent between districts but within departments, and 79 percent within districts.

education opportunities result in significant gains and improved learning outcomes. Initial education is both under funded and inaccessible to most children in Bolivia. Per pupil expenditures are less than 60 percent of per pupil expenditures at the primary level. Additionally, only 35 percent of 5 year-olds and 67 percent of 6 year-olds are enrolled in initial education. Unfortunately, it is exactly those who need it most who have the least access to pre-school education. While 32 percent of urban 5- and 6-year-olds are in pre-school, the corresponding figure for their rural counterparts is 24 percent; while 34 percent of 5- and 6-year-olds from non-poor households have access, only 27 percent of the poor are in early childhood education.²¹

LOW INTERNAL EFFICIENCY IN HIGHER EDUCATION

2.23 Tertiary education in Bolivia is characterized by poor quality and low internal efficiency. As a result, few students who enter the system actually graduate. Graduation rates are very low (see Table 1.20). And although they are improving over time and may be underestimated²², this signals a high level of waste of public resources especially given that higher education absorbs 25 percent of all expenditures in education.

Table 1.20: Enrollment and Graduation in Public Universities

| Year | Total Enrollment | New Enrollment | Graduates | Graduation Rate |
|------|------------------|----------------|-----------|-----------------|
| 1990 | 105,879 | 28,241 | 4,785 | |
| 1991 | 111,455 | 25,316 | 5,349 | |
| 1992 | 120,976 | 27,969 | 5,272 | |
| 1993 | 128,199 | 26,411 | 6,524 | |
| 1994 | 136,791 | 25,104 | 7,040 | 25% |
| 1995 | 142,249 | 28,622 | 8,338 | 33% |
| 1996 | 151,768 | 29,398 | 9,890 | 35% |
| 1997 | 164,393 | 32,754 | 10,550 | 40% |
| 1998 | 178,507 | 36,297 | 10,500 | 42% |
| 1999 | 194,853 | 39,425 | 12,311 | 43% |
| 2000 | 212,441 | 41,266 | 11,836 | 40% |

Source: Ministry of Education/UDI.

²¹ In depth analysis of initial education and higher education are beyond the scope of this report.

²² Higher education data is not very reliable.

3. POLICY RECOMMENDATIONS

3.1 Efforts to improve the education system have resulted in an increase in overall coverage during the past decade. The challenges outlined above have prompted an emphasis on improving the performance of the education sector especially in the area of secondary education which has been neglected in previous reform efforts. Given the key issues outlined above some possible options to respond to the situation are presented below.

IMPROVING ACCESS TO AND RETENTION IN UPPER PRIMARY AND SECONDARY SCHOOLS

Supply Side Interventions

3.2 To sustain gains made in primary education, the first and possibly most urgent issue is the need for the expansion of upper primary and secondary schooling. The combination of greater access and increased completion at the primary school level, combined with the population pressure from a greater cohort size, will inevitably result in a higher demand for secondary schooling, especially in rural areas. Indeed, demand for rural secondary enrollment is estimated to double by 2010.

3.3 An important determinant of access to schooling is the supply. For example, schools must be nearby, teachers must be present and books must be available. Improving access involves both investments in the existing conventional systems and exploring alternative methods of service delivery to meet the specific needs of rural students. For children who drop out or do not attend due to living far from existing schools, methods such as radio education and/or tutorial home/school combinations are particularly promising. There are many examples of successful radio programs in Latin America. Tutorial programs, which have also been used in many countries, can be cost effective and efficient in terms of educational impact. Tutorial programs consist of either having a teacher visit an isolated community once or twice a week or having the children travel to a distant school once or twice per week. During the remaining days, the children follow a work program supervised by an adult from their community. If combined with radio education, as battery powered radios are available even where there is no electricity, the model can be further enhanced.

3.4 Given the tight fiscal situation, using existing school infrastructure for alternatives such as telesecondary education in areas that have access to electricity is a promising low cost alternative to formal delivery of secondary education in rural areas. This modality consists of using existing primary infrastructure and staff for provision of secondary schooling. A generalist teacher, with training as a high school teacher plays the role of a facilitator while content teachers lead instruction through video or television channel. In Mexico, where this modality has been evaluated, telesecondary students, once student

background is controlled for, can result in student achievement levels similar to those of other modalities.²³

Demand Side Interventions

3.5 Beside supply side strategies and given the economic downturn and increasing poverty especially in rural areas, demand-side interventions are needed to attract and retain children in school. Such interventions include conditional cash transfers, where families are provided cash subsidies in exchange for enrolling their children in school and maintaining high attendance rates. While the cost is high, these programs have proved to be very successful in other countries in Latin America and should be studied for application in Bolivia (Box 1.2).

Box 1.2: Increasing School Enrollment through Stipends in Brazil: The Bolsa Escola Program

In 1995 the federal district municipality of Brasilia launched the innovative *Bolsa Escola* program with the goal of increasing educational attainment and reducing the incidence of child labor. *Bolsa Escola* aims to break the vicious cycle of poverty and low educational attainment in Brazil. The relevance of this program for lifelong learning is based on its use of such grants to offset the opportunity cost of attending school.

The program also includes a savings program that creates an incentive for staying in school. The school savings program deposits money into the account of each child whose family is a beneficiary of the scholarship program if the child is promoted to the next grade. Half of the amount deposited can be withdrawn when the child reaches the fifth grade. Withdrawals can be made again upon successful completion of the eighth grade and secondary school.

3.6 Mexico has had tremendous success in enrolling and retaining children in schools through its conditional cash transfer program, *Oportunidades*. Rigorous impact evaluations of the program indicate that it has significantly increased the enrollment of children, particularly girls, especially at the secondary school level. The results imply that children will have an average of 0.7 years of extra schooling because of *Oportunidades*, although this effect may increase if children are more likely to attend upper secondary school as a result of the program. Using panel data for Mexico for 1997 to 1999 (Behrman and others 2005; Skoufias and Parker 2001; Schultz 2004) it has been shown that *Oportunidades* resulted in higher school attainment among indigenous children, and a significant reduction in the gap between indigenous and non-indigenous children (Bando and others 2005). Results show a significant reduction in the probability that indigenous children work after their participation in the program. Nonetheless, indigenous children had lower school attainment compared to children that either only speak Spanish or are bilingual.

3.7 It is important that these interventions be carefully targeted, particularly at the very poor and the indigenous populations who are the most vulnerable. Household

²³ See World Bank (2005).

surveys can be valuable tools to exploit for information on disadvantaged groups, namely the indigenous. Without the necessary political will on the part of the government, however, targeting is unlikely to be significantly improved. Yet this option while implying a fiscal cost would also lead to a reduction in unit costs.

3.8 In addition to demand side financing schemes described above, the Secondary School for All program in Chile (Box 1.3), designed to tackle the problem of school dropout among secondary school students, can be studied for possible application in Bolivia. Similar programs in the United States have been shown to be highly cost-effective (Greenwood and others 1998).

Box 1.3: Chile Secondary School for All Program

Chile's "Secondary School for All" program, begun in 2000, is designed to tackle the problem of school dropout among secondary school students. It is part of a plan aimed at achieving a universal minimum of 12 years of schooling. The educational establishments are selected through a school vulnerability risk index which estimates the school dropout probability of the students of each school on the basis of the maternal level of schooling and the repetition and attendance rates of the students. The same index serves to determine the number of scholarships required by each school. It is complemented with an appraisal card for the students, which allows the beneficiaries to be selected on the basis of their school attendance, average marks and overage status (scholastic lag or age-for-grade).

The program is based on an intervention strategy which combines two dimensions: the quality of life and the quality of education. The former includes access to welfare services (mainly scholarships for the students who are most vulnerable), improvement of the conditions in schools, and the implementation of a school health program designed to help keep young people in school. As to the quality of the education component, each establishment must formulate and develop a plan of action to avoid school dropout, based on a process of reflection and analysis, and receives: (a) scholarships, worth 148,000 Chilean pesos per year (about \$200 per beneficiary); (b) a teaching development plan; (c) a psycho-social development plan; and (d) the improvement of boarding schools.

The "Secondary School for All" program has not yet been evaluated and its coverage has been relatively limited – during 2001 the program awarded around 6,000 scholarships. However, similar programs are highly cost-effective. In the United States, incentives to induce disadvantaged high-school students to graduate have proven to be a cost-effective approach.

Sources: CEPAL 2002; Greenwood and others 1998

3.9 Some other successful programs of Network Schools in other countries in Latin America should also be studied. For example, the Matte Schools of the *Sociedad de Instrucción Primaria* of Santiago (SIP) is an example of a private subsidized network of schools that have been very successful in providing a quality education to disadvantaged children. The SIP schools are located in low-income neighborhoods, have complete autonomy, and were originally supported entirely from private contributions. They were among the first to take advantage of the opportunity to become private, when Chile's nationwide voucher system was established in 1980. The SIP schools have higher

performance on Chile's national achievement tests than do both public (municipal) and private-subsidized schools, and almost as good as the more selective and more expensive paid private schools. This is an important finding considering that SIP schools serve children from poor backgrounds (McMeekin 2003). Such programs have the benefit of reducing fiscal costs while serving poor children.

IMPROVING LEARNING OUTCOMES

Provision of Quality Learning Materials

3.10 Access to learning materials, especially in low-income areas and in bilingual schools is critical to improving student learning. Low educational quality can be due to family background factors as well as school-related factors. Among school related factors, quality learning materials along with a positive school climate have the greatest positive effect on achievement (UNESCO 2000). In Bolivia, ineffective and untrained teachers and lack of or inadequate learning materials receive much of the blame for poor student achievement. Achievement can be increased substantially through appropriately designed and targeted interventions, provided that they are well implemented. When tailored to the needs of disadvantaged children, these interventions can reduce the difference in learning outcomes between these children and their peers. Thus, a substantial increase in learning achievement is possible for schools in rural and disadvantaged areas if increased quality inputs are well targeted. Despite the gains of the institutionalization of intercultural bilingual education, part of the education reform, implementation has been far from perfect. To date it has yet to be fully implemented and pedagogic text production has suffered from considerable delays and as a result many children were left without pedagogic materials. Perhaps the main failure of bilingual education was that it was often applied against the wishes of parents and students and resulted in unnecessary resistance among parents who were anxious to see their children learn Spanish and excluded those who wanted the bilingual approach. An important recommendation is for bilingual education to be an option, not an imposition.²⁴

National Assessments

3.11 The use of national assessments (SIMECAL) is necessary for establishing benchmarks for future tracking of achievement trends and linking results to teacher training and curriculum. Bolivia has established a comprehensive evaluation system with the original idea of making systematic use of the available information. However, the results from SIMECAL have not been used to provide feedback to policy makers. While the original intention was to use the results to inform curriculum reform and teacher training and thus lead to changes in the classroom, this has yet to occur. Limited budget has meant that testing has been conducted sporadically (1997, 1999, and 2000); each time in different grade levels, and only for small, though representative, samples. These characteristics limit the usefulness of findings and make rigorous comparisons difficult. Of great concern is the fact that SIMECAL evaluations have recently been suspended.

²⁴ Evidently, choice in the bilingual option will involve planning difficulties for the MOE. For example, materials and particularly trained teachers cannot be provided overnight. Nevertheless, the benefits of choice far outweigh its costs.

Although SIMECAL has not been eliminated, the staff has been reduced and no new assessments have taken place in primary schools since 2000. This assessment system provides an excellent opportunity for Bolivia to establish national standards for what students should learn by the end of the each grade, teacher qualification, curriculum evaluation and development, and provide incentives for the improvement of education. Transforming the student assessment system from a policy tool into a pedagogic one, along the lines of what exists in Chile and Uruguay today, is the first step towards establishing mechanisms for ensuring accountability and improving educational quality.

International Assessments

3.12 Furthermore, it is important for Bolivia to participate in international assessments such as TIMSS and PISA and use the results to benchmark its performance against other countries. TIMSS and PISA results provide an excellent opportunity for a country to evaluate its educational system and inform policy responses (Box 1.4). This has been the case in Singapore and Jordan where the results are repeatedly used to reform curriculum, train teachers and conduct research on the determinants of learning. In both cases, but especially in the case of Singapore, the use of the TIMSS results has provided significant returns. The cost of participation is relatively low and the benefits are many.

Box 1.4: The Case of Jordan

Jordan has benchmarked its education system against other countries in the areas of education indicators and international achievement tests. This provides Jordan with comparable information by which to analyze systemic progress towards better educational quality. Jordan is also one of the World Education Indicator Countries, which benchmark their systems to OECD countries.

In 1990, Jordan became the first Arab country to participate in the International Assessment of Educational Progress (IAEP II). The IAEP II study was launched simultaneously with Jordan's effort to undertake a thorough review of its education system that could be used to design a comprehensive reform program. The IAEP process not only provided crucial data on Jordan's educational performance (at the 8th-grade level), but also allowed national educational specialists the opportunity to learn the techniques that such an exercise involves – including sample selection, administration of tests, and implementation monitoring. The IAEP II study was to be instrumental in building national capacity for independently conducting national surveys of education achievement in the future. Jordan's students ranked near the bottom in IAEP II.

Then Jordan participated in TIMSS in 1999. The results of the study came as a shock. About 75 percent of students in mathematics and about 67 percent of students in science scored lower than the international average. Jordan stood third from the bottom in both subjects among the 20 participating countries.

An expert committee was subsequently established to investigate the causes of this poor performance. After an item-by-item examination of the test and school curricula, as well as administration of practice tests, Jordan re-administered the entire TIMSS examination. The results were almost identical to those obtained during the first round of testing. However, the results served to inform efforts to reform educational quality. More specifically, it served to: (a) establish benchmarks of 13-year-olds' achievement relative to 19 countries; (b) show the areas of weakness and strength in each subject; (c) compare the performance of students in schools run by different authorities, regions and areas; (d) identify cognitive processes and respond with a view to informing teacher training; (e) analyze family and home characteristics associated with student achievement; and (f) target negative and positive influences of classroom practices, out-of school activities, and attitudes.

Jordan's example indicates the importance of government commitment to use the results of international assessments for evaluating education systems, establishing benchmarks for future tracking and informing policy responses. Most importantly, the efforts paid off. In 2003, Jordan again participated in TIMSS. The results were impressive. Jordan improved its scores in both math and sciences. In science, Jordan's performance was above average.

IMPROVING DECENTRALIZATION ARRANGEMENTS TO INCREASE EFFICIENCY AND EFFECTIVENESS

3.13 By decentralizing the educational system, the government can increase local resource mobilization and efficiency, and greater community and parental involvement in education. Educational decentralization as implemented in New Zealand, Victoria (Australia), Brazil, Colombia and Chile is likely to enhance the performance of the education system. On the other hand, a decentralized system of finance without an effective compensatory mechanism can be detrimental to children in economically disadvantaged areas. Through appropriate policies, the benefits of decentralization can be enjoyed without undermining equity. One of these policies is for the federal government to ensure that disadvantaged states get more resources than others. Decentralization presents an opportunity to rethink the way federal money is allocated and to allow the distribution of funds in a simple and more transparent manner, with less potential for overlap. In particular, interest in a formula-driven allocation with a corresponding accountability framework provides a good opening for more effective alternatives for dealing with equity and efficiency issues.

3.14 It is notable that much of Chile's remarkable achievements in improving learning outcomes came after its decentralization policy was complemented with implementation of well-designed public school improvement programs that increased material support for disadvantaged schools and strengthened support for professional development of teachers. Successful decentralization efforts such as those cited above have been effective in improving education because they focused on the schools. Administrative and budgetary reforms were designed to ensure that schools and their teachers have the professional competence, authority, resources and incentives to design and carry out learning and teaching activities that are suitable to the needs of the individual students. It is impractical and inefficient for the national government to bypass sub-national governments because there are educational activities that are done best at the lower levels. These are activities which the government cannot handle efficiently because it is too far away from the problem (for example, supervision, coordination of location of schools, and ensuring equity among localities within a state).

3.15 In light of Bolivia's present arrangements and the strong political move towards further decentralization, changing financing rules to have funds follow students may be the best solution. If the central Ministry of Education finances departments or municipalities (or both) according to a student-based formula (adjusted for special conditions such as sparsely rural areas or transportation difficulties) this would create incentives to have as many children as possible in school without the wasteful assignment of teaching positions in existence today. The MOE could then assume the role of setting standards, evaluating performance, and providing technical support to the departments and municipalities that would be running schools.

Box 1.5: Examples of Financing Following Students

Chile. Chile allows funds to follow children through school choice. This means that private education providers or municipalities receive funding from the central government that is strictly proportional to the number of children enrolled in each school. Children are free to enroll in any school they choose (private or municipal). Private schools receive funding proportional to the number of students enrolled. In the case of municipal schools, the municipalities that run the schools receive the per capita funding, add any own resources they wish, and then divide the resources among their schools as they see fit.

Brazil. Brazil has always had a decentralized education system in which schools were run either by municipalities or states, which were required by law to dedicate 25 percent of their total revenues to education. Unfortunately, this led to high inequalities in financing due to large difference in per capita revenues among Brazil's states. Started in 1998, a reform called FUNDEF (Fundo de Manutenção e de Desenvolvimento do Ensino Fundamental e de Valorização do Magistério) takes 15 percent of tax collection and revenue sharing at the state and municipal levels and creates a state level fund. This fund is then redistributed to the municipal systems and the state system in proportion to primary enrollments from the previous year. The federal government then tops off the fund in those states in which tax collection falls beneath a certain minimum. Once again, the end result is that financing follows children.

Colombia. Colombia has followed a decentralization path closest to that being taken by Bolivia now. Decentralization in education was a political decision made as part of a national decision to decentralize in all areas. When teachers were first decentralized to the departmental level their wages were paid for by a block grant called the *Situado Fiscal*. However, most of the *Situado* was distributed according to trends driven by pre-decentralization distribution of costs. This, of course, did not lead to a better allocation of teachers or equity among departments. Even worse, for a while departments could hire teachers and pass on the cost to the *Situado*. Municipalities also receive a formula-driven grant (*Participaciones Municipales*) and hire some teachers for municipal schools. Teachers were decentralized with no attention to equity between departments or municipalities. This led to very large disparities in student-teacher ratios with no incentive to change the resource allocation rules. As the situation became more complicated, incremental funding that follows students has been introduced and the situation is expected to improve.

Improved Accountability

3.16 The fragmented decision-making process that characterizes Bolivia's current decentralization arrangement highlights the need to assign responsibility for improving learning outcomes. In most countries that perform well in international assessments, local authorities and schools have substantial responsibility for educational content and/or the use of resources, and many set out to teach heterogeneous groups of learners. In order to improve learning outcomes it is necessary that school empowerment be accompanied by a strengthened accountability framework that enhances social and parental participation in schools. Finally, accountability can strengthen school quality by involving parents and the community more, and by setting clear goals and visions for the school system. To improve quality, Bolivia needs to continue its efforts to move decision-making to the school level.

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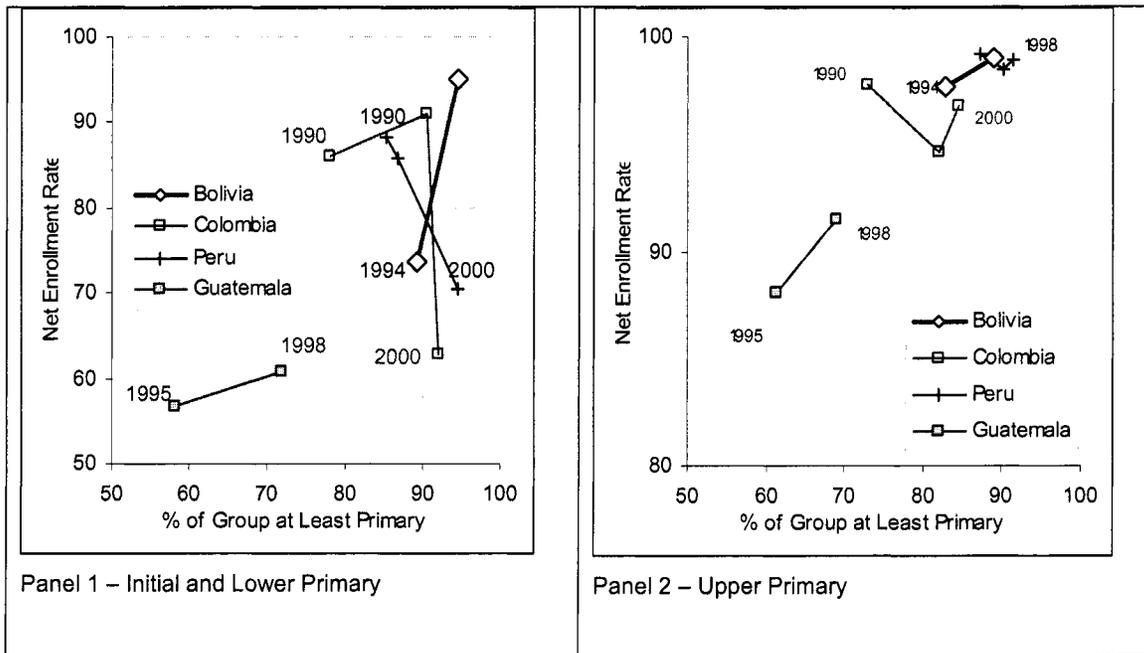
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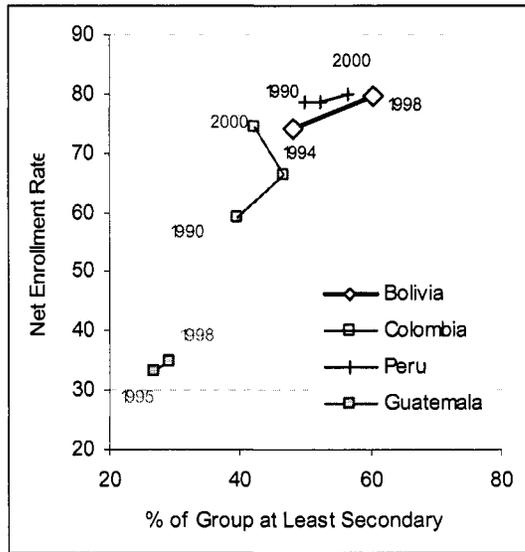
ANNEX A.1: ACCESS AND ATTAINMENT

The four panels in Figure A.1.1 show a phase diagram constructed with comparable DHS Household Survey data for the four Latin American countries with available series data (Bolivia, Peru, Colombia, and Guatemala). The objective is to include information on enrollment and attainment and to show both a time trend and comparisons with other countries.

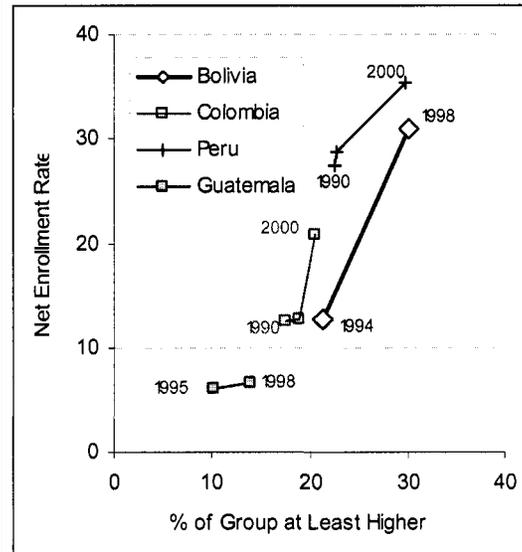
The percentage of the age group enrolled in school is on the vertical axis. The first panel shows 6-10 year-olds, the second shows 11-15 year-olds, the third shows 16-20 year-olds, and the last shows 21-24 year-olds. These correspond approximately to children who should be in initial and lower primary, upper primary, secondary, and higher education respectively. The percentage of the age group that has attained at least some primary (panels 1 and 2), some secondary (panel 3), or some higher education (panel 4) is on the horizontal axis. Countries with low access (such as Guatemala) will be in the lower left hand corner, those with high access but inefficient flow will be in the lower right hand corner, and those with both good access and good flow will be in the upper right hand corner. The upper left hand corner is, in principle, impossible. The phase diagram shows progression over time.

Figure A.1.1 – Access and Attainment by Age Group





Panel 3 – Secondary



Panel 4 – Higher

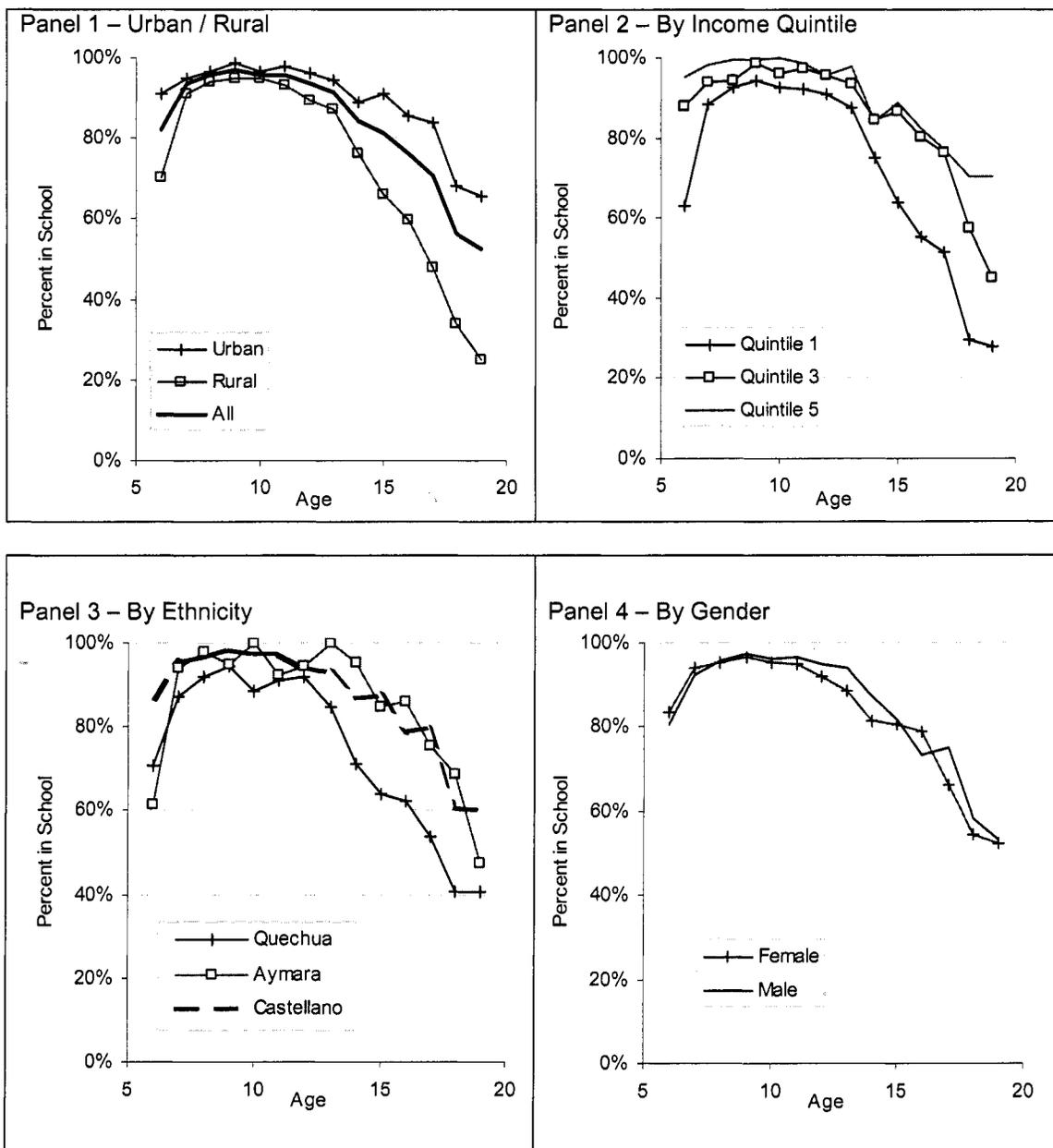
Source: DHS microdata.

Panel 1 shows that, although Bolivia improved access to lower primary, most of the improvement relative to the other three countries was in internal efficiency (i.e., less grade repetition and dropout). This can be seen in the highly sloped line representing a small change in the horizontal axis and large change in the vertical one. Panels 2 and 3 show changes in access due to improvements in the educational efficiency of previous levels. This suggests that upper primary and secondary will be facing increases in enrollment as a result of improvements in internal efficiency at the primary level.

ANNEX A.2: SCHOOL ENROLLMENT BY AGE, BY INCOME, BY ETHNICITY AND BY GENDER

The 1998 DHS reveals that the enrollment rate for 7-11 year-olds is 95 percent. However, from age 12 onwards, enrollment plummets and the differences in enrollment rates among different groups grow larger.

Figure A.2.1 – School Enrollment by Age



Source: 2002 MECOVI.

At age 16, the difference in enrollment rates is 27 percentage points between urban and rural youth, 26 percentage points between the richest and poorest quintile, and 17 between

Quechua and Spanish speaking youth. The gender gap is smaller than the urban/rural, income, and indigenous/non-indigenous gaps. After age 12, boys have higher enrollment rates of up to 6 percentage points but girls have a higher enrollment rate at age 16. It is important to note the differences between indigenous groups. Aymara youth appear to do much better than Quechua speakers. This reveals that rural, low income, and Quechua are strongly associated with higher dropout rates, while urban, high income, Spanish, and non-rural Aymara students are associated with lower dropout rates.

The above graphs show the results according to various demographic groups, but do not show the specific effect on enrollment of belonging to one group. For example, native Quechua speakers tend to be overwhelmingly more rural than Castellano speakers, which means that it is impossible to tell if the factor keeping them out of school is their rural location or their native tongue. A multivariate analysis in Table A.2.1 shows the effects on enrollment when changing only one student background characteristic.²⁵ The table also shows the change in enrollment probabilities from being a modal (male, Spanish speaking, urban inhabitant of the altiplano who does not work and whose mother does not work) student to one different in only one dimension.

²⁵ The numbers were calculated as follows: a probit was estimated on children from 7 to 14 to estimate coefficients showing the impact of each variable on enrollment. The estimated coefficients were then used to construct the probabilities of enrollment for the modal student (male, Spanish speaking, urban inhabitant of the altiplano who does not work and whose mother does not work).

**Table A.2.1 – Changes in Enrolment Probabilities
by Variables**

| | 1999 | 2000 | 2001 | 2002 |
|---------------------------|-------|--------|-------|--------|
| <i>Language</i> | | | | |
| Spanish | Base | | | |
| Native Quechua Speaker | -0.2% | -1.3% | -0.4% | 0.4% |
| Native Aymara Speaker | 0.4% | 0.3% | 0.6% | 1.4% |
| <i>Gender</i> | | | | |
| Male | Base | | | |
| Female | -0.4% | -0.4% | -0.4% | -0.9% |
| <i>Location</i> | | | | |
| Altiplano | Base | | | |
| Valle | -0.7% | -2.8% | -1.3% | -2.2% |
| Llano | -0.6% | -5.4% | -2.3% | -5.3% |
| <i>Family Background</i> | | | | |
| Father's Schooling (yr) | 0.2% | 0.7% | 0.4% | 0.5% |
| Mother's Schooling (yr) | 0.1% | 0.3% | 0.2% | 0.5% |
| Mother works | 0.2% | 1.6% | 0.4% | 1.0% |
| Child works | -2.6% | -15.0% | -3.1% | -9.4% |
| <i>Rural Interactions</i> | | | | |
| Urban | Base | | | |
| Rural | -3.4% | -0.9% | -2.5% | -2.9% |
| Rural Woman Interaction | -2.7% | -5.1% | -4.1% | -2.3% |
| Rural Quechua Interaction | -0.5% | -0.2% | -0.5% | 0.6% |
| Rural Aymara Interaction | -8.1% | -3.3% | -1.8% | -13.0% |

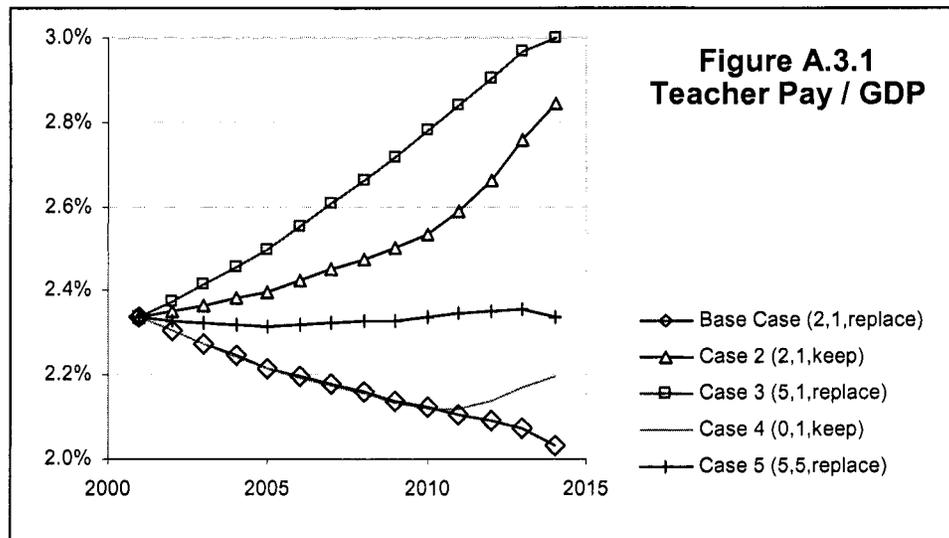
Source: MECOVI surveys.

The results show that rural location, particularly when combined with non-Spanish language, is a strong negative determinant of enrollment. Higher parental education level has a strong positive effect on enrollment and child labor has a strong detrimental effect, although it is worth noting that child labor may be jointly determined with school enrollment making the relationship between the two more complex than what a simple probit estimation can reveal. The negative impact of rural location and indigenous native language is quite clear, though.

ANNEX A.3: FISCAL IMPACT OF IMPROVING TEACHER ALLOCATION

The objective of this annex is to show that better allocation of teachers can allow for financially sustainable investments in education. The World Bank and the Ministry of Education have advanced in the creation of a Dynamical Model for teacher wages and their fiscal impacts. The software used for modeling is called *iThink* and simulates a large number of relations entered in this program. The teacher simulation model is quite complex and what follows merely scratches the surface of modeling possibilities.

The issue to be investigated is the fiscal impact of different policies for teacher hiring and remuneration. The results are all shown in terms of percentage of GDP that the primary teacher wage bill requires. Figure A.3.1 shows five scenarios out of an almost countless number of possibilities. The base scenario supposes a geometric growth rate of the real *haber básico* of 2 percent, which is close to but slightly less than the historical average for the last 10 years²⁶, a conservative growth rate for real GDP of 1 percent, which is close to but slightly more than the average since the 2000 crisis, and also that the number of teachers remains the same—i.e., that the Ministry merely hires new ones to fill up the openings left by teachers retiring or moving to new professions. This is indicated by the caption *Base Case (2, 1, replace)* in the graph. For this scenario to be real, of course, either teacher allocation must improve or children will be left without teachers.



Source: I Think simulations.

The base scenario shows that the pressure of the teacher wage bill on GDP is not explosive and will even fall from 2.25 percent currently to 2.03 percent by 2014. Average teaching wages will rise by 22.7 percent over the next decade, which is slightly less than the 25 percent increase over the previous one. This option, of course, presupposes that teacher allocation can be rationalized to allow the teacher student ratio to rise without losing coverage. It is important to state that this is a complete simulation, which takes into consideration retirement,

²⁶ The rest of the *escalafón* grows linearly with the *haber básico*.

abandonment, promotion through the *escalafón*, and demographics. It does not, however, include geographic analysis and does not take into account how teacher allocation will improve.

In addition to the base case, various other scenarios were explored. In particular, situations in which the student-teacher ratio is kept constant were simulated. Case 2 is identical to the Base Case except that the student-teacher ratio is kept constant and the graph shows that the situation is explosive. The wage bill will go to 2.85 percent of GDP and average teaching wages will increase only 16.5 percent. Only Case 3, in which the *haber básico* grows by a phenomenal 5 percent per year and retiring teachers are replaced, is worse for public finances, with average teaching wages growing by 70.1 percent over 10 years and the wage bill going to 3 percent of GDP. Case 4 shows how tough salary negotiations would have to be in order to make the wage bill fall while keeping the student teacher ratio constant—no increases at all in the *haber básico* would be possible if GDP grew at 1 percent per year.

Case 5 serves to show the potential of high growth rates in GDP. If GDP grows at 5 percent—good but not stellar and only slightly above the average for the high growth years of the late 1990s—then the *haber básico* could grow at 5 percent as well and teachers would be making 70 percent more 10 years from now at no additional fiscal impact on public finances.

The most important conclusion of the simulation exercises is that the number of teachers and not really their salary (within reasonable parameters) is the fundamental variable in determining the wage bill in the medium to long run. Constant wage increases are possible if carried out with a policy of optimizing teacher allocation. Equally, some wage increases, particularly targeted wage increases, can be combined with policies for keeping children and youth-at-risk from dropping out, improvement of quality, and expansion of secondary schooling.

