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SECONDARY EDUCATION IN BRAZIL: TIME TO MOVE FORWARD

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FOREWORD

Over the last two decades basic education indicators in Brazil have made impressive progress. In the early 1980s, an average Brazilian would attain less than 4 years of schooling; only half of them completed primary and a mere 17% completed secondary education. By the late 1990s, the average years of education of the population had reached 6,5 years; access to primary education is almost universal; one out of two students have access to secondary and about a third are completing secondary education.

Over the last decade, the remarkable improvements in primary education have begun to translate into an exploding social demand for secondary education: enrolments at this level are growing by over half a million new entrants every year. At the same time, globalization and increasingly competitive labor markets have placed education at the center of the development agenda, both as a prerequisite for sustained growth as well as a key factor towards improving income distribuition and reducing poverty.

The government of Brazil is facing the double challenge of rapidly expanding access to secondary education and, at the same time, transforming the curricula and improving the quality of secondary education. The Inter-American Development Bank and the World Bank have been supporting these efforts and have made secondary education a central priority in their development assistance strategies for Brazil.

This study represents a collaborative effort between the two Banks, developed in close consultation with Brazilian government officials and education authorities, both at the federal and state level. The report is based on new research commissioned to Brazilian social scientists focusing on both supply and demand factors affecting student attainment and performance. It explores the main challenges faced by Brazilian secondary education in terms of access, equity, quality and financing, and presents a menu of policy options -- not prescriptions -- to address them.

We hope this study will contribute to the lively exchange of ideas among brazilian education authorities and practitioners.

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Brazil's basic education system is divided into pre-school, an eight-year cycle (*ensino fundamental)*, and upper secondary education (*ensino médio)*. The *ensino fundamental* cycle unifies the former primary (grades 1-4) and lower secondary (grades 5-8) cycles. Despite the legal unification, in practice, grades 1-4 are usually housed in separate schools from grades 5-8. Of schools offering upper secondary education (grades 9-11), 58 percent also offer the final four years of *ensino fundamental*. Given these operational characteristics as well as many instructional similarities, this report includes grades 5-8 (lower secondary) and 9-11 (upper secondary) under the discussion of "secondary education."

Brazil has made great strides in secondary education over the last ten years. With nearly 90 percent of children entering school expected to complete the primary cycle (grades 1-4) nationwide, enrollment rates at the secondary level are increasing. The 1988 Constitution mandated minimum spending levels for education at the federal, state, and municipal levels, and further clarified responsibilities in the provision and financing of basic education.[3] Other advances include the development of modern educational information and assessment systems, a new law guaranteeing a per-student minimum expenditure for all students in *ensino fundamental*, and the recent adoption (1998) of new Secondary Curriculum Guidelines. In line with trends worldwide, these guidelines mandate a general but more life-skills oriented academic preparation at the secondary level, abolishing the traditional two-track system of "general" and "vocational" secondary education.

Despite these advances, Brazil still faces substantial challenges with regard to access, equity, and quality in secondary education. This report explores these challenges, based in large part on new research conducted by Brazilian social scientists and commissioned as part of this study. The study itself is a collaborative effort between the World Bank and the Inter-American Development Bank, and was developed in close consultation with Brazilian Government officials. The main study findings are summarized in the sections below, with the hope that they may serve to inform the design of policy strategies and investment programs. Policy options discussed in the report are summarized in the table appearing at the end of the Executive Summary. In discussing findings and presenting policy options, we attempt to highlight the fact that national-level data obscure enormous differences between regions and states within Brazil. The well known phrase "the two Brazils" – developed and developing – still holds true with regard to secondary education.

There are a number of important issues that the study has chosen not to address, or to address only in a limited way. One is the issue of vocational education; a second is the

[3] According to the 1988 Constitution, the Federal Government must spend a minimum of 18% of revenues on education, while states and municipalities must spend 25%.

issue of curriculum content. In both cases the Government has recently taken clear policy positions, although much still needs to be done to implement them. Regarding technical and vocational education, the government chose to separate technical education from secondary schools altogether, making a clear choice for secondary education as the last stage of basic education, and dealing with technical education at the post-secondary level. This reform is being implemented as part of the *Programa de Reforma e Melhoria do Ensino Profesional* (PROEP) and is linked to the definition of a curriculum for secondary education that emphasizes basic skills and competencies.

A third area is that of teachers and teacher training. Although clearly important, we expect many issues to be more fully covered in a forthcoming study on teachers and teacher training in Brazil.[4]

II. Access: "Universalization" of Primary and Growing Demand for Secondary Education

Under the Constitution, states are responsible for upper secondary education, while the responsibility for *ensino fundamental* (which includes the lower secondary grades) is shared with municipalities. In fact, states are the overwhelming providers of both lower and upper secondary education, accounting for 69 percent of total enrollments. Municipalities account for 15 percent of enrollments, private providers for another 15 percent, and the federal government for 1 percent. Private participation is higher in upper secondary education, accounting for 20 percent of enrollments and more than a third of all upper secondary education establishments in 1997.

With the possible exception of isolated rural communities, access to education through lower secondary does not appear to be a problem. In fact, the ratio of gross to net enrollments (1.63 for primary and 1.24 for lower secondary) indicates that there are more enrollments than would be required for universal coverage. Completion rates, however, tell a different story. Of students entering the first grade in 1998, only 66 percent are expected to complete lower secondary education (8^{th} grade). The contrast between coverage and completion rates raises major questions regarding system efficiency.

In fact, student flow analysis for Brazil demonstrates that repetition, rather than physical access, is the principal impediment to the expansion of secondary education. Repetition is widely used as a classroom management tool in Brazil, and is deeply entrenched in the system. Repetition rates result in only two out of three children who enter first grade in 1998 expecting to complete lower secondary education (8^{th} grade), spending on average 10 years to do so, while only one out of three first graders will eventually finish upper secondary education (11^{th} grade) taking an average of 14 years to do so. Beyond the serious educational problems behind these indicators, such a system wastes resources, both human and financial. Repetition rates tend to be particularly high in the "transition"

[4] "Brazil: Teacher Development and Incentives" World Bank, forthcoming.

grades of 5th and 8th, when students are moving between levels of the system and frequently between schools.

The legacy of repetition also shapes the profile of the secondary school population. Around 60 percent of students enrolled in upper secondary education are enrolled in night schools, because a majority of them must work full time. The decision to study at night is largely determined by the age of the student; as he/she gets older and his/her age-grade gap increases, the student faces rising opportunity costs and strong incentives to study at night, as a last resort before dropping out altogether. About 55 percent of students enrolled in upper secondary are older than their target age group, while over one third have more than three years of lag.

Chronic repetition also leads to dropout. Both lower and upper secondary education are characterized by persistent dropout, which in large measure explains why even the gross enrollment rate at the upper secondary level is so low (68 percent). Not only do older students have strong incentives to drop out of school, repetition itself appears to have a discouraging and stigmatizing effect. Previous studies have shown that a child who repeats first grade is at greater risk for further repetition. Nor does repetition appear to improve children's achievement levels. Moreover, because poorer children tend to be disproportionately represented among repeaters, the connections between repetition and dropout have important equity implications.

III. Equity: Differences among Regions and Socioeconomic Groups

Brazil comprises 27 states (including the Federal District) ranging from the economic powerhouses in the Southeast to the poor states of the North and Northeast. This vast heterogeneity is mirrored by large differences in the development of education systems between states. In many of the poorer states in the Northeast, 2 out of 3 students do not complete *ensino fundamental*, and only a small minority ever gets to upper secondary. By contrast, in the more developed states in the South and Southeast, a higher standard of living and significant reductions in repetition rates in primary grades have widened educational opportunities and produced a broad-based expansion in secondary education. In São Paulo, for example, two out of three students complete *ensino fundamental* and enrollment in upper secondary schools is approximately two million students, (close to one third of the total for Brazil).

Secondary education, particularly upper secondary, is overwhelmingly urban. Almost 95 percent of enrollments in lower secondary and nearly 99 percent of enrollments in upper secondary education are in urban areas. Particularly striking is the drop-off in the share of rural enrollments between the primary and lower secondary levels: while 25.9 percent of total enrollments at the primary level are rural, only 5.2 percent of lower secondary enrollments are. It is not clear to what extent this shift is exclusively due to higher dropout and repetition rates in rural areas, or whether localized problems of physical access to lower secondary also act as a disincentive for children to finish even the primary cycle. A common pattern for the few rural student who do finish lower

secondary education is to migrate to urban areas either to work or continue their education.

Perhaps the greatest source of income inequality in Brazil is the difference in education opportunities and performance between socio-economic groups. While the child of a wealthy family usually completes university education, even at the graduate level, the likelihood that a student from the lowest three deciles (an income group roughly equivalent to the population under the poverty line) completes primary education is only 15 percent, and the chances that s/he will complete secondary education are a slim 4 percent. The are also large differences in educational attainment among racial groups: only one in four students attaining 9 or more years of education is non-white.

In analyzing factors affecting the demand for education, the study found parents' education to be the single most important determinant of the number of years of schooling attained by children, even after controlling for differences in family income levels. Evidence on opportunity costs is mixed, a finding that can be partially explained by the role of night schools. Because studying at night is customary in Brazil, the traditional tradeoff between school and work is somewhat muted.

Returns to secondary education, although starting to decrease, are still positive (between 12 and 14 percent in one study); returns to higher education, however, (for which secondary is a pre-requisite) are even higher and rising. This fact acts as a strong incentive for better-off families to ensure that their children attend high quality secondary schools and is consistent with the large differences in family expenditures on education. Families in the top income decile spend more than twenty times the median value for all families, and there is a relatively flat pattern of low expenditures on education up to the seventh decile. Furthermore, education as a share of total family expenditures rises steeply among the top deciles. Interestingly, education expenditures of the poor, although quite small, are mainly represented by the purchase of books, whereas private tuition costs account for the lion's share of educational expenditures among the top deciles.

The study also found large inequities in access to school quality inputs. Independent of school administration (state, municipal, or private), poorer students attend lower quality schools. Private schools are generally far better equipped than their public counterparts, with the notable exception of school books, where state schools are comparable. Among public schools, the quality of municipal schools falls below that of state schools. Public schools also lag behind private schools in terms of instructional time; 80 percent of private schools operate solely on a day shift basis and 90 percent have more than 4 hours of instructional time, while 40 percent of public schools offer night classes and only 60 percent offer more than 4 hours of schooling. Importantly, however, the study also found that higher school quality has a strong positive impact on the years of schooling attained.

IV. Quality: Determinants of School Success

In terms of overall learning levels, Brazilian secondary school quality is quite low. According to results of a recent national assessment test (SAEB 1997), only 52 percent of 8th and 26 percent of 11th grade students are achieving at the expected level for their grade in Portuguese. Outcomes for math achievement are even more dramatic: 48 percent of 8th grade students performed below the expected mathematics level for fourth grade students.

In Brazil, as in the rest of the world, school characteristics do not have nearly as much impact on learning achievement levels as do background variables (such as community and contextual characteristics). They do, however, make a difference. Comparing factors influencing mathematics achievement in secondary school in Brazil, for example, the study found that school variables alone can generate greater learning gains than an additional year of schooling. Combining this information with the finding that school quality has a strong positive effect on educational attainment, the study concludes that efforts to improve school quality are central to any strategy to improve educational outcomes at the secondary level.

As with all quantitative research, there are limitations on what it is possible to measure. Results, therefore, need to be interpreted with caution. In analyzing which school factors have the highest impact on learning, the study found the availability and maintenance of adequate facilities and instructional inputs to be extremely important. In fact, once equalized for these inputs, achievement differences among private, municipal, and state schools were eliminated. The estimated impact of a well equipped school versus one with fewer inputs can be equivalent to almost an additional half year of study. Maintenance also has a strong positive effect on achievement growth rates, though high standards of school maintenance may also in part reflect more capable school-level administration.

With regard to teachers and principals, the study found teacher experience to have a positive impact on student achievement, while education and salary levels did not. One explanation of the lack of impact of teacher education may be its generally poor quality in the Brazilian context. Another may be that while education levels may make a strong difference in some situations, they do not in others. Other research has found strong teacher content knowledge and high expectations to have a positive effect on learning, in addition to practical experience. Ironically, secondary schools in Brazil where principals have more experience were found to have lower achievement growth rates – perhaps because more experienced principals are older and conceivably less attracted to pedagogic and administrative innovations that could improve student learning. In contrast, principal salary had a positive effect on achievement. It may be the case that because principal salaries are less regimented than those of teachers, salaries reflect more of a market assessment of principals' capabilities: the better ones are better paid.

Other factors thought to influence student achievement are instructional time, school governance, and curriculum. Although absenteeism has a strong negative impact on learning, instructional time did not emerge as a significant explanatory variable in this study. Other research on the issue suggests that improving time-on-task within the

classroom may have more of an impact on learning than merely increasing the hours of schooling. A quantitative analysis of the impact of a number of innovations in school governance in Brazil (including direct transfer of financial resources to schools, election of principals, and the institution of community based school councils) found a modest positive impact of these innovations on most of the student outcome indicators examined. Other aspects found to positively contribute to learning at the secondary level include an orderly and supportive environment, with numerous mentoring opportunities, and clear rules and expectations. Finally, various programs in the U.S., Europe, and some Latin American countries have sought to "contextualize" secondary academic education, increasing its relevance to student life and work experience. There is as yet, however, little evidence as to the relative success of these efforts.

V. System Financing: Funding Secondary School Expansion

While public sector spending in education in Brazil (4.7 percent of GDP) exceeds the Latin American regional average (3.7 percent), it is characterized by multiple inequities and inefficiencies. Public financing of tertiary education means that although higher education enrollments represent only 2 percent of total enrollments in the education system, this level of education captures 25 percent of total education expenditures. As seen earlier, this financing largely benefits the wealthy, since the poor for the most part do not make it beyond the primary level. Despite decades of mandatory education financing and federal transfer programs, sharp regional and intra-state disparities in per-student expenditures persist. While Brazil at first glance appears to spend little per-student in comparison with many other countries, such comparisons do not factor in the actual costs of producing a graduate. Once spending on repetition and dropout are taken into account, Brazil's per-student expenditure levels are comparable to those found in Hungary, Argentina, or Malaysia, countries widely recognized to have solid education systems. In other words, current resources could be better spent.

With regard to lower secondary education, the Brazilian Government has recently undertaken a major effort to improve inequities in per-student spending through the launching of the Fund for Development of Fundamental Education and Valorization of Teachers (FUNDEF) in 1997. While the workings of this fund are described in more detail in the body of this report, the principal result of the FUNDEF is that every child in Brazil's *ensino fundamental* will study in a school system spending at least a minimum amount per child annually. The immediate impact of the program has been substantial, including: (a) a 50 percent increase in average teacher salaries in the Northeast; (b) a 6 percent increase in initial enrollments; and (c) nearly 11 million students benefiting from increased educational expenditures within their systems. Incentives for expanding access to lower secondary (grades 5-8) are built into the FUNDEF, as each additional student retained in the system represents additional income.

States are responsible for the provision and financing of upper secondary education. Given that the law mandates a minimum investment of 25 percent of state revenues for education (of which 15 percent is earmarked for the FUNDEF), the remaining 10 percent

(or more, if the state exceeds the minimum investment level) represents the financial resources that can be used to finance upper secondary education. Upper secondary education competes for these resources, however, with other education-related expenses, including higher education and teacher pensions.

Based on current student flow projections and per-student spending levels, the study estimates that costs for provision of *ensino fundamental* Brazil-wide will actually start to decline over the next few years, while the costs of upper secondary education will continue to rise. The initiation of the decline of *ensino fundamental* costs will vary from state to state; these costs are already starting to fall in some of the more developed states such as São Paulo, while costs are still rising in less developed states like Bahia. Although there are institutional barriers (principally the division between state and municipal systems) to overcome, it should theoretically be possible to finance all of the expansion of access in grades 5-8 and almost half of the expansion of access to upper secondary education through a combination of shifting resources between grade levels and modest improvements in efficiency within *ensino fundamental.* Similarly, better targeting of investments, regionally, between education levels, and within the range of educational inputs, should be adequate to raise education quality without a significant increase in the overall level of education spending.

VI. Conclusion: Challenges and Policy Options

Brazil still faces a number of important challenges if the goal of universal completion of a quality basic education through the secondary level is to be achieved. Judging from the evidence presented above, major challenges include: (a) reducing repetition and dropout; (b) expanding access for hard to reach students (including those in rural areas); (c) improving quality and relevance of public secondary schools (including night schools); and (d) financing the projected expansion of secondary education. The time to focus on these challenges is now.

Large differences within Brazil also mean that certain challenges will weigh differently in different regions and states. No state can afford to ignore the issue of repetition, for example. In more developed regions such as the Southeast, however, improvements in repetition rates in primary grades have already prompted a large expansion of access at the secondary level. Attention to repetition in these areas could help smooth transitions between levels of the system (primary to lower secondary, and lower to upper) and address equity issues (repeaters are disproportionately from poor families). In less developed areas, such as parts of the North and Northeast, massive repetition in the primary grades is still effectively constraining expansion of secondary education. In these cases, both access and equity objectives at the secondary level might be best met by focussing attention on improving education quality and student flows in primary school. In summarizing policy options in the table that follows, we have tried to take into account these differing realities.

POLICY INTERVENTION / PROGRAM **Main Program Objective**	**Target Population/ Stage of Educational Development**	**Targeted Level**	**Reference**
EXPAND ACCESS TO SECONDARY EDUCATION			
Flow correction / *Classes de Aceleração*: *Why?* Repetition limits the number of students completing *ensino fundamental* and results in large age-grade gaps. Both limit the demand for *ensino médio*. *How?* Modular/flexible curriculum; contextualized learning materials; grade cycles without repetition; students progress at their own pace; continuous assessment system.	Both developed and developing states. **Particularly critical in less developed systems**.	Grades 5-8	Chapter II Box 2.3 Page 15
School Reorganization / Vertical Integration / Joint State-Municipal Educational Planning: *Why?* Optimize use of existing infrastructure; promote efficient use of resources; take advantage of space resulting from falling primary enrollments; improved school organization and use of teacher's time; pedagogical advantages of grouping students of similar ages; strengthens school identity. *How?* Integrate lower and upper secondary in one school (*escola de jovens* in São Paulo); municipalization of primary education; microplanning, school networks and school feeder systems.	Both developed and developing states.	Grades 5-8 and 9-11	Chapter II Box 2.4 Pages 16, 20
Expansion and Enhancement of Equivalency Exam (*Supletivo*): *Why?* Provides recognition of skill levels and potential access back into formal education system for dropouts and school leavers; provides incentive for self-directed learning; cost effective solution to improve flow problem. *How?* Establishment of clear rules; development of high quality tests; application of tests at no cost in a wide range of geographic locations and with very flexible scheduling.	Both developed and developing states.	Grades 5-8 and 9-11	Chapter II Page 19
Alternative Delivery Options: *Why?* Expand access to under-served population groups, in cases where it is not viable to have a regular secondary school. Disperse rural communities, scale, lack of teachers. *How?* Distance Education; modularized curriculum (Ceará); credit system; alternatives to regular *supletivo* (Telesalas in Sao Paulo); public-private collaboration.	Both developed and developing states. Large rural populations, remote communities, overcrowded urban schools.	Grades 9-11	Chapter II Page 21

IMPROVE EQUITY			
Targeted Quality Improvement programs for poor or under-performing schools: *Why?* Schools catering to the less privileged have fewer quality inputs. Disadvantaged students are in greatest need for targeted interventions (positive discrimination). *How?* Quality educational materials; curricular improvements/ flexibility; contextualized learning.	Poorer communities. Marginal areas in large metropolitan centers. Overcrowded urban schools.	Grades 9-11	Chapter III Page 37
Improve Quality of Night Schools: *Why?* Schools with night shifts serve poorer segments of the secondary school population and are generally more precarious in their operations than exclusively day-shift schools. *How?* Quality educational materials; curricular improvements/flexibility; increase instructional time and time-on-task through weekend enhancement courses and distance education.	Both developed and developing states.	Grades 9-11	Chapter IV Page 54
Flow Correction / *Classes de Aceleração:* *Why?* The poor are disproportionately represented among repeaters and dropouts. *How?* See above.	Both developed and developing states.	Grades 5-8	Chapter II Page 15
Alternative Delivery Options: *Why?* Poor tend to be disproportionately represented in isolated rural communities and night schools, and thus would stand to benefit from alternative delivery options. *How?* See above.	States with large rural populations. States with overcrowded urban schools.	Grades 9-11	Chapter II Page 21
Incentives/ In kind subsidies to poor families: *Why?* Family variables have a strong effect on educational attainment. Family expenditures in education are very regressive, the rich spend a much higher share of their income on education. Education expenditures are income inelastic among the lower income quintiles. Books and school supplies represent the lion's share of limited educational expenditures by the poor. *How?* Subsidizing school supplies, books and educational materials (i.e. textbooks), and transport is likely to be more effective than giving cash transfers to families. However, may be costly to sustain.	Universal program for poorer states and targeted programs for poor communities within more affluent states.	Grades 5-8 Greater targeting risks at grades 9-11	Chapter III Page 40

INCREASE QUALITY OF SECONDARY SCHOOLING			
Progressive adoption of Minimum Operational Standards for Secondary Schools: *Why?* –Public secondary schools lack a minimum of quality inputs and operation characteristics that favor student learning. Quality inputs have a strong impact on student achievement. *How?* Introduce minimum standards for physical and human resources; provide a minimum package of instructional materials. However, may be costly and may require a selective and phased approach.	Start in poorer states and disadvantaged schools. Gradually extend to other schools.	Grades 5-8 and 9-11 Start with 5-8	Chapter IV Page 53
Implementation of Curricular Guidelines in the classroom: *Why?* New curricular guidelines for upper secondary are yet to be implemented. New curriculum is competency based, emphasizes basic skills and provides flexibility to adapt to local conditions. *How?* Contextualized teaching practices; develop age appropriate materials; emphasize content and basic skills; develop school materials for adapting curricula to school and local needs.	All states.	Grades 9-11	Chapter IV Page 52
Competitive selection of Principals / Innovative in-service training of teachers: *Why?* Principals are key actors that need to be strengthened. *How?* Qualification of principals; competitive selection; training of principals through development of school improvement projects (Minas Gerais experience). Requires further research to identify best practices.	All states.	Grades 5-8 and 9-11	Chapter IV Box 4.3 Pages 51
Strengthening school autonomy and school governance: *Why?* Greater school autonomy strengthens principal leadership; strengthens school identity and community involvement in support of the school. Successful experiences with federal programs. *How?* Strengthening community participation in school decision making; transfer of resources to schools; preparation of school development plans (PMEs) for competitive financing.	All states. However, allow flexibility for states to choose the decentralization modality.	Grades 5-8 and 9-11	Chapter IV Page 55

FINANCING / RESOURCE OPTIMIZATION			
<u>Invest savings from efficiency gains in primary in improving quality of lower secondary:</u> *Why?* Resources liberated can be more readily applied for *ensino fundamental*. Quality improvements in primary and lower secondary are the foundation for academic success in upper secondary. *How?* Invest in inputs and innovations shown to have strong effects on educational outcomes (i.e. educational materials, maintenance, efforts to improve school governance and autonomy, practical in-service training for teachers, etc.)	Both Developed and Developing States. Potential savings larger in mature systems.	Grades 5-8	Chapter V Page 68 Chapter IV for discussion of effective investments
<u>Incentives for States to increase their financial commitment to upper secondary:</u> *Why?* Facing the challenge of expanding and improving the quality of upper secondary will require increased financial resources. Currently states have other commitments (higher education, pensions). *How?* Extending FUNDEF to *ensino médio* (FUNDEM). Institute financial incentives for states to increase expenditures on upper secondary (FUNDEF incentives).	Developing states (FUNDEM). Developed states (FUNDEF incentives).	Grades 9-11	Chapter V Page 71

I. INTRODUCTION

A. Secondary Education Overview

1. Objectives of Secondary Education

As defined in Brazil's 1996 Education Law (LDB), secondary education has multiple objectives. The first is academic preparation, building upon the foundation of mathematics, Portuguese and science acquired in lower grades. A second objective is the acquisition of tools for citizenship, including critical thinking skills, ethical sensibilities, and social skills. Finally, secondary education must prepare youth for employment, with the goal of producing flexible learners, capable of adapting to changes in the labor market in an increasingly global economy. This diversity of objectives presents both a challenge and an opportunity for the sector. While multiple objectives are often difficult to combine effectively, recognizing and addressing this range of objectives is important in attracting and retaining a diverse clientele of Brazilian youth.

2. System Structure

In the Constitution of 1934, the Brazilian government defined education as a basic right for all its citizens. Today, Brazil's basic education system is divided into pre-school, an eight year cycle (*ensino fundamental)* joining the former primary (*primário)* and lower secondary levels (*ginásio)*, and a three year "intermediate" cycle (*ensino médio)*. Pre-school education includes the social development of children up to age 6. *Ensino fundamental* (for 7-14 year olds) is divided into two stages (grades 1-4 and 5-8), with national testing conducted at the end of each stage and an increasingly diversified curriculum and instructional organization beginning in the second half of the cycle. *Ensino médio* is comprised of grades 9-11 and is intended for students aged 15-17. The LDB describes *ensino médio* as the "final phase of basic education" to which all citizens are guaranteed access.

Despite the formal unification of grades 1-4 and 5-8 into a continuous *ensino fundamental* cycle, in practice grades 5-8 act in complement to *ensino médio*. The clearest evidence of this is school organization: most schools that offer grades 9-11 also offer grades 5-8, as documented in Figure 1.1, below. These operational characteristics, combined with instructional similarities discussed later in this report, merit the joint study of grades 5-8 and 9-11 under the heading of secondary education (see Table 1.1). Thus, "Secondary Education" in this report will refer to the formal schooling comprised by lower secondary education (grades 5-8) and upper secondary education (grades 9-11).

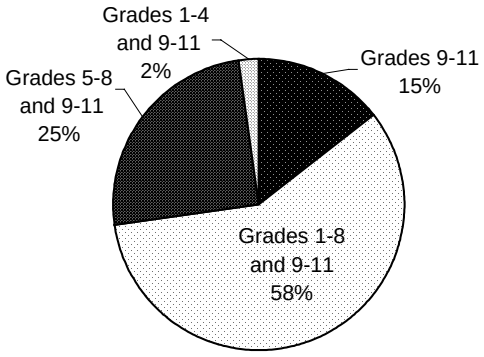
Table 1.1: Structure of the Brazilian Basic Education System

Age	Grade	Brazilian Structure	Report Terminology
7	1st.	*Ensino Fundamental* (Series 1st-4th)	Primary
8	2nd.		
9	3rd.		
10	4th.		
11	5th.	*Ensino Fundamental* (Series 5th-8th)	Lower Secondary
12	6th.		
13	7th.		
14	8th.		
15	1st	*Ensino Médio*	Upper Secondary
16	2nd.		
17	3rd.		

Shading indicates grade at which SAEB, the National Achievement Test, is applied

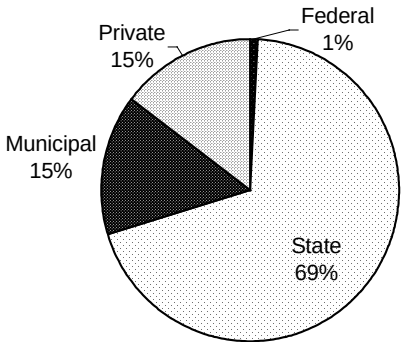
Prior to the 1988 Constitution, all three levels of government (municipal, state, and federal) were involved in the financing and provision of all levels of education. The uncoordinated coexistence of federal, state, and municipal education systems for decades has been one of the main sources of inequity and inefficiency within Brazilian basic education. Building upon new guidelines in the 1988 Constitution, the 1996 LDB further delineated administrative responsibilities as follows: municipal and state governments share responsibility for financing and provision of grades 1-8, while state governments are primarily responsible for the provision of grades 9-11.

Figure 1.1 Organization of Schools that offer upper Secondary Education , Brazil 1997



Source: MEC/INEP/SEEC 1998

Figure 1.2 Distribution of Lower and Upper Secondary Enrollments by Administrative System, Brazil 1997



Source: MEC/INEP/SEEC 1998

State systems in Brazil currently enroll 47 percent of grade 1-4 students, while municipal systems enroll 43 percent. The picture for lower secondary is quite different: state systems account for nearly 70 percent of students, while municipal systems account for 20 percent. States also bear the lion's share of upper secondary education with 72 percent of enrollments, while municipalities account for nearly six percent, the private sector for nearly 20 percent, and the federal government for two percent. Figure 1.2, above,

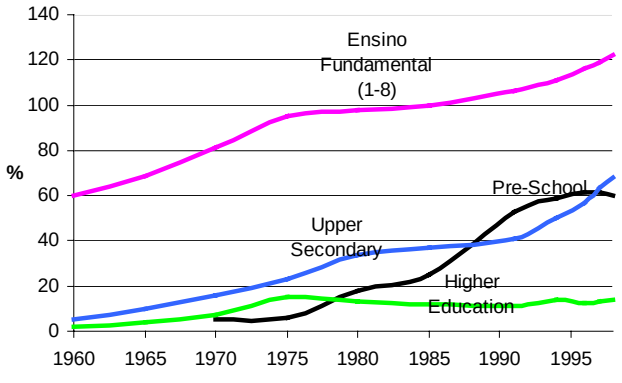
presents the distribution of upper and lower secondary enrollments among administrative systems. While there is significant variation among states, many state governments are in the process of transferring the administration of schools that offer grades 1-4 to municipalities.

Together, lower and upper secondary enrollments account for some 20 million students, (13 million in lower secondary and approximately 7 million in upper secondary). According to the 1997 teacher census, there are more than 430,000 5th to 8th grade teachers, 24 percent of whom do not have university education. Approximately 16,600 schools in Brazil offer grades 9-11, employing some 239,000 teachers, 10 percent of whom do not have university education, the legal requirement for upper secondary (and for lower secondary, beginning in 2007).

3. Recent Advances in Secondary Education

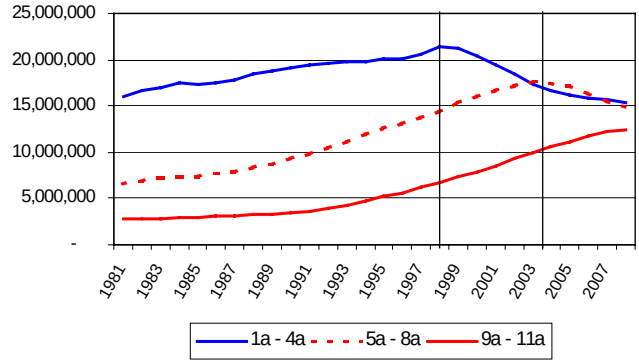
Brazil has made important advances in secondary education over the last ten years. As shown in Figure 1.3 below, there have been substantial **increases in enrollments** in nearly all sub-sectors, while growth in upper secondary schooling has nearly doubled in the past ten years. As shown in Figure 1.4, the upward trend in enrollment at the secondary level is also projected to continue: while enrollments in grades 1-4 have actually already begun to decline, enrollments in lower secondary education (grades 5-8) are projected to peak within the next 5 years, while enrollments in upper secondary education will continue to rise.

Figure 1.3: Gross Enrollment Rates, 1960-1998



Source: MEC/INEP/SEEC 1996, 1998

Figure 1. 4: Evolution and Projection of Enrollments by Cycle 1981-2008



Source: Klein Calculations, 1999.

The increasing number of students entering secondary education, with varied social backgrounds and educational needs, has required reexamination of the underlying policies governing secondary education, including curriculum and financing. Brazil's efforts in these areas have been substantial, and demonstrate a commitment on the part of the Government to create a framework for success at the secondary level.

Revised **Secondary Curriculum Guidelines** (June 1998) formalized the trend in Brazilian upper secondary education towards a more general academic rather than vocational emphasis. Building on the concept of "basic skills" defined in the LDB, the new Guidelines affirm that the *ensino médio* academic curriculum (accounting for three-fourths of instructional time) should provide an education foundation for all types of employment, thus, emphasizing "general education." In allowing for 25 percent of the curriculum to be non-academic, Brazil has made a deliberate political decision to enhance school level autonomy while leaving vocational and technical education as a post-secondary, professional sector of education offered mostly outside of the formal *ensino médio* sector. With the exception of teacher training schools, responsible for training primary school teachers, most vocational secondary schools will be phased out by 2007.

School autonomy has also been a focus of government efforts. As student population has increased and diversified, schools have come to be recognized as the best positioned to make decisions regarding the needs of their clientele. Initiatives such as the direct transfer of resources to schools and the creation and fostering of school councils, have increased the ability of schools to respond to the needs of their communities as well as include them in decision making.

The **Fund for Development of Fundamental Education and Valorization of Teachers** (FUNDEF), which became fully effective in January 1998, guarantees a minimum per student expenditure for all *ensino fundamental* (including lower secondary) students of R$315 (1998 US$300). The FUNDEF promotes the redistribution of resources among state and municipal education systems within each state, in accordance with the number of students enrolled in each system. The Federal government provides supplemental resources for those states falling below the legislated minimum, thus reducing regional disparities in education spending. Further discussion of the financing structure of secondary education can be found in Chapter V.

Despite these advances, Brazil still faces enormous challenges in meeting the projected demand for secondary education. As discussed later in this report, these challenges include finding resources and adopting policies to ensure access, equity, and quality within the sector. The federal government has an important role to play in setting the course and providing guidelines and incentives to implement the curricular reform of secondary education at the state level. Nevertheless, the responsibility of facing many of these challenges will fall primarily to states, as the main providers of secondary education.

B. Report Objectives and Framework

Unlike primary education, highlighted by international and national organizations alike as the key to reducing inequality, and tertiary education, long the focus of interest group and class support, secondary education has seen little support from powerful constituencies and multilateral institutions. As a result, there is currently a dearth of information on and analysis of the sector. Given that trends in enrollment have finally galvanized political

commitment to the reform and expansion of education at the secondary level, this information gap is particularly unfortunate.

This report seeks to help fill the information gap. A collaborative effort between the World Bank and the Inter-American Development Bank, the report is based in large part on new research conducted by Brazilian social scientists and commissioned as part of this study. Collaboration and consultation with the Government of Brazil occurred throughout the study, culminating in meetings held in Rio de Janeiro in January 1999, and a National Seminar on Secondary Education convened by the Ministry of Education in Brasilia in June 1999. It is hoped that the information and analysis discussed in this report and associated background papers will help inform the design of policy strategies and investment programs in the coming years.

The are also certain issues that the report has chosen not to address, or to address only in a limited way. One is the issue of vocational education; a second is the issue of curriculum content. In both these cases, the Government has recently taken clear policy positions, although much still needs to be done to implement them. We believe the general direction of Government policy in these areas to be sound and in line with current international trends, and we do not therefore venture into an examination of the institutional structure or merits of the existing vocational education system.

A third area deliberately under-emphasized in this report is that of teachers. The clear lack of qualified teachers, especially in the sciences, is a persistent challenge in secondary education, in Brazil as in the rest of the world. In accordance with the 1996 LDB, all lower and upper secondary teachers must have a university teaching certificate in their area of discipline by the year 2007. These and other teacher preparation issues will be covered more fully in a forthcoming study on teachers and teacher training in Brazil.

Finally, a very important limitation to the report is the fact that Brazil-wide data and analysis obscure huge differences of realities between regions and states. In commissioning background papers and studies, we attempted to partially account for this phenomenon by including more in-depth analysis of three states: Rio Grande do Sul (in the South), São Paulo (in the Southeast) and Bahia (in the Northeast). Throughout the report we illustrate, where possible, a basic dichotomy between the “developed” Brazil, comprising most of the South and Southeast, and the “developing” Brazil, comprising the North, much of the Northeast, and parts of the Center-West. Even within this broad typology, however, there are important inter and intra-state differences which a report such as this cannot capture. In order for state-level policy makers to have a more accurate sense of the dimensions of the challenges facing them in secondary education, more state-level analysis is still needed.

The main policy issues that the report addresses are as follows:

- The challenge of increasing access to secondary education: what needs to be done to ensure that universal access to primary is followed by progressive universalization of secondary education?

- The challenge of promoting equity: which incentives must be in place so that the poor will attend and persist in secondary schools?
- The challenges of schooling young working adults: how can secondary schools best respond to the needs of students and of a dynamic labor market?
- Improving quality and efficiency of the secondary education system: which are cost-effective investments in secondary schools to enhance quality?
- Financing challenges: dimension, sources, and alternatives to finance the expansion and enhancement of secondary education: what are the costs of expanding and improving secondary schools?

The report is divided into six chapters, with Chapter I as this introduction. Chapter II deals primarily with access to secondary education, emphasizing the analysis of student flows and school completion. Chapter III addresses the issue of equity, providing an analysis of current students, the characteristics of expected enrollments and analyzing the role of demand side variables affecting secondary education attainment. Chapter IV provides an analysis of quality issues, as they relate to school-level characteristics and inputs that have an effect on making schooling more attractive to students and their families. The implications of financing the expansion and quality improvement of secondary schooling are discussed in Chapter V, and the report's main conclusions, policy options and a further research agenda are summarized in Chapter VI.

At the end of each chapter, after discussing the study findings ("the story") and "the challenges" that are pertinent to the chapter, this report presents a set of policy options. These options are not policy prescriptions but rather a menu of strategies that have been used in various contexts. These options can be brought to scale (if they have been successful in a determined region within Brazil) or adjusted to the Brazilian reality (if they have been successful in other countries of the world). Those policy options considered most likely to be viable and relevant in the context of "developing" and "developed" Brazil are summarized in matrix form in Chapter VI.

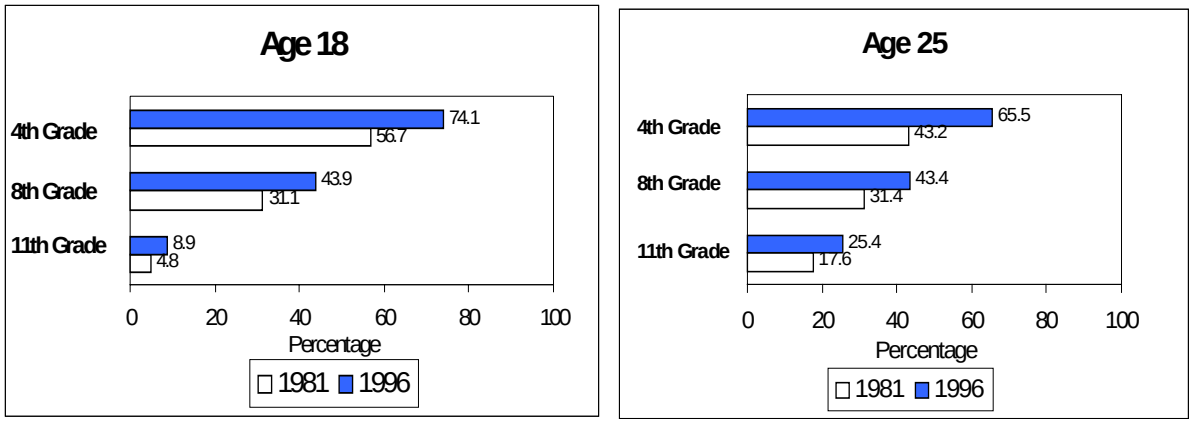
II. ACCESS: "UNIVERSALIZATION" OF PRIMARY AND GROWING DEMAND FOR SECONDARY EDUCATION

A. The Story

Basic education indicators in Brazil show a remarkable improvement over the last two decades. In the early 1980s, an average Brazilian would attain less than four years of primary education, only half completed primary and a mere 17 percent completed upper secondary education (11th grade). By 1996, an average Brazilian completed 5.7 years of schooling. Three out of four students were expected to complete the 4th grade, half the 8th grade, and about a fourth were expected to complete upper secondary education. The adult literacy rate also dropped from 25% in 1980 to 15% in 1998. Average educational attainment for women is slightly higher (6.0 years) than that for men (5.7 years).

Figure 2.1 compares the educational attainment of the population of 18 and 25 years of age between 1981 and 1996, based on household survey data (PNADs). The data show large improvements in the percentage of the population who have completed grades four (primary) and eight (lower secondary) but more modest improvements in the percentage completing upper secondary education (grade 11).

Figure 2.1: Percentage of the Population Aged 18 and 25 Years Completing Each Cycle: 1981-1996



Comparing the two panels, the following points stand out:

- The percentage of 18 year old individuals who have completed 4th grade is greater than that for the population 25 years of age. This is because younger cohorts have attended an education system which is more efficient than the one attended by older cohorts.
- The fact that the percentage of the population completing 8th grade is similar for both ages 18 and 25 is another sign of system improvement. It means that reduced repetition is allowing students to achieve by age 18 the same level of educational attainment that an earlier cohort achieved up to age 25.

- Finally, the fact that the percentage of the population completing 11th grade is much higher for individuals at age 25 than that for those at age 18 means that a majority of students who complete their basic education are older than 18 years, a fact that is consistent with the evidence that there is a substantial age-grade gap.

Brazil still has some distance to cover to catch up with international averages for educational attainment. Brazil's educational performance is still well below OECD standards and even regional LAC averages (see Table 2.1)**,** particularly in secondary education.

Table 2.1: Basic Education Indicators (mid 90s)[5]

	Avg. Years of Schooling	Net Enrollment Primary (%)	Net Enrollment Upper Secondary (%)	Adult Illiteracy Rate (%)
Brazil	5.8	90	20	16.1
LAC avg.	6.0	92	32	12.8
OECD avg.	9.5	98	91	---

Source: Brazil: MEC/INEP; LAC: World Bank; Country Group Data; OECD: OECD Education Database

Over the last decade, a growing awareness of this education gap among Brazilian policy makers and society at large has placed education at the front of the national development agenda. Improvements in education levels are recognized both as a prerequisite for sustained economic growth in a competitive global environment, as well as a key policy intervention to reduce inequality and poverty.

1. Universalization of Ensino Fundamental: Coverage Versus Completion

As seen in Figure 1.4, overall demand for enrollments within Brazil is beginning to shift from primary to lower and upper secondary. As the wealthy in Brazil have always had access to secondary education, the increase in enrollment rates and improvement in completion rates is increasing equity of opportunity. As yet, however, very few of the poorest are making it through secondary education (this topic is explored further in Chapter III).

Table 2.2 compares enrollment rates (gross and net) and completion rates for the three basic cycles (1-4, 5-8, and 9-11). Completion rates are examined from two different perspectives: the fourth column (based on 1996 PNAD household survey data) shows the percentage of the population of a given age which has attained a particular level of education in a given year (1996); on the other hand, the last column reflects the percentage of a student cohort entering first grade in a given year (1998) who are

[5] It should be noted that there are some differences between Brazil, LAC and OECD countries in the structure of their education systems, and thus the number of years included in primary and secondary cycles; the Brazil data listed here as "primary" includes grades 1-8.

expected to eventually complete a particular level of education (based on the simulated flow of a student cohort using current repetition and dropout rates).

Table 2.2: Brazil: Coverage vs. Completion in Basic Education

Grades (Cycles)	Gross Enrollment 1998 (%)	Net Enrollment 1998 (%)	Population having completed a given level in 1996 (%)	Expected completion by students entering first grade in 1998 (%)
Primary (1-4)	163	100	79	90
Lower Secondary	105	85	45	66
Upper Secondary	68	31	28	48

Source: MEC/INEP/SEEC; PNAD (1996), and Klein, 1999

Several points are worth noting:

- There is more than enough space in Ensino Fundamental to accommodate every child in the target population, as evidenced by gross enrollment rates above 100%. Thus access, at least through lower secondary, does not appear to be a major problem.[6]
- The ratio of gross to net enrollments (1.63 for primary and 1.24 for lower secondary), illustrates that there is ample physical space for expansion. That is, if repetition were eliminated, there would be more than enough room to accommodate all of the target population group at the primary and lower secondary level, with the possibility of using extra space to accommodate upper secondary enrollment.
- The comparison between gross and net enrollment and completion rates indicates that there is a major problem with system efficiency. In fact, the gap between coverage and completion is so large that it raises questions about the meaning of the term "universalization" of Ensino Fundamental.
- Finally, the comparison between the percentage of the population having completed a given grade in 1996 and the percentage of entering students expected to complete a particular grade (last two columns) shows the impact of rapid gains in system efficiency in recent years (this is further analyzed in Table 2.4, later in this chapter).

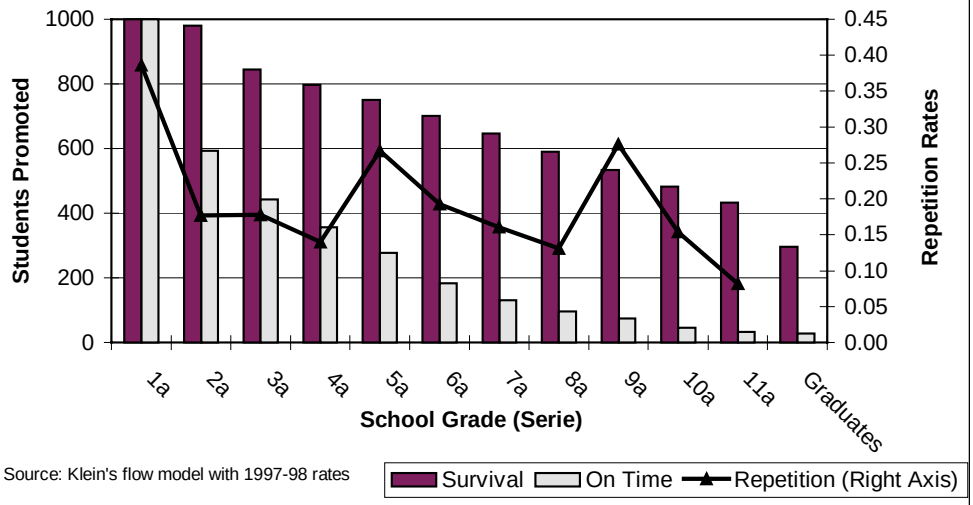
[6] While access to Ensino Fundamental as a whole is not a problem, there may be bottlenecks in access to lower secondary in some of the poorer states or in isolated rural areas. This topic is explored further in Chapter III. Many students are making the transition to lower secondary, although half of them do so with a substantial age distortion. This is consistent with the thesis that the main bottleneck, even in lower secondary, is not access but repetition and dropout, leading to low completion rates.

The next section focuses on the characteristics of student flows in basic education in order to understand the determinants and policy variables that are critical to improve access and coverage of secondary.

2. Internal Efficiency and Access to Secondary

Student flows analysis for Brazil (see Box 2.1 for further information) confirms the inefficiencies of its education system. Figure 2.2 summarizes the trajectory of a cohort of 1000 students entering 1st grade and how they progress (or fail to do so) in the system. The combined effects of student repetition and dropout can be seen in the downward trend of the dark "survival" or promotion bars: at each successive grade level, fewer numbers of students make it to the next grade. The lighter "on time" bars indicate numbers of students who are in the correct grade indicated for their age (i.e. have not repeated a grade). As can be seen from the graph, by eleventh grade, there are practically no students who have not repeated. Repetition rates are represented by the dark line on the graph: these remain quite high (between 15% and 30%) through grades 1 to 10, with particularly high peaks in first, fifth, and ninth grades.

Figure 2.2: Student Flows in Basic Education



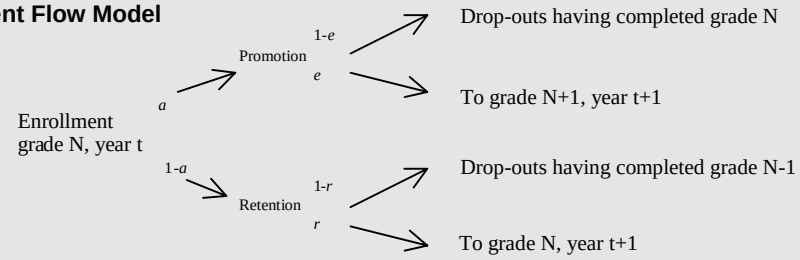
Source: Klein's flow model with 1997-98 rates

Box 2.1: Analyzing Student Flows

The methodology used for this analysis is the education flow model developed by Ruben Klein and based on seminal work by Sergio Costa Ribeiro (see bibliography). The model is a methodological improvement on traditional student flow models which corrects the historical underestimation of repetition rates and overestimation of dropout rates in official statistics in Brazil and hence produces more reliable estimates of the student flows which actually take place in basic education. Using this model it is possible to estimate the percentage of a cohort entering first grade who eventually complete each cycle and the time it takes for

an average student to do so. The internal efficiency parameters estimated by the model can then be used to simulate the trajectory of a cohort of students entering the system today and project expected enrollments in the future.

Basic Student Flow Model



This methodology has now been officially adopted by the Ministry of Education in calculating true transition rates between grades. Further information can be found in the INEP Educational Statistics Yearbook for 1998. (see also Ribeiro, S.C, 1991; Klein and Ribero, 1991, and Klein, 1995 and 1999)

The outcome of a system with such high levels of repetition and dropout is shown in Table 2.3 which summarizes the internal efficiency problems affecting basic education in Brazil today. These indicators show that only two out of three children who enter first grade can expect to complete lower secondary education (8th grade) spending on average 10 years to do so, while only one out of three first graders will eventually finish upper secondary education (11th grade) taking an average of 14 years to do so. Beyond the serious educational problems behind these indicators, such a system wastes resources, both human and financial. As indicated earlier, a simple comparison of gross vs. net enrollment rates in Brazil tells us that there are almost 64 percent more students in basic education than the number necessary to achieve universal coverage, if educational flows were ideal. When seen from the perspective of the number of student years that it takes to produce a secondary school graduate, the results are even more shocking: it takes 23 student years to produce a graduate at grade 11 -- over twice the cost and effort that it should take. This topic and its implications for system financing will be developed in Chapter V.

Table 2.3: Flow Simulation of a Cohort Entering First Grade in 1998

	% expected to complete each cycle	Years required to complete each cycle
Grades 1-4	90%	5.4
Grades 1-8	66%	10.3
Grades 1-11	48%	14.0

2. SOURCE: KLEIN 1999

Thus the "universalization" of *ensino fundamental* (grades 1-8) remains a somewhat elusive goal, when seen from the perspective of ensuring completion of this compulsory level by all students. In fact, almost universal net enrollment rates (95%) *in ensino fundamental* hide three important facts: (i) students are enrolled in grades much lower than they should be given their age; (ii) chronic repetition means that a large percentage of students never complete basic education; and (iii) those who eventually complete 8th grade have spent much longer than they should, hence they are usually young adults (17 to 18 years of age on average) and many of them have already joined the labor market. These features of basic education in Brazil determine the profile of students entering upper secondary education and are key to understanding the challenges of expanding and improving secondary education in Brazil.

3. Profile of the Secondary School Population

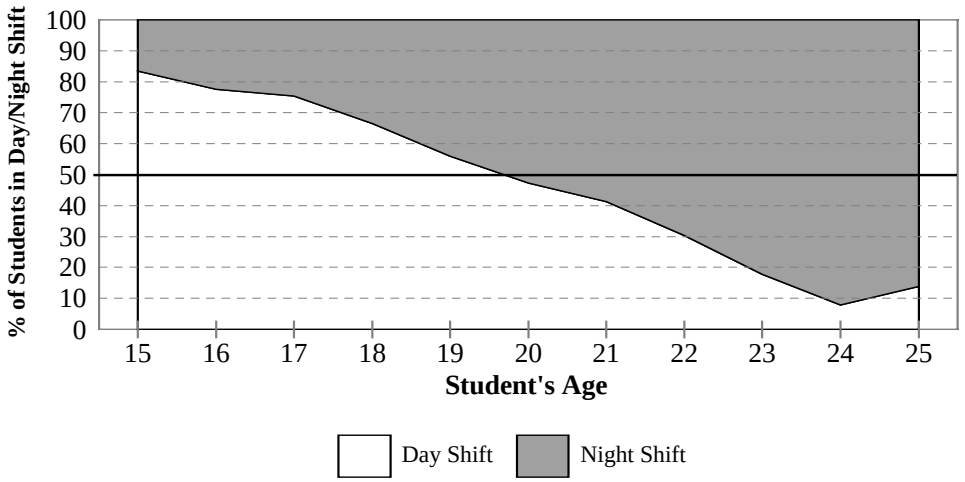
The fact that the survivors of lower secondary education (the clientele for upper secondary) are largely young working adults has deep implications for the identity of secondary schools and poses difficult tradeoffs and pedagogical challenges. Around 60% of students enrolled in upper secondary education (9th – 11th grades) are enrolled in night schools, because a majority of them must work full time. This is confirmed by data from the 1996/97 survey of living conditions (PPV) which shows that the proportion of night shift students employed or looking for work is 57% vs. only 23% for daytime students. This is consistent with the hypothesis that students study at night in order to work during the day.

The predominance of night schools is a central feature of secondary education in Brazil and one that is not likely to go away, at least in the short run. Figure 2.3 illustrates how the decision to study at night is largely determined by the age of the student; as he/she gets older and his/her age-grade gap increases, the student faces rising opportunity costs and strong incentives to study at night, as the last resort before dropping out altogether.[7] Assuming a three year age-grade gap on average, the graph supports the conclusion that at least a small percentage of students in lower secondary education also attend night schools.[8]

[7] There is also evidence that there may be lack of space in dayshift schools in some areas. There is increasing pressure for daytime schools as student flows are corrected, as evidenced by faster growth of enrollments in daytime schools compared to night schools.

[8] In Bahia, for example, fully 30 percent of students in lower secondary education (grades 5-8) attend night classes.

Figure 2.3: The Option for Night Schools Increases with Age



Source: IPEA, based on PPV 1996/97.

4. Chronic repetition leads to dropout in secondary education

Once students reach lower secondary education, dropout becomes a critical problem. Dropout is in large measure a response to multiple, or chronic repetition within the system: once a child has been held back several years, he or she becomes discouraged and drops out. Rather than acting as a corrective, repetition within the current Brazilian system appears to have a stigmatizing effect: previous studies have shown that a child who repeats first grade is at greater risk for future repetition.[9] Nor does repetition appear to improve children's achievement levels: children who have repeated a grade tend to have lower achievement levels than colleagues who have not repeated the same class.[10] As poorer children tend to be disproportionately represented among repeaters, the connections between repetition and dropout also have important equity implications.

Box 2.2: Why So Much Repetition?

[9] "A Call To Action" World Bank/Unicef/Projeto Nordeste, 1997.
[10] Fletcher, 1999

Repetition in Brazil is a phenomenon that is deeply rooted in the education system. Although still not fully understood, Brazilian educators who frequently observe classroom environments attribute widespread repetition to prevailing expectations about the roles of teachers and students, and teachers' lack of familiarity with disciplinary techniques other than punitive ones. Observers suggest that, in Brazilian education culture, a good teacher is that one that is perceived as stringent, maintains order in the classroom, and, as a result, may have more students repeating. Under this hypothesis, repetition reflects more behavior than learning.

Evidence in support of this hypothesis include studies showing that, at the school level, there is no relationship between schools' repetition rates and their average academic achievement. At the student level, research has documented that in fact lower achieving students in a classroom tend to be those who repeat (see also Box 4.1). Research has also found, however, that the expectation (a preconception usually built at the beginning of the school year) of the teacher about a student's abilities was a key element that determined probability of repetition. The behavior hypothesis also partially explains why older students (that tend to be more disruptive) repeat more and, in fact, repeat several times over their lifetime.

The "culture of repetition" frequently extends to parents who may not recognize that repetition is undesirable, and as a result do not hold the teacher accountable for her decision. Qualitative studies have shown, moreover, that the culture of repetition places the full responsibility for the failure to learn on the student, thus generating a very detrimental cycle of low self-esteem and low performance.

Older students, moreover, have strong incentives to drop out of school, including work and families. Most students who enter upper secondary are already two or more years above their ideal age for grade (only 3% of 14 year olds have completed the 8th grade, compared to 44% for 18 year olds). In fact, 55% of the students enrolled in upper secondary are older than the target age group. Over one third have more than three years of lag. To some extent, the expected tradeoff between work and school is diminished in Brazil due to the prevalence of night school. Nonetheless, the difficulties of balancing both work and school coupled with the poor quality and lack of relevance of much of secondary schooling results in high dropout rates. One out of three students who join the 9th grade will never complete the 11th grade, the terminal year for upper secondary education.

B. The Challenges

Given the evidence presented above, clearly the main challenge for increasing coverage of secondary education in Brazil is **reducing repetition and correcting student flows** (see Boxes 2.2 and 2.3). The importance of this issue can be gauged by looking at the dramatic improvements that have been taking place in recent years. Table 2.4 compares the internal efficiency of basic education in 1995 and 1997 and projects the parameters that could be obtained by 2007 if repetition and dropout rates continue to improve.

(a) Table 2.4: Improvements in System Efficiency

Grade	% expected to complete each cycle			Average years required		
	1995	1997	2007	1995	1997	2007
4th Grade	85	90	91	5.9	5.4	4.7
8th Grade	52	66	74	11.2	10.3	9.1
11th Grade	33	48	64	15.3	14.0	12.4

Source: Klein Calculations, 1999 .

The first striking fact is how much the system has improved between 1995 and 1997, as evidenced by the rapid increases in the percentage of students expected to complete each cycle and the corresponding reduction in the number of years it takes to complete a cycle. On the other hand, it is important to realize that these parameters would affect new entrants to the system and that it takes them 14 years to go through the system (at 1997 rates). Hence, even though student flows have improved substantially, it takes time for these effects to materialize in higher terminal efficiency rates.[11] A cautionary note regarding the 1997 data is important: enrollment data for 1997 may be inflated due to the new availability of FUNDEF resources at a per student basis. Although INEP/MEC heavily audited the reported data, it is likely that the reports may be slightly overestimated. This can explain some, but not all, of the observed improvement between 1995 and 1997.

A particularly thorny challenge for secondary education is lowering both repetition and dropout rates in the **transition grades** of 5th and 9th. Given the configuration of educational responsibilities in Brazil, these grades are often ones in which children are switching schools, and (in 5th grade) frequently moving from municipal to state-run schools. Lack of integration between systems, changes in the organization of instruction, and, in rural areas, longer distances to school can result in transitions between these grades being especially difficult. Most schools offering upper secondary education, however, also offer the last years of *ensino fundamental* (5th – 8th grades). Rather than being a problem, this fact provides an opportunity for focusing on the transition between *ensino fundamental* and *ensino médio* and to reduce dropout and the spike in repetition rates in the 9th grade. From the point of view of managing the system, this organizational model also facilitates the process of municipalization of the first cycle of *ensino fundamental* (grades 1-4) and allows the state to focus on secondary education (lower and

[11] An example can serve to illustrate this point. Even though 1997 efficiency rates tell us that 66% of students entering first grade (in 1997) are expected to graduate from 8th grade, this will only occur 10.3 years later, that is in 2007. The percentage of students completing a given cycle in any given year would be lower than that reflected in the systems efficiency parameters for that year. This is so because students graduating today have been in a system with lower internal efficiency for some years.

upper). Nevertheless, increased integration between state and municipal systems to diminish problems in the transition to 5th grade remains a challenge.

(i) Box 2.3: Correcting Student Flows – The *Classes de Aceleração* Program

A 1998 MEC report indicated that 73 percent of all fundamental cycle students are older than they should be for their corresponding grade. Many of these students eventually drop-out, as older students increasingly compare the benefits of employment to participation in a poor quality system with little relevance to their needs. Given the high financial and social costs of repetition, and the failure of the traditional grade system to resolve the growing problem, the LDB of 1996 allowed for more flexible mechanisms for incorporating older students back into the system and accelerating their grade attainment process.

As a means of reducing these high levels of repetition and age-grade distortion the Center for Research in Education Culture and Community Action, CENPEC, created the *Classes de Aceleração* Program. The Accelerated Classes Program groups over-age Fundamental Cycle (grades 1-8) students in modules within which students progress and are evaluated at their own pace, eventually being "tracked back" into the main system at higher (and more age-appropriate) grade levels. The program began in 1996 in the State of São Paulo with the School Flow Reorganization Project (grades 1-4, *"Ensinar pra Valer!"*) and was adapted for the Lower Secondary Flow Correction Project in Paraná in 1997 (grades 5-8, "*Ensinar e Aprender"*). Similar programs have also been created in Bahia and Ceará.

The particular characteristics of these older fundamental cycle students requires a new approach to the traditional teaching practices and curriculum design. The result is *an integrated teacher training and curriculum design program* that uses *age-appropriate materials* and reinforces the autonomy and self-esteem of teachers and students. Year-end student evaluations are substituted for *continuous assessment*, monitoring student progress throughout the learning process and guiding teachers in their practice.

The initial results are promising. Of children who started in "Aceleração I" in São Paulo from 1996-1998 (normally these children were in grades 1 and 2), 37.8 percent were tracked back into 4th grade, 19.6 percent were tracked into 5th grade, and 1.4 percent were tracked into 3rd grade. About 1/5th of children (21.3 percent) moved on to "Aceração II" and the overall dropout rate was 8.4 percent – higher than the statewide average, but not so high when considering that this is a population at particularly high risk for dropout. Of children in "Aceleração II," 2.5 percent went on to 4th grade, 76.3 percent went on to 5th grade, 2.8 percent stayed in the "Aceleração II" or had some other remedial work, and 6.3% dropped out. While further evaluation of the program is needed, initial evidence has shown that students that have been rejected by the traditional system can succeed in one that is more flexible and responsive to their particular needs.

Given the current profile of students in secondary education, a major challenge for reducing dropout and improving coverage in the short and medium term is exploring more relevant and effective means of teaching **young working adults**. Meeting this

challenge may involve both revisiting current curriculum content, focussing more attention on improving the quality of night schools (see Chapters III and IV for a more detailed discussion of these issues), and the exploration of more diverse and flexible means of delivering secondary education.

Finally, there is a question of **physical and human resources** for the expansion of secondary school. Although theoretically the elimination of repetition would mean sufficient places in existing schools to accommodate most of the projected expansion into secondary, the actual physical configuration of existing schools and staff will need to be adjusted (see Box 2.4). There are, however, significant structural barriers to such a reorganization, including split ownership of the existing school infrastructure between states and municipalities, and existing staffing shortages in certain subjects at the secondary level.[12]

There are also wide differences among and within states in the magnitude as well as in the profile of demand for secondary education (see Chapter III). While in the major cities limited construction of new schools may be a priority, in smaller towns as well as in remote rural areas it may be impossible to achieve a minimum scale for operating a secondary school or to find the necessary teachers in all the disciplines. This means that the menu of options for expanding access should be broadened, not to substitute daytime secondary schools, but to create viable alternatives to expand quality secondary education opportunities in those cases where it is not feasible to have a traditional daytime school.

Box 2.4: Maximizing Physical Space – School Reorganization in São Paulo

One example of maximizing the use of existing infrastructure and creating appropriate environments for curricular and extracurricular activities of students took place in São Paulo. In 1995, overcrowding in the São Paulo school system meant that nearly 20% of schools were operating with more than three shifts each. A flows analysis revealed that demand for enrollments in grades 1-4 had actually leveled off, while there had been an explosion in demand for grades 5-8. Because (unlike in most of Brazil) schools in São Paulo generally housed grades 1-8 under one roof, these schools were overcrowded while upper secondary schools often had unused space.

For both efficiency and pedagogical reasons the Secretariat of Education launched a massive reconfiguration of schools and students. Students in grades 1-4 were grouped into their own schools, while students in grades 5-8 were moved to other schools, which often also housed upper secondary (grades 9-11). Pedagogically, this division has allowed for greater school focus on learning issues particular to each age group; from a space standpoint, there was also an immediate gain. The number of schools with more than three student shifts dropped by 10 percent with the reorganization alone. The reorganization was greatly facilitated, however, by the fact that, at the time, the state was

[12] A forthcoming study on teachers by the World Bank will be looking more closely at supply and demand issues between levels and disciplines.

the overwhelming provider of education for grades 1-8. As mentioned above, negotiating space maximization *between* state and municipal systems is far more complicated.

C. Policy Options for Increasing Coverage and Terminal Efficiency

- **Flow correction programs**
  - *Classes de Aceleração* (see Box 2.2 for additional description)
  - *Escola nas Ferias*

Given that high chronic repetition and large grade-age gaps are the key factors behind the low terminal efficiency of basic education, a growing awareness of this problem has developed in Brazil over the last decade. This has resulted in a increasing number of initiatives to reduce repetition, reinforce learning of students who are lagging behind and other programs to correct educational flows. One example is the *Classes de Aceleração* program, profiled in the box above; another is the "*Escola nas Ferias*" program being implemented by a number of states, including Bahia.

As a means of reducing chronic repetition in the state education system, the Bahia State Secretary of Education (SEC-BA) initiated a summer school program in January of 1998. Parents of students at risk of failing were sent letters near the end of the school year, describing the benefits of the two week program and encouraging them to enroll their children. The demand for the program was much higher than anticipated: even after enrolling an additional one third of the original planned number of students, SEC-BA was forced to turn families away. The results were promising: of the 58,250 participating students upper and lower secondary students, 96 percent were promoted to the next grade. For a state in which upper and lower secondary repetition rates consistently range between 10 and fifteen percent, the summer school program seems to be an effective method of student flow correction.

- **Academic Credit Systems**

As seen earlier in this chapter (Box 2.2), repetition tends to engender low student self-esteem and performance. Multiple repetition also frequently leads to dropout, as children become disillusioned with school, bored, and, as they grow older, face additional incentives to drop out.

One possible means of minimizing the stigma and wasted resources associated with repetition would be to introduce a credit system at the secondary level. In a credit

system, certain minimum academic standards are built into required courses, and a certain number of these courses are required for graduation. Many systems allow flexibility, however, regarding how and when the credits are obtained (students can be part-time or full-time, and have some control over the combination of courses taken at any one time).

Currently, a Brazilian secondary student who passes classes in three subjects but fails the other two may be forced to repeat the entire year, including those classes in which he/she did well enough to pass. Under a credit system, such a student would be required to repeat only those classes for which he/she did not obtain a passing grade, and would be able to move ahead with his/her peers in other subjects. Under this system, a student's failures would not outweigh achievements, thus helping to avoid some measure of the stigma attached to repetition. Credit systems are the norm in higher education around the world, but there are few examples of their use at the secondary level. They are attractive in that they help ensure that all students master a body of knowledge and demonstrate certain capabilities before graduation, but allow students to progress more at their own pace.

- **Automatic Promotion**

Another possible approach to the repetition problem is automatic promotion. Under an automatic promotion system, students move from grade to grade with their peers regardless of their level of academic mastery. Several states in Brazil have experimented with instituting automatic promotion between certain grade levels, usually at the primary level. The institution of a "basic cycle" composed of the first two years of schooling in Paraná, São Paulo, Minas Gerais and other states is one example. Promotion between the two years of the "basic cycle" is automatic, in order to give children more time to master certain skills before they are subject to high-stakes evaluations.

A few countries (including the United States) have experimented with instituting automatic promotion through the secondary level. In the U.S., "streaming" or "tracking" has long been a feature of secondary education, though it has also been the target of much criticism. Under a streamed system, a ninth grade student failing math will be promoted to the tenth grade, but will be tracked into a remedial math section, whereas high performing students will be tracked into more demanding sections. All students may be required to take three years of math to graduate, but some students will have taken calculus while others may not have mastered geometry.

While automatic promotion effectively eliminates repetition, it has raised teaching dilemmas and academic quality concerns in the countries in which it has been tried. At the secondary level, where the mastery of certain academic content is of chief concern, automatic promotion is especially problematic. Current efforts in the U.S. to set minimum performance standards for all graduating students are an attempt to move away from this model. This trend away from automatic promotion at the secondary level in the U.S. echoes similar trends world-wide.

- **Academic Clustering**

The difficulties in the transition from primary school to lower secondary school are further complicated by the immediate shift from the home-teacher environment to a multi-teacher environment. Students take a long time to adapt to this significant change and find it hard to identify adult role models or guidance within this less personalized learning environment. In Brazil this transition is exacerbated as it happens earlier in the schooling process than in any other country in the region. While some countries move into multi-teacher environments in 9th grade, most do it in 6th grade. Only Brazil does it in 5th grade. In this regard, the middle school movement, very popular recently in the United States, advocates more personalized environments in the schooling of early adolescents as a key element to increase student engagement and learning.

A possible option to diminish the impact of this early, radical transition in Brazil is to cluster subject matters in grades 5-8 such that students transition from a home-teacher into a three- or maximum four-teacher environment and only in 9-11 series into a multi-teacher environment. Social sciences and physical sciences are examples of subjects that can be clustered. Naturally, such a policy option requires additional support and training for teachers, but ultimately may decrease the number of teachers needed in grades 5-8.

- **Expansion of Equivalency Examinations (*Supletivo*)**

Equivalency exams provide an important door between formal and non-formal education. These exams test content and skills knowledge equivalent to that expected for a particular grade level in the formal education system, but are open to anybody, including school dropouts. Although participation in an equivalency-exam preparation course is not required for test takers, most equivalency systems offer such a course on an informal basis (i.e. flexible hours and materials, and through a range of organizations). Most people taking an equivalency exam do so for one of two reasons: (a) they wish to continue their studies in the formal education system after having dropped out; or (b) they seek more formal recognition of their knowledge and skills levels in order to advance in the workplace.

The equivalency exam modality (known as *supletivo* in Brazil) has been available in Brazil for several years. However, despite increasing demand, it is not widespread and only a small percentage of students are actually able to take the test. Geographic considerations, as well as inflexible schedules are some of the deterrents for further expansion of the *supletivo*. These equivalency exams allow students to be promoted from one school year to another without necessarily attending classes as long as the academic objectives for each approved grade are met. A large scale enhancement of equivalency exams in Brazil could help accelerate students through the system while guaranteeing a minimum level of academic mastery among the students that are promoted based on the results of the *supletivo*. Based on the well-developed SAEB test, *supletivo* exams could be offered to certify achievement of objectives for any grade level. The exams could be offered in flexible schedules, and in some cases where technology is available, they could be offered immediately on demand. Rules and regulations (such as number of times that a given test can be taken, length in time for which a given result is valid, and others) should

be developed carefully. Past experiences in Brazil as well as international experiences can be very helpful in this effort.

An effective implementation strategy for the expansion of the *supletivo* would be to focus initially on widely offering the test for the terminal grades of each cycle (that is, 4th and 8th series of *ensino fundamental*, and 3rd series of *ensino médio*). The current availability of SAEB tests for these grades would make this initial stage feasible. Then, tests for other grade levels can be developed and offered broadly throughout Brazil.

- **Vertical integration of primary and secondary schools**

A complementary strategy to reduce the losses that occur in the transition from primary to secondary and to facilitate access to secondary schools is to foster networks of primary schools feeding into one secondary school.

Vertical networks have been practiced for a long time in the United States, where school assignment at all levels has been linked to geographic location. A single school district manages a pyramid of schools where, for example, seven primary schools feed into three middle schools, which ultimately feed into one high school. This vertical network guarantees that schools within the network share a common goal, common administrative practices, and common pedagogical and academic beliefs. A student entering the system in first grade can easily track the middle and high schools that she will attend during her life in the school district.

Several countries in Latin America have implemented similar policies. A project in the municipality of Pasto (Colombia) has established such networks as an avenue to guarantee access to every student entering the system and enhance quality within each network. In Pasto, networks produce a common PEI (Institutional Development Project) which is thereafter converted into an investment plan. Central government transfers financial resources to the network to facilitate implementation of the investment plan. Schools within the network have more flexibility as they can rotate their teachers and share their resources, while sharing common goals and objectives.

While the idea of school networks is certainly attractive in terms of guaranteeing access and reducing losses in the transition from primary to secondary, large differences in quality among public secondary schools result in fierce competition for access to a few high quality public schools, which poses difficult problems when attempting to track students into high schools serving a particular area. Thus, efforts at making school quality more homogeneous among public schools may be a prerequisite to the effective implementation of school networks.

- **School Reorganization**

As mentioned earlier, the fact that, Brazil-wide, a majority of schools currently house lower and upper secondary under the same roof can be seen as an advantage. Some states have a deliberate policy to move towards a new model of *escola de jovens*, integrating the last cycle of *ensino fundamental* (5^{th} –8^{th} grades, or lower secondary) with upper secondary (see also box 2.3 above). The benefits of this model are both pedagogical and managerial. The *escola de jovens* builds its own identity around the characteristics of youngsters and avoids mixing children and young adults in a single space. This makes it easier to work pedagogically on the transitions from lower to upper secondary. From a managerial standpoint, the "shared responsibility" between states and municipalities for *ensino fundamental* is facilitated by setting some clear guidelines. Increasingly, responsibility for provision of primary education (grades 1-4) is being devolved to municipalities, while states remain the primary providers of secondary education.

- **Promoting State and Municipal Joint Planning Processes**

Most strategies to efficiently utilize school spaces will require substantial collaboration between states and municipalities. For political and historical reasons such collaboration is difficult to achieve. Brazil is experimenting with several strategies towards this end. One of these is the creation of joint state-municipal planning forums under the FUNDESCOLA Project.

FUNDESCOLA has adopted the IBGE microregion as the best way to promote collaboration and coordination between municipal and state education management personnel in each of the municipalities involved, and to maximize efforts and resources within a microregion. The mayors, or their representatives, in conjunction with the state secretary of education and the state president of National Association of Municipal Education Managers (UNDIME) are members of the microregion forum which operates as a local planning instance of the project to: (a) negotiate the priorities within and across the municipal and the state education systems in the microregion; (b) agree on the consolidation of the various municipal action programs into a single, prioritized microregion action program (PAZ), (c) agree on common targets for the microregion action program; (d) plan and monitor the implementation of the microregion action program; and (e) and propose the annual implementation program.

- **Alternative delivery options**
  - *telesalas noturnas*;
  - partnerships with community-run schools;
  - use of new technologies to supplement and support teaching in specific areas where there is a shortage of qualified teachers.

Distance learning is not a recent innovation in Brazil. Beginning over sixty years ago with the radio pioneer Roquette Pinto, Brazil has enjoyed a long tradition in the integration of distance learning and technology. The 1990's however, marked a turning point in Brazilian distance education as a result of the dramatic increase in computer use and the widespread implementation of social marketing techniques for educational and

social change. The effects of these two features on distance education can be illustrated by the features of Telecurso 2000, developed in 1995. Its major features are:

- Target population is 15-30 year olds already in the labor force
- Curriculum is based on the primary and secondary school programs, and is focused on preparation for a secondary school equivalency examination
- Pedagogical approach emphasizes education for work, the development of basic skills, citizenship, and contextualized teaching
- Program employs use of broadcast television (to nearly 1.4 million people in São Paulo each morning), print materials, mentors, and "*telesalas*," or support center classrooms
- Students must pass an exam for each subject in the secondary school program; when they have passed all the subjects in a study program, they receive a certificate which is valid anywhere in country
- According to FIESP, the program has been growing steadily. Currently there are more than 700,000 students enrolled in one or more Telecurso subjects. In the telesalas, the number of students enrolled has grown from approximately 6000 in 1995 to 250,000 in 1999. Moreover, the number of telesalas nationwide has increased from 243 in 1995 to over 8000 in 1999.
- There is preliminary evidence that, under the right conditions, Telecurso students perform at least as well as comparable students attending regular schools. This was the case of "Projeto Serra do Mel" in Rio Grande do Norte, where a student achievement evaluation, using SAEB data, showed that Telecurso students performed better than the control group. Average scores for Telecurso students were higher than those for other schools in the same municipality, and higher than the average for the state as a whole.

III. EQUITY: DIFFERENCES AMONG REGIONS AND SOCIOECONOMIC GROUPS

A. The Story

In the previous chapter, we saw that while Brazil has made significant progress in increasing educational attainment, further improvements in average education levels and expansion of secondary school coverage depend in large measure on the correction of high repetition and dropout rates. These overall trends, however, obscure important differences among regions and socioeconomic groups. This section explores some of these differences more fully, and presents evidence on the socioeconomic determinants of educational attainment.

1. Large Regional Differences

Brazil comprises 27 states (including the Distrito Federal) ranging from the economic powerhouses in the Southeast to the poor states in the Northeast and the North. This vast heterogeneity is mirrored by large differences in the development of education systems between states. While the most developed states in the South and Southeast have education performance indicators comparable or above the regional averages for LAC, basic education indicators among the poorer states in the Northeast are among the worst in LAC, often being compared to those of very low income countries. Table 3.1 shows country-wide averages and examples of two extremes.

Table 3.1: Regional Differences in Basic Education Indicators (1998)

	Avg. Number of grades completed (1996)	Primary Enrollment (Net)	Students expected to complete 8th Grade	Upper Secondary Enrollment (Net)	Students expected to complete 11th Grade
Brazil	6.0	95%	50%	31%	26%
Northeast	4.4	90%	35%	14%	20%
Southeast	6.6	97%	65%	43%	35%

Sources: MEC/INEP/SEEC, PNAD, and Klein model simulations.

In the poorer states in the Northeast, where two out of three students do not complete *ensino fundamental* (grades 1-8), only a small minority ever gets to upper secondary education. For many years, this elite has attended private or religious schools and therefore has not benefited from or demanded public upper secondary schools. In many of these states, the main bottleneck to the expansion of upper secondary is the need to improve quality and efficiency in primary and lower secondary education. Nevertheless, in some of these states, there has also been a localized explosion in demand for upper

secondary education in the metropolitan areas, where enrollments often grow as fast as in more developed regions.

By contrast, in the more developed states in the Southeast and South, a higher standard of living and significant reductions in repetition rates in primary grades have produced a broad-based expansion of secondary education. Two out of three children are completing 8th grade and most of them are demanding access to public upper secondary schools. In São Paulo, for example, enrollment in upper secondary schools (grades 9-11) represents approximately two million students (one third of the total for Brazil).

Large economic differences among states, higher educational demands from the labor market in the more developed states, and different degrees of maturity of educational systems all combine to produce wide differences in educational opportunities across states and regions. As reflected in Table 3.2 below, a child entering first grade in Bahia faces a 46% chance of never completing 8th grade and an 60% chance of never completing 11th grade. S/he can expect to spend over 6 years to successfully complete 4th grade and almost 12 years to complete 8th grade. By contrast, a child entering first grade in São Paulo can be almost certain to complete 4th grade in 4 years, s/he faces a 71% chance of completing 8th grade, taking only 9 years to do so and s/he has a 50% chance of completing 11th grade.

Table 3.2: Student Flows in Basic Education; Bahia vs. São Paulo

(Flow simulation of cohort entering in the year indicated)

	Bahia Flow Simulation (1997)		**São Paulo Flow Simulation (1997)**	
	% completing cycle	Years required	% completing cycle	Years required
Grades 1 – 4	78%	6.2	94%	4.3
Grades 5 – 8	54%	11.5	71%	8.7
Grades 9 – 11	41%	15.2	51%	12.0

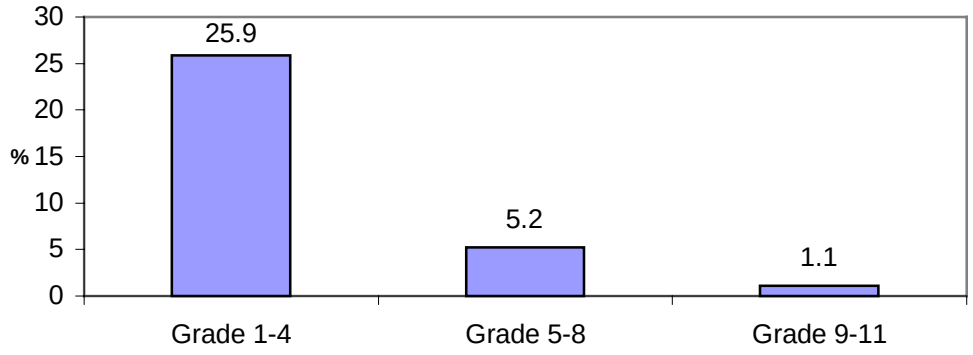
Source: Klein model with 1995/96 system efficiency rates.

Obviously this snapshot is not static. It changes reflecting improvements in repetition and dropout rates. However, improvements are larger and faster in those states which have focussed on improving quality in the early years of primary education and/or have had flow correction programs in place for some time (it takes a few years for these to be reflected in systemic improvements). This finding highlights the importance of instituting or reinforcing this type of program precisely in the least developed states, where repetition is higher. In absence of such improvement, the educational gap between regions is unlikely to be reduced.

2. Secondary School is an Urban Phenomenon

Secondary education, particularly upper secondary, is overwhelmingly urban. As shown in Figure 3.1, 94.8 percent of enrollments in lower secondary and 98.9 percent of enrollments in upper secondary education are in urban areas. Particularly striking is the drop-off in rural enrollments between the primary and lower secondary levels: while 25.9 percent of total enrollments at the primary level are rural, only 5.2 percent of lower secondary enrollments are. It is not clear to what extent this shift is exclusively due to higher dropout and repetition rates in rural areas, or whether localized problems of physical access to lower secondary also act as a disincentive for children to finish even the primary cycle. A common pattern for the few rural students that do finish lower secondary education is to migrate to urban areas either to work or continue their education.

Figure 3.1: Rural Enrollment as a Percent of Total Enrollment, Brazil 1997



Source: MEC/INEP/SEEC 1998

3. Lower Educational Attainment Among The Poor

In Brazil, as in many developing countries, the family's socioeconomic status (SES) as well as other contextual variables like the region and urban vs. rural area of residence play a large role in determining what kind of educational opportunities a child has and what kind of educational environment the student faces outside the school. There are wide gaps between different socioeconomic groups in Brazil, both in terms of income and in terms of other socioeconomic characteristics such as parents' education, labor market participation, or race.

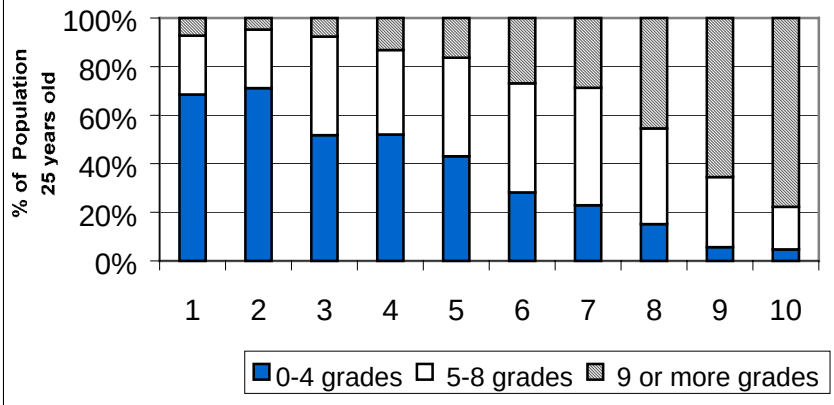
Perhaps the single most important source of income inequality in Brazil are differences in education opportunities and performance. While the child of a wealthy family usually completes university education, even at the graduate level, the likelihood that a student from the lowest three deciles (an income group roughly equivalent to the population under the poverty line) completes primary education is only 15% and chances that s/he will complete secondary education are a slim 4%. These differences are illustrated in Figure 3.2 below, which compares the years of education attained by individuals with 25

years of age, across family income deciles (source PNAD 1996). There are also large differences in attainment among racial groups: only one in four students attaining 9 or more years of education is non-white.

Differences in education are even more skewed when compared across groups with different levels of parents' education. This is not only true because education may be a better indicator of permanent income, but also reflects the fact that educational differences are steeper at the top of the income distribution -- a fact that is consistent with the elitist nature of higher education in Brazil as well as with large differences in educational investments between families at the top of the income distribution and the rest.

Inequality of educational opportunities across income groups is also reflected in the composition of enrollments in secondary schools and of graduates from upper secondary. On the basis of 1996 PNAD data we know that the poor account for a very small fraction of the population who have attained more than 4 years of schooling. Among the population 15 to 21 years of age, the poor (bottom 30%) account for less than one fourth of those with 5 to 8 years of education; furthermore, less than 10% of those with schooling beyond the 8th grade come from to the bottom three deciles. By contrast, students from the upper 30% of the income distribution account for over half of the total population with schooling beyond the 8th grade, meaning that they are the main beneficiaries of upper secondary education.

Figure 3.2: Differences in Educational Attainment by Income Decile



Source: IPEA 1999

From the graph above, we can infer that the poor repeat more and dropout more than the rich (they do not reach 5th or 8th grade, despite virtually universal access to these levels). Thus, we can draw the conclusion that the quality and internal efficiency problems that are behind high repetition and low completion in the first Eighth grade have direct equity implications by limiting access to the upper grades, particularly for the poor.

4. Why Students Attend School

Differences in educational performance between socioeconomic groups result from the interplay of two kinds of variables. On the one hand there are socioeconomic factors, family variables, and labor market conditions that determine family decisions regarding the ***demand*** for education and the level of investment in human capital (demand side variables). On the other hand are ***supply-side*** variables affecting access, quality and relevance of education opportunities available. This section will contrast the impact of these two groups of variables on years of schooling attained. The next chapter will analyze the role of school variables on student learning outcomes.

There is a long history of quantitative research using production functions and other forms of multivariate regression analysis to attemp to explain educational attainment (measured by years of schooling or achievement tests applied to students). In Brazil, these studies have been conducted, since the seventies, to try to measure the impact of school vs. student or family variables, on educational outcomes. The shortcomings of such studies are well known to all researchers in the field and need not be stressed here.

On the other hand, the consistency observed in studies done with somewhat different statistical tools and different moments in time give greater credibility to the majority of the findings, shared be several studies. The overwhelming power of student background, for example, is a common result from the review of the literature. The present study confirms these results. Education of father and mother as well as other variables (such as income) composing this cluster of socio-economic status always correlate strongly with performance.

What is new is the incorporation of other variables, available from recent surveys and new databases (i.e. PPV, SAEB), the use of more sophisticated statistical tools (i.e. HLM models) as well as the attempt to put together demand and supply-side variables to gauge the relative impact of different groups of variables. In this sense, this study adds a few new insights to understand the complex interaction between demand and supply side variables, between family or individual decisions and educational inputs and policy variables.

Using household survey data, a background study by IPEA analyzed the relative weight of family variables, labor market variables, and school quality inputs in determining the educational attainment of students, measured by the number of years of schooling. Table 3.3 (below) summarizes the econometric results from that study.[13]

[13] For a more complete and detailed examination of the statistical work, the reader should consult the two background papers and tables (IPEA, 1999).

In interpreting these results the following caveat should be made. The data sources, household surveys, provide a wealth of information on socioeconomic and labor market variables which are essential to understand contextual and demand side factors affecting family and student choices. However, household surveys, have limitations as to the quality of educational variables included. Supply side variables have been included in the summary table insofar as they affect educational attainment, rather than educational achievement. The analysis of school variables and their impact on learning outcomes will be presented in Chapter IV, using a more robust data set and methodology for this purpose.

Table 3.3: Qualitative Summary of Econometric Results

(Dependent variable: Years of education attained)

Independent Variables Included	**PNAD (1996)**	**PPV (1996/97)**
Demand Side Variables	Effect on Years of Education Attained	Effect on Years of Education Attained
Individual Characteristics (controls) • Age • Gender (female) • Race (non-black)	*Expected* • Education increases with age; attainment greater for females and for non-blacks	*Expected* • Education increases with age; attainment greater for females and for non-blacks
Family Variables • Family Income per capita • Father's Education • Mother's Education	*Expected* • Positive • **Strongly Positive**, particularly mother's education	*Expected* • Positive • **Strongly Positive**, particularly mother's education
Local Labor Market Variables • Expected wage (given individual's education) • Average Local Wages • Probability of Employment	*Expected* • Negative and Significant • Mildly Negative • **Strongly Negative**	*Unexpected* Positive but **statistically insignificant** in all cases
Local Community Variables • Per capita Income • Avg. education of adults in local community	*Expected* • Marginally positive • **Strongly Positive**	*Expected* • Marginally positive • **Strongly Positive**
Regional Variables (controls) • Region (Northeast vs Southeast) • Area (metro / urban / rural)	*Expected* • Higher attainment in Southeast and in Urban	*Expected* • Higher attainment in Southeast and in Urban

	areas	areas
Supply Side Variables		
Availability of Schools • Secondary Schools in Municipality / Pop 11-25 • Avg. Distance to School	*Mixed* • Positive • Positive *(Unexpected)*	*Mixed* • Positive • Positive *(Unexpected)*
Quality Variables • Teacher's Education • School Quality Index	Teachers Education *Mixed* Positive for primary teachers; Negative for secondary teachers.	School Quality**:** *Expected / Mixed* Strongly Positive in primary schools. Mixed in secondary schools: Positive in the Northeast and negative in the Southeast.
Sample Size	13000 to 32000	1400 to 3200
R squared	**0.4 to 0.5**	**0.4 to 0.5**

Among these new insights, the following are worth highlighting, as they suggest potential policy implications:

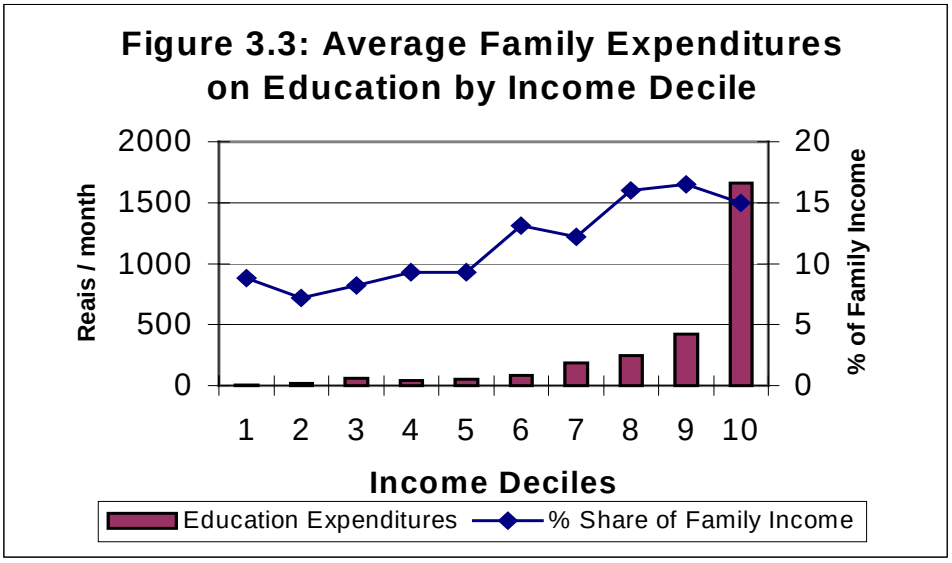
- Educational climate in the family or in the community is more important than family income alone. This is confirmed by the high significance of parents education, after controlling for family income, as well as by a new result, not to be found in other studies, namely the impact of the overall level of education of the immediate community of the students. Those who live in places where average schooling levels are higher tend to stay longer in school. "Keeping up with the Joneses" is a powerful social or economic driving force.
- The results pertaining to labor market variables and opportunity cost indicate that their role in Brazil is more complex than suggested by economic theory alone. On the one hand, their labor participation plays an important role in students' choice for night schools, in conjunction with students' age, as discussed in Chapter II. On the other hand, the prevalence of night schools creates a third option, namely to study and work at the same time. This, in turn, makes the notion of opportunity cost less clear cut and more difficult to measure in the regression analysis. The results suggest that the effective availability of jobs matters more than the reference wage level, particularly given current labor market conditions, with high unemployment rates among youngsters.
- Among supply-side variables, the availability of schools correlates positively with years of education. This may appear obvious but most previous analysis ignored the availability of school places in explaining results. This kind of result brings the analysis to a more balanced view of supply and demand of school vacancies. This is a topic that merits further research, particularly as it relates to the choice for night schools.
- Distance to school may not be a good measure of school availability. Given that most secondary schools are in urban areas, what matters most is school availability, as students can and often do travel long distances using public transportation.
- On the finding that teacher´s level of education does not have a significant impact on student attainment or achievement, this result is consistent with other research done by INEP using SAEB data and suggests the need to focus more on the content and effectiveness of teacher training rather than on achieving a specific level of education (licenciatura plena or posgraduaçao).

- Regarding quality of school inputs, although results are mixed, the study suggests that school quality variables have a strong impact on students' attainment. In the regressions where the school quality index is significantly and positively correlated with attainment, its impact is comparable to that of family income. A more in-depth analysis and discussion of school input effects is found in Chapter IV.

The results summarized above indicate that demand-side variables play a significant role in determining educational attainment. Beyond individual characteristics and regional variables used as controls, family variables (income and parents' education), labor market variables (notably the probability of finding employment), and other contextual variables (average level of education in a community) have a strong influence on family and student choices affecting school attendance and permanence. Overall, these findings are consistent with economic theory and signal the need to take into account contextual variables in the design of educational policies. These results, however, in no way diminish the key role of educational policies centered at the school level. In fact, since socioeconomic and contextual variables tend to reinforce differences in educational attainment between socioeconomic groups, school variables and positive discrimination policies to favor disadvantaged groups must compensate for differences in family and contextual variables.

Family variables. Parents' education is the single most important determinant of the number of years of schooling attained by children, even after controlling for differences in family income levels. This is not surprising since parents' education reflects not only family income but also the kind of learning environment that students face out of school. Interestingly, the average years of education in the community where the student lives is an equally strong predictor of school attainment, which reinforces the point that role models, availability of cultural opportunities, and stimulus and support provided by an educated environment are more important than mere differences in income.

Costs and Benefits. Other important variables affecting the demand for education are the perceived private costs and benefits of educational investments. The study found very large differences in the average **family expenditures** in education across income groups (see Figure 3.3). Families in the top decile spend over twenty times more than the median value for all families, and there is a relatively flat pattern of low expenditures in education up to the seventh decile. More importantly, rich families spend a much higher share of their income on the education of their kids. Further analysis of this data showed that family expenditures in education are relatively inelastic across a broad income span, becoming very elastic at the top three deciles of the income distribution.



Regarding the composition of educational expenditures, two results stand out:

- Education expenditures of the poor, although quite small, are mostly directed towards the purchase of books which account for half of their education expenditures, the next item in importance being uniforms, and almost nothing in tuition (the poor go to public schools). This fact confirms the importance of programs aimed at providing free or subsidized books to poor students.

- In contrast, the top three deciles spend mostly on tuition costs (between 70 and 80% of their education expenditures), followed by books. This is consistent with the elitist nature of private secondary education in Brazil and also reflects the rational behavior of wealthy families who know competitive access to universities depends on giving their children high quality secondary education.

The empirical evidence on **opportunity costs** is mixed. The data from the 1996 PNAD show a statistically significant negative relationship between labor market wages and years of schooling which is consistent with economic theory. On the other hand, the data from the 1996/97 survey of living conditions (PPV) show a statistically insignificant relationship. The finding that opportunity cost variables are difficult to capture in the regression analysis can be partially explained by the role of night schools.

It is clear that labor market participation, together with student's age, is a key determinant of the choice for night schooling, as discussed in Chapter 2. This was confirmed by the finding that labor market participation rates are not only significantly higher among students attending night schools than among those attending dayschools, but they are as high as those for students of the same age no longer attending school. In other words, night schooling provides a third option of studying while working, thus blurring the binary tradeoff between education and work. This option, however has a high cost in terms of lower quality and less time dedicated to study, which in turn result in lower

achievement and higher dropout rates among night students. This is consistent with the results of regressions using PNAD data which indicate that the availability of employment reduces the expected number of years of education attained.

Labor market signals, however, play on both sides of the cost/benefit equation. On the one hand current wages represent income foregone (an opportunity cost) insofar as students effectively forego work opportunities by going to school (a tradeoff that is not straightforward in Brazil, as explained above). On the other hand, families clearly perceive the benefits of completing secondary education. Low average levels of education of the labor force and higher educational demands from the labor market imply high returns to secondary education and even higher and rising returns to tertiary education.[14] In an increasingly global economy, labor market signals clearly point towards the need for achieving a minimum education level in order to remain employable. Current labor market conditions with growing unemployment, low wages, and temporary (unstable in nature) work particularly among young uneducated workers, indicate that in large metropolitan areas this minimum is secondary education, a level well above the average of the workforce in Brazil today. With attainment of secondary education, better paid and stable jobs become available for graduates. Hence, families and individuals are rapidly internalizing the idea that it is important to get past the barrier of secondary education if they want to have access to better employment opportunities. This highlights the key role of policies to expand and improve secondary education as a necessary condition for improving equity.

Box 3.1 Boys falling behind in Brazilian education system: A worrisome trend

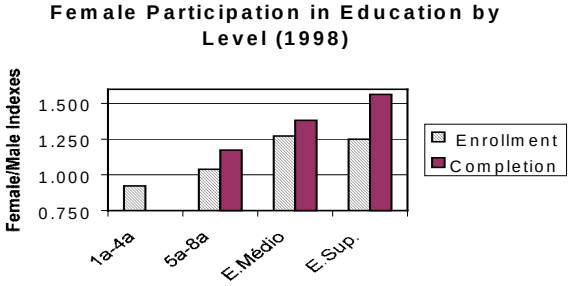
The decade of the 1990's marks a significant landmark in the relationship of gender and academic achievement in Brazil. For the first time in Brazilian history, female students are performing better than their male counterparts with respect to literacy rates, average number of years of schooling, enrollment and completion rates at all levels of schooling. This trend, although promising for female students, is also a sign that boys are clearly falling behind in the Brazilian education system. This worrisome trend will most likely continue unchecked unless a targeted strategy is developed to address the situation.

[14] The private rates of return to education in Brazil have been documented in several studies. Among these, IPEA estimates for São Paulo show wage differentials between 12 and 14% for secondary education (relative to no education) and above 16% for tertiary education. However, as the average years of education of the labor force rises, the returns to primary and secondary education begin to diminish. This is already evident in decreasing returns to primary education over the last 15 years. Returns to secondary education have been more stable but begin to show a slightly downward trend. On the contrary, returns to higher education exhibit a clearly rising trend.

According to the 1996 population census, the proportion of illiterate women under the age of 39 is significantly lower than for men in the same age group. For example, among 15-19 year olds, the illiteracy rate is 7.9% for men and 4.0% for women; and for 20-24 year olds, the illiteracy rate is 8.7% for men, and 5.5% for women. For the population over the age of 39, the inverse relationship is true: the proportion of illiterate women is higher than for men. This trend suggests that women have taken better advantage of increased educational opportunities over the last thirty years. Another sign of this trend is the rapid increase in average years of schooling among females, particularly over the last decade. Until the late 1980's, male students tended to complete more years in school. However, during the 1990's this tendency shifted to favor women. From 1990-1996, the average number of years of schooling increased from 5.1 to 5.7 for men and from 4.9 to 6.0 for women. Thus, while the average number of years of schooling jumped by more than a year for women, the improvement for men was only about a half a year during the same period.[15]

The flip side of this success story is the under-performance of boys, which should cause concern among education policymakers to understand why boys are falling behind relative to girls. What factors inside and outside the school system are acting as a disincentive for boys to stay in school longer? What measures or programs can be devised to address this issue?

The data on enrollments and completion rates suggests that boys are repeating more and ultimately choosing to leave schools earlier. The percentage of boys enrolled in lower and upper secondary school who are older than the reference age for their grade is higher than that for girls. Furthermore, female students progress faster and more consistently from one education level to the next than boys. The proportion of female students among those who complete secondary and higher education substantially exceeds the proportion of female students in total enrollment at each level. By contrast, male students are increasingly underrepresented in secondary and higher education.



Source: Own calculations based on MEC/INEP data

The ratio of female to male participation in enrollments is higher than one, meaning that females are over-represented in total enrollments at every level, except primary (grades 1 to 4). The degree of female participation increases in secondary and higher education as more females complete each cycle relative to men. This is clearly shown by the substantial over-representation of females in upper secondary, where they represent 56% of enrollments but close to 60% of those concluding that level. Likewise, females account for 55% of enrollments in higher education and they represent 61% of those completing higher education.

[15] Source: Report on Human Development in Brazil, 1996: PNUD/IPEA, 1996.

The above data provide evidence that female students are increasingly dominating enrollments in secondary and higher education and that male students progress slower and dropout more than females. But what happens in terms of learning outcomes? Although the differences in academic achievement between the sexes are not large, results of recent academic achievement exams (SAEB 97) show that female students consistently outperform males in Portuguese but male students do better in Math and Science. This pattern has been observed in other countries and may be linked to gender biased role models or differences in teacher attitudes and expectations. Nevertheless, these results pose a pedagogical challenge for teachers to overcome societal and cultural biases and to use approaches that engage and motivate all their students in their subject matter.

Why do boys tend to quit school earlier than girls? Male participation in schools may taper off as a result of the overt or subtle socio-economic, cultural, familial or self pressure to earn extra household income by dropping out of school to enter the labor market. This pressure is particularly strong among low-income families, as well as for many households in the poor states of the North and Northeast. While the pressure on young boys to enter the labor market causes many to drop out of school, many young girls are able to continue with school since they tend to do domestic work, which offers a more flexible schedule, thereby allowing them to stay in school.

Paradoxically, increased female participation in the labor market goes hand in hand with higher educational attainment among women. A possible explanation for this trend may be the way women are interpreting labor market signals and choosing to stay in school. In a context of high youth unemployment and persistent salary discrimination against women, particularly in informal or unskilled jobs, women are choosing to pursue academic achievement as their best strategy to raise the possibility of securing stable work and better salaries.

Why do large proportions of young males choose to drop out of school in order to join the labor market, even if they find it increasingly difficult to secure good jobs without a secondary or higher education? Several factors may be involved, including a different interpretation of labor market signals, a higher propensity for risk, different role models, and more impatience to achieve financial independence. In any case, educational policies need to address the issue by focusing on both school and extra-school factors that act as disincentives for males to stay and progress in school, and to perceive educational achievement as a priority.

Such incentives need to take into account both the opportunity costs and the perceived benefits of staying in school. On the demand side, cash transfers linked to school attendance and performance may partially offset the opportunity cost of staying at school. On the supply side, investing in raising school quality, as well as providing age-appropriate learning materials, contextualized learning practices and engaging extracurricular activities (i.e. sports and artistic expression) can make schools more attractive and relevant to students. These measures are key to upgrading student perception of education as the most important investment in their future.

5. Large inequities in school quality inputs

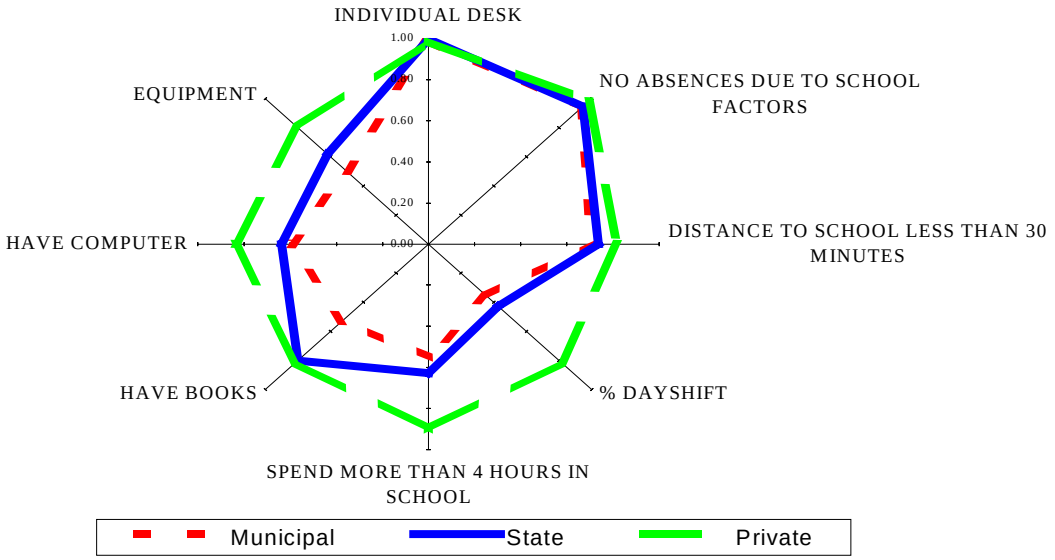
3.

4. WHILE THE ROLE OF SCHOOL QUALITY IN DETERMINING EDUCATIONAL ACHIEVEMENT IS EXAMINED MORE FULLY IN CHAPTER IV, THE DISTRIBUTION OF EDUCATIONAL QUALITY INPUTS HAS STRONG EQUITY IMPLICATIONS. HAVING EXAMINED THE ROLE OF FAMILY AND LABOR MARKET VARIABLES IN DETERMINING THE DEMAND FOR AND THE LEVELS OF INVESTMENT IN EDUCATION THAT FAMILIES MAKE, WE NOW TURN TO SUPPLY SIDE VARIABLES, IN PARTICULAR THE AVAILABILITY AND DISTRIBUTION OF SCHOOL QUALITY INPUTS IN DIFFERENT TYPES OF SCHOOLS, ACROSS REGIONS AND ACROSS SOCIOECONOMIC GROUPS. BASED ON DATA FROM THE 1996/97 LIVING CONDITIONS (PPV) SURVEY, ELEVEN CHARACTERISTICS RELATED TO SECONDARY SCHOOL OPERATION AND TO THE AVAILABILITY OF EDUCATIONAL INPUTS WERE ANALYZED.

The analysis of these data highlights the large quality gap between public and private schools and between state and municipal schools. In addition, the data show large inequalities in the characteristics and quality of schools attended by the rich vs. those attended by the poor. These findings are summarized in the diamond graphs below, where each axis plots the percentage of schools which have a particular quality input or school characteristic. A bigger diamond represents a better quality school.

Figure 3.4 shows that public schools still have a long way to go to be comparable to private schools in terms of the school quality indicators measured.

Figure 3.4: Differences in School Quality Public vs. Private
(% of Upper Secondary Schools Possessing Each Quality)



Two aspects are particularly worth highlighting:

- **Day/night shift and time in school.** Private schools have longer schooling hours: 90% have more than 4 hours of class time, while only 60% of public schools have this characteristic. This is consistent with the fact that 80% of private schools operate only within one or two shifts (morning and afternoon) compared to only 60% of public schools (presumably the other 40% operate three shifts or evening shifts with less than 4 hours of instruction).

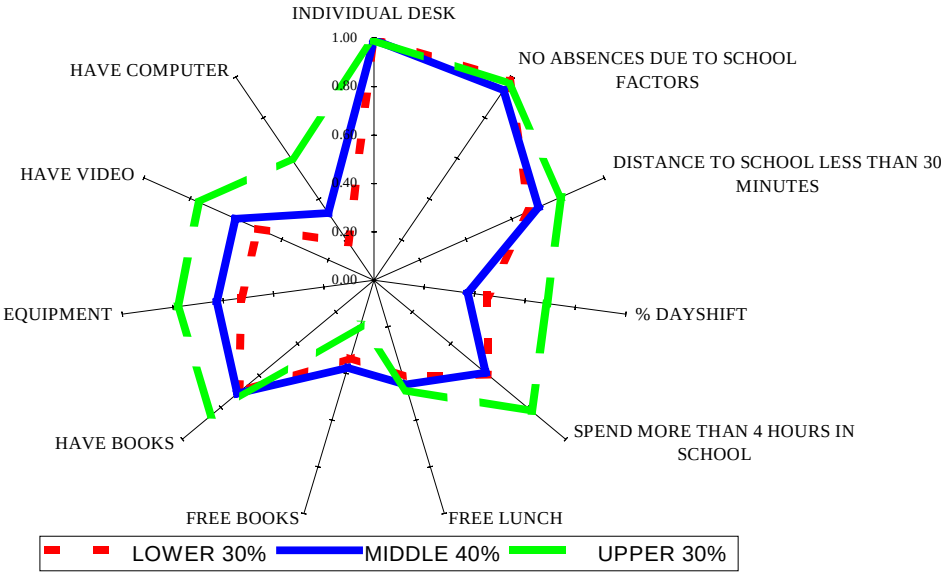
- **Lower quality of municipal schools**. A larger fraction of municipal schools lack quality inputs, including libraries, science laboratories, and other educational equipment. Studies have shown the availability of books to have a strong impact on student learning. Interestingly, state schools appear comparable to private schools in this area, but municipal schools lag far behind.

The same data allow an analysis of the availability of school quality inputs across socioeconomic groups. Families interviewed can be grouped by income decile which

gives an idea of the differences in quality of educational opportunities between rich and poor students.

Figure 3.5, below, shows that schools attended by students from the bottom three deciles are in general inferior to those attended by students from the top three deciles. This gap in school quality is clearly concentrated at the top of the income distribution since the schools attended by the middle-income groups feature similar indicators to those attended by the poor.

Figure 3.5 : Differences in School Quality Across Income Groups
(% of Upper Secondary Schools Possessing Each Quality)



The following results are worth highlighting:

- Wealthier children spend more time in school, predominantly in daytime schools. The rest of Brazilian students spend much less time in school, and over half of them attend night schools;

- The vast majority of schools attended by the rich feature most quality inputs, except for free school lunch and free books for students (these programs, where they exist are public programs). Although sizeable differences exist in the availability of most educational inputs (books, laboratories and other equipment) the most salient difference is the availability of computers; 60% of the schools catering to the rich have them compared to only 20% of the schools catering to the poor.

- Despite state efforts to achieve comparable standards to private schools with regard to the availability of books, the wealthy still have greater access to books than do the

poor. This finding supports the hypothesis that the wealthy attend the better public schools, while the less-well off attend public schools of lower quality.

B. The Challenges

High repetition and quality problems in Brazilian education, combined with wide socioeconomic differences between regions and income groups, are largely responsible for the fact that poor students are extremely underrepresented in secondary schools.

Lowering repetition and dropout rates are once again key to expanding secondary education opportunities to the poor, particularly in less developed regions where these rates remain very high. Poor children are disproportionately represented among repeaters and dropouts; as mentioned earlier, the likelihood that a child from the lowest three income deciles completes primary education is a mere 15 percent. Lowering repetition and dropout rates can be addressed through a combination of flow-correction programs and targeted investments in improving educational quality.

Making secondary schools more attractive to young males: The higher propensity of young males to drop out of school is a serious source of concern which merits more careful study (see Box 3.1). The challenge is for education policymakers to design interventions aimed at making schools more attractive and relevant to young adults while looking for ways to reduce the opportunity cost of school vs. work. Of critical importance is improving teaching practices to make them more engaging, providing age-appropriate materials, emphasizing contextualized learning and fostering extracurricular activities more attuned to the interests of young males (i.e. sports, music and theater gropus, artistic expression). In addition, part time training or community work programs could be designed, where students could pursue areas of their interest (i.e. computers) and/or earn a stipend for part time work that does not interfere with school attendance. Eligibility to participate could be conditioned to maintaining certain school performance standards.

Compensating for regional and system inequities is another major challenge. An enormous positive step in this direction was taken in 1996 with the establishment of the *Fundo de Desenvolvimento do Ensino Fundamental* (FUNDEF). Described more fully in Chapter V, this fund guarantees a minimum level of expenditure in grades 1-8 across the nation, redistributing resources in favor of poorer states and municipalities. The possibilities of extending this type of financing mechanism and incentive system to upper secondary education is explored further in Chapter V.

Ensuring access for rural students to continue their studies into secondary education may be an important factor in trying to boost low rural enrollment and completion rates at the secondary level. A minimum scale is needed, however, to make particularly an upper secondary school viable. Thus, small towns and areas of dispersed population require alternative delivery options including modular classes, and distance education. The state of Rio Grande do Sul, for example, has determined that it is not possible to have schools

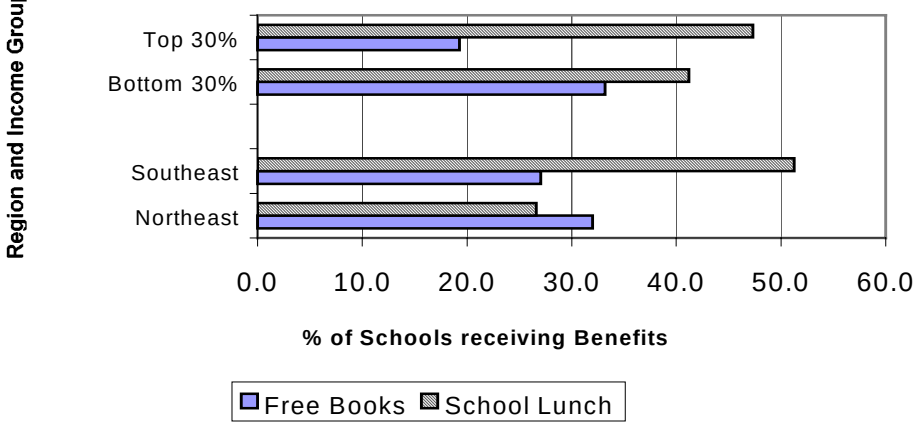
operating with fewer than 100 students. Schools below that minimum size use *Telecurso 2000* as an alternative (see also Policy Options in Chapter II).

Improving quality of public secondary education. Beyond the factors that limit access by the poor to secondary education, the large quality gap between elite private schools and average public schools is a major source of inequity. Poor quality of inputs, deficient teacher training and poor pedagogical practices result in little value added of public secondary education which contributes to low motivation by teachers and students alike, as well as chronic repetition and dropout. Improving the quality and relevance of public secondary education can go a long way in allowing a broader base of students to progress beyond primary education and achieve higher economic returns either by pursuing higher education or by entering the labor market with a sound foundation of basic skills.

Targeting quality inputs to the poor. While quality basic education is clearly a universal policy, some universally designed programs fail to reach the poorer beneficiaries and their benefits tend to be captured by the better off. This is so mainly because the poor are substantially underrepresented in secondary schools (because they do not complete primary education). Thus, in designing quality improvement programs with equity in mind it is essential to consider introducing positive discrimination elements or delivery mechanisms which can render universal programs more progressive.

Programs such as *merenda escolar* (school lunch) and the *Programa Nacional do Livro Didático* (textbook program) are efforts made by the Government to enhance the quality and attractiveness of *ensino fundamental*. A preliminary evaluation of the distribution of benefits of the *merenda escolar* and the *livro didático* programs, based on data from the 1996/97 PPV (see Figure 3.6) suggests that the former is somewhat regressive while the latter is very progressive. According to this survey, the coverage of the *merenda* was higher in urban areas, in the Southeast vs. the Northeast, and among students of the upper income deciles. By contrast, the *livro didático* achieved higher coverage in rural areas, in the Northeast and among students of the bottom three deciles. These findings are worth considering in improving the design and delivery mechanisms of these important programs, and particularly if considering extending them to upper secondary education, where the composition of enrollment is even more skewed towards the upper classes.

Figure 3.6: Distribution of Benefits from Selected Federal Programs by Region and Income Group



Influencing the demand for education. In some states, income support mechanisms are being tried to promote primary school attendance and retention of students from poor families. This type of mechanism has been tried in other countries at the secondary level (i.e. Argentina). However, as secondary school students tend to be from better-off families, such a program would require careful targeting mechanisms, including attention to youth currently out of school. Our background studies showed that family income differences alone play a relatively modest role in determining educational attainment when compared with parents' education or with school quality variables, which can act as powerful policy levers in increasing student retention and learning. These issues need to be carefully weighed when considering using income support policies as educational programs. The main risk is that these programs, although interesting and effective as income support mechanisms, may have little impact in terms of educational objectives, particularly in absence of school quality improvements. Thus any income support programs that aim to improve educational outcomes should be balanced with interventions focusing on school quality. Another risk, which has proven to be a problem elsewhere,[16] is that the volume of financial resources involved may divert scarce resources from educational priorities, particularly improving quality.

Box 3.2 The Brasilia Bolsa Escola Program

Since the early seventies, minimum income programs have been proposed as a means to alleviate poverty in Brazil. The Bolsa-Escola Program in the Federal District is a good example of targeted cash transfer program in a relatively wealthy milieu. In contrast to similar programs, the Brasilia Bolsa Escola program is characterized as an education rather than as a minimum income program. The program's main goal is to "promote the enrollment and permanence of children ages 7 to 14, under material needy condition and poor social and familiar situation, in public school." Families that meet the selection criteria with children enrolled in school are provided a minimum monthly salary for as long as their children attend at least 90 percent of their classes in any given month. After three years of operation, the program has demonstrated positive results in terms of focus and coverage (Sabóia e Rocha, 1998).

Evidence of program impact is mixed. There is some evidence that it can function well as a safety net program while improving enrollment and reducing dropout. A study conducted in 1997 found lower dropout rates for "beneficiaries" (0.2%) compared to "non-beneficiaries" (6.5%). It should be noted that it it is difficult to separate program effects from other educational influences. Furthermore, there is little evidence of its impact on student achievement.

C. Policy Options to Improve Equity in Secondary Education

[16] See J.C. Navarro, 1996 (mimeo).

Secondary education policies in Brazil must meet the challenge of ensuring greater access by the poor as well as better quality of the schools they attend. Policy options for improving equity in secondary education include the following:

- **Flow correction programs**

These include programs such as the *Classes de Aceleração* and *Escola nas Ferias*, which are profiled in Chapter II.

- **Use of alternative delivery strategies to expand access to rural poor**

Given the magnitude of the challenge that Brazil faces in secondary education (current net enrollments are around 25%) it is important to carefully explore alternative delivery strategies which can expand access to areas or beneficiaries who are unlikely to be reached by traditional public school models. Distance education can be a cost-effective way to extend coverage to areas of low population density where it is difficult to achieve a minimum scale (see also policy options for Chapter II) and has been successfully tried in poor rural communities (Serra do Mel in Rio Grande do Norte).

- **Targeted programs to improve school quality**

- Increased focus on improving quality in night schools, where poorer students are likely to be found;
- Use of minimum operating standards concept to focus on improving those schools which are in worse condition (see also Chapter IV);
- Exploration of public-private partnerships to improve school quality (such as the *Escolas conveniadas* – profiled in Chapter IV) and/or open access for the poor in higher quality schools, either through vouchers or purchase of spaces in private schools.

An option to improve both the quality and equity in distribution of educational inputs is to use a minimum standards model for secondary schools. The minimum operational standards model is going to be implemented in Bahia. Under this proposed project, a detailed school survey is applied to all schools within the project region. This survey is then processed and compared to a defined minimum standard for each size school module. Those schools that do not meet the minimum standard receive inputs to bring them closer to standard. This process should help to substantially reduce the politicking that traditionally accompanies resource allocation.

- **Financing mechanisms and incentives**

Financing allocation schemes like the FUNDEF have addressed the issue of regional differences and the need to guarantee a minimum level of expenditures per student in *ensino fundamental* across the nation. This type of instrument has created strong incentives for redistributing resources in favor of poorer states and to rationalizing responsibilities between states and municipalities. Extending this type of mechanism to

all of basic education (including upper secondary) or setting up similar resource allocation formulas to generate greater financial resources for upper secondary is an important issue for policy makers in Brazil. These topic will be elaborated in Chapter V.

- **Incentives/ In kind subsidies to poor families**

Family (context) variables have a strong effect on educational attainment. Family expenditures in education are very regressive as the rich spend a much higher share of their income on education, while education expenditures are income inelastic among the lower income quintiles. On the whole, books and school supplies represent the lion's share of limited educational expenditures by the poor, while a large portion of education expenditures among the wealthy is spent on tuition. Subsidizing school supplies, books and educational materials (i.e. textbooks), and transport is likely to be more effective for improving educational achievement than providing cash transfers to families. Well-designed targeting mechanisms are an important aspect of this policy, and may vary from state to state. Education subsidy programs could be universal for poorer states, while income-based targeted programs could be initiated for poor communities within more affluent states.

IV. QUALITY: DETERMINANTS OF SCHOOL SUCCESS

A. The Story

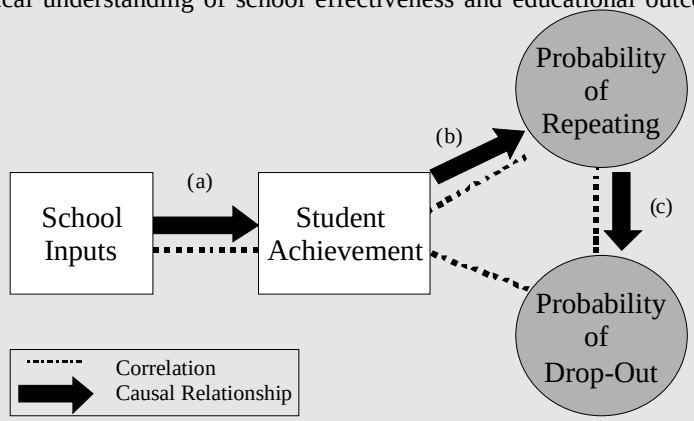
In previous chapters we addressed four key issues: the pervasive repetition rates in the Brazilian educational system, their effect on the expected demand for secondary schooling in Brazil, the profile and determinants of that demand, and differences in education opportunities among regions and socioeconomic groups. Reasons behind high systemic repetition rates are complex, but include cultural expectations of teachers and students and lack of teacher familiarity with non-punitive disciplinary techniques (see Box 2.2). An analysis of the determinants of educational attainment in Chapter III found that school quality, as measured by a composite index of educational inputs, had a strong positive effect on years of education completed (see Table 3.3). Low quality schooling is not only less attractive when compared to participation in the labor force, it is more costly as students reap fewer benefits and have higher opportunity costs. Moreover, enhanced secondary school quality increases student learning and in turn may contribute to reducing repetition and dropout (see Box 4.1). In other words, **quality matters**.

In terms of overall learning levels, Brazilian secondary school quality is quite low. According to results of a recent national assessment test (SAEB 1997), only 52 percent of 8^{th} and 26 percent of eleventh grade students are achieving at the expected level for their grade in Portuguese. Outcomes for math achievement are even more dramatic: 48 percent of 8^{th} grade students performed below the expected mathematics level for fourth grade students. Only 7.6 percent of 8^{th} and 5 percent of eleventh grade students achieved the expected level for their grade.

(i) Box 4.1: Links Between Quality, Achievement, Repetition, and Dropout

Linkages Between School Inputs and Student Outcomes

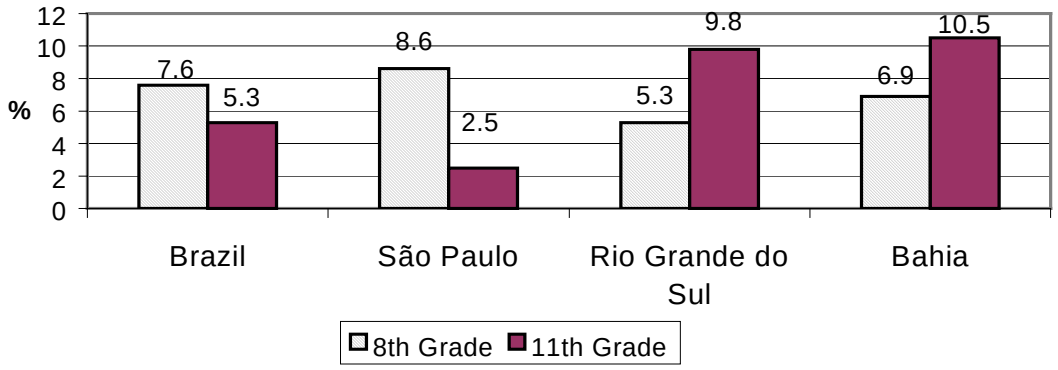
A simple, theoretical understanding of school effectiveness and educational outcomes would suggest the following scheme:



This figure signals the known correlation between school inputs, academic achievement, probability of repetition, and probability of drop-out. This correlation has been illustrated by numerous school effectiveness studies and are confirmed for Brazilian secondary education through our own data analysis of SAEB 1995. Causal effects are more difficult to demonstrate. In fact, only the links that are presented as (a) and (c) have been documented as causal links through our research. Other studies, however, have documented the relationship between student achievement and repetition (marked in the drawing as (b)). In A Call to Action, classroom studies found that teachers in fact retain those students with lower achievement. In Brazil's education system, student achievement affects the probability of dropping out through the probability of repeating. Students who repeat are at greater risk for future repetition; nor does repetition appear to improve achievement levels. This finding illustrates that dropout in Brazil is the result of a frustrating cycle of repetition. In the same way that alienation from society leads to suicide (Merton, 1949, Durkheim, 1933), low quality and disengagement from school leads to "repeated repetitions" which in turn lead to dropping out.

It should be noted that these average achievement rates mask disparities between and within states and regions (see Figure 4.1). For example, whereas 10.5 percent of 11th graders in Bahia scored at or above the expected level in mathematics, only 2.5 percent did so in São Paulo. One possible explanation for this difference is access: as shown in Chapter II, access to secondary school is much broader in São Paulo than in Bahia. With upper secondary enrollments growing at over 100,000 new students each year, more than doubling total enrollments over the last decade, and reaching 1.6 million students in upper secondary public schools, it is likely that quality in São Paulo may have suffered. In fact, concern with reversing this trend and improving student learning is currently the main objective of São Paulo's efforts to prioritize investments in quality improvement at the secondary level. Nonetheless, Rio Grande do Sul, which has also seen a substantial expansion of access to secondary school, albeit on a more manageable scale, comes out only slightly lower than Bahia in terms of learning levels. This result suggests that it is possible to work on access and quality issues simultaneously.

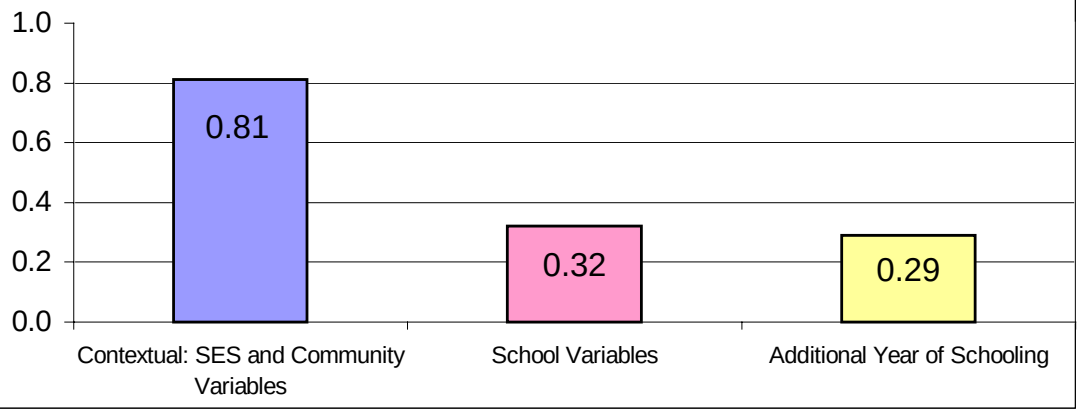
Figure 4.1 Percentage of 8th Grade and 11th Grade Stydents Achieving at or Above the Expected Level for their Grades in Mathematics - SAEB 1997



How can schools and systems raise secondary school quality standards? More specifically, what characteristics of Brazilian secondary schools contribute most to student learning? This chapter will address these questions, indicating those factors that increase student success in secondary schools in Brazil, and suggesting policy options to improve secondary school quality and relevance.

In Brazil as in the rest of the world, school characteristics do not have nearly as much impact on achievement levels as do background variables (such as community and contextual characteristics). Figure 4.2 compares the impact on mathematics achievement of community and contextual variables, school-level variables, and a full additional year of schooling in Brazil's secondary schools as they are found today.

Figure 4.2 Marginal Product Impact on Mathematics Achievement of Contextual and School Variables and an Additional Year of Schooling



It is striking to observe the comparably high effect of school variables on student learning – school variables alone can generate greater learning gains than an additional year of schooling. The importance attributed to school factors is not new, rather it is the relative importance of these factors that gives cause for reflection. Research indicates that school level effects are stronger in developing than in developed countries as the extra-school environment, including social capital, is not as rich. It is clear that despite the strong effect of contextual variables on student achievement in secondary school in Brazil, **school matters**. As Brazil begins to enhance and expand the secondary school system it is very important that resources are directed toward interventions that seem the most effective. As such, the identification of those school factors that lead to increased student learning is crucial. Based largely on quantitative analysis of 1995 SAEB data, these factors are described below.[17] A description of the analytical methodology used is found in Box 4.2 and a summary of the results from this study is found in Tables 4.1(a) and (b).

Box 4.2: Hierarchical Linear Modeling (HLM)

In fields such as education, students are grouped in classrooms, which in turn are grouped in a particular school. Within a school, this arrangement provides different educational experiences and determines specific characteristics for students as a group, depending in the class they are in. At the school level, differences can be even more striking. For example, the environment in a private school is different from that of a state-owned school. This variable grouping limits the usefulness of traditional statistical analysis. Ordinary Least Square analysis gives equal weights to each observation, and, as shown in various studies in which observations are grouped in levels, as in the cases studied in the field of education, this assumption gives us biased estimates.

In order to measure the academic achievement of students, family factors (socioeconomic) and school factors (schedule, sector, equipment) which affect performance must be taken into account, by finding the appropriate weights of the variations that can be attributed to the student and to the school. Linear regression models do not seem to be the most appropriate in this context. For this reason, several alternative methods have been considered to minimize the bias of the estimates when using OLS.

For instance, one could associate the characteristics of the school to each student. However this would be violating the assumption of independence between observations, thus underestimating the standard error and omitting the hierarchical nature of the outcome. If, on the other hand, one decided to summarize the characteristics of the students at the school level, this would be ignoring the analysis of the individual characteristics of each school, thus losing much of the explanatory power of differences in achievement, and often obtaining greater correlation among variables, due to the decrease in the variance, which resulted from the aggregation. One would not be able to obtain point-wise results from these aggregate results.

A third possible solution would be to study each school separately, upon which one would eliminate the inter-group variability analysis (between schools), thus discounting the analysis of the most important causalities, due to the lack of knowledge on the grouping effect, and underestimating the effect of family factors associated with the student.

The estimation of a hierarchical model requires a systematic analysis starting from the simplest of models (the empty model, which doesn't include estimating variables, and only estimates the overall mean of achievement), and will continue to be perfected by the progressive inclusion of explanatory variables,

[17] Most of the findings in this chapter are based on research conducted by Phillip Fletcher as background paper to this study. The research used SAEB 1995 data and Hierarchical Linear Models as an analytical tool. Some other findings referred to in this Chapter are based on other recent school effectiveness research done in the region (i.e. Colombia (Piñeros and Rodriguez), United States (Miller)).

related to students and to schools. Depending on the effect that the inclusion of variables have on the reduction of the total variance, these will be retained or dropped from the model (see Annex 1).

1. Teachers

Arguably, teachers are the single most important educational input. In the case of Brazilian secondary school teachers, experience appears to contribute most to higher student increases in achievement. Interestingly, teacher salary, education, and pedagogical style failed to demonstrate significant effects on student learning in this study. Greater secondary teacher education levels in the IPEA study referenced in Chapter III also showed a negative effect on student attainment, while the effect of education at the primary level was positive.[18] It is very clear, however, that secondary school teacher experience and seniority enhance student achievement growth rates, suggesting that teacher effectiveness is enhanced by practical experience and training. Previous research also suggests that teacher content knowledge is strongly related to student achievement, particularly at the secondary level. Investment in secondary school teachers seems most effective when it is targeted to increasing practical experience and developing content-specific knowledge. The mixed results found among different research regarding teacher effects on student learning raise questions regarding what it is that makes a teacher effective . There are several ways to interpret these results. One possible explanation is that a teacher who is effective in a given context may not be effective in other contexts. That is, there is no single "good" teacher for every learning environment. Another explanation is that teacher characteristics that may have an effect on student learning do not lend themselves to quantitative research.

2. School facilities and educational materials

The availability and maintenance of adequate facilities and instructional inputs is extremely important in explaining student achievement. In fact, once equalized for these inputs, *achievement differences among private, municipal, and state schools are eliminated* --there appears to be nothing intrinsic to private education that cannot be attained in the public sector[19]. The estimated impact on student achievement of a well equipped school versus that of one with fewer inputs can be equivalent to almost an additional half year of study. For an individual between 11 and 18 years of age, this difference is similar to that of the average schooling gap between the Northeast and Southeast regions, and greater than the educational gains resulting from having parents with one additional year of schooling. Facilities and equipment include typewriters,

[18] There is conflicting evidence in international research on the effects of teacher education. Piñeros and Rodriguez, (1999), found teacher education levels to have a positive effect on student achievement levels in secondary education in Colombia, for example.

[19] This result is an encouraging one and confirms the key role of school quality inputs. However, there is evidence in other research (i.e. Savedoff, 1988) that differences in school organization and management between public and private schools are important in determining whether a school can make optimal use of its resources, which in turn may have an impact on student achievement. Typically, public schools have had less autonomy, less control over the full range of educational inputs and face greater rigidities than private schools in deciding how to allocate resources.

blackboard, teachers' room, books, photocopiers, video-cassette recorders, televisions, slide and overhead projectors, auditoriums, physical education facilities and equipment and science and computer laboratories, among others. Maintenance also has a strong positive effect on achievement growth rates. There are many modestly equipped schools that are well maintained and many elaborate institutions where nothing works. High standards of school maintenance may also partly reflect more capable school-level administration.

3. Night Shift and Instructional Time

As noted earlier, substantial numbers of secondary students in Brazil attend night classes (more than 60 percent of upper secondary students). Schools offering night classes are generally public, have shorter hours, and fewer educational inputs than exclusively day shift schools. Repetition and dropout are higher among night school students than their day shift counterparts. Overall learning levels for night school students also lag behind those of day students.

Given these facts, a surprising study outcome is that, by itself, the fact of attending day or night classes does not appear to have a significant effect on achievement. The overall differences in achievement between day and night school students appear to be largely due to differences in student socioeconomic status, attendance patterns, and the characteristics of the schools they attend, rather than any inherent handicap associated with the night shift *per se* (i.e. students are less able to focus because they are tired). Holding all variables except day/night shift constant (e.g. socioeconomic status, teacher experience, educational inputs, etc.), night school students perform no differently than day school counterparts. In other words, investing in improving the quality of educational imputs and teaching methodologies in night schools could yield comparable results to making those investments in any other secondary school.

A similarly surprising finding emerged with regard to instructional time. Instructional time was cited in Chapter III as an important difference between day and night shifts as well as between schools serving the rich and poor (night schools and schools attended by the poor generally have fewer hours of schooling). With regard to achievement, however, instructional time was not a significant explanatory variable in this study. Other research on this issue is in fact mixed. Though increasing time-on-task within the classroom appears to increase learning achievement, merely increasing the hours of schooling does not necessarily have the same effect (Martinic, 1998). Absenteeism, however, was found to have a strong negative effect on learning in Brazilian secondary schools.

4. Principals

Paradoxically, secondary schools in Brazil where principals have more experience tend to have lower achievement growth rates. Among other explanations, this could imply that more experienced principals are older and conceivably less attracted to pedagogical and administrative innovations that offer increased learning opportunities for students. By contrast, principals' salary seems to have a positive effect on student achievement. Apparently, well-paid and presumably motivated principals are a key component in a strategy designed to enhance student achievement. In fact, many successful innovations in secondary education were initiated by school principals. It may also be the case that because principal salaries are less regimented than those of teachers, salaries reflect more of a market assessment of principals' capabilities: the better ones are better paid. There was no evidence in the HLM analysis of SAEB data, however, that principal education level is an important factor in achievement at the secondary level. It is important to note that some inconsistencies found in different research regarding principal effects on student learning may be a signal of the strong variations in the definition of an "effective principal." As with teachers, these mixed signals regarding the effect of principal education may be pointing to deficiencies in current approaches to teacher and principal training.

5. Governance and curriculum

Two additional areas believed to have important quality effects are school governance and climate and curricular content and delivery. Both teacher pedagogical effort and collegial administration of the school failed to show any significant effects in this study. Other research on school effectiveness, however, supports the thesis that school governance makes a difference. A 1998 study (Paes de Barros and Mendonça) examined the effects on student outcomes of three school governance innovations undertaken in several Brazilian states during the 1990s: (a) direct transfer of financial resources to schools; (b) election (rather than appointment) of principals; and (c) the institution of community based school councils. The study found positive, though modest, impact of these innovations on most student outcome indicators examined. Aspects of school climate have been found to positively contribute to learning, especially in lower secondary schools. An orderly and supportive environment, with numerous mentoring opportunities and clear rules and expectations strongly contributes to student's engagement and learning (Rodriguez, 1996). With regard to curricular content and delivery, various programs and experiments in the United States, Europe, and some LAC countries have sought to "contextualize" secondary academic education, increasing its relevance to student life and work experience. There is as yet, however, little evidence as to the relative success of these efforts.[20]

[20] See Wolff and Moura Castro, forthcoming.

i. Table 4.1(a): Variables that Resulted in Significant Effects

(Dependent variable: Mathematics achievement, 9-11 grades)

Independent Variables	Effect on Math Achievement	Comment
Student Variables (n=32,675)		
• SES (Socio-economic status)	*Positive.* Achievement increases with higher SES, measured as a set of household characteristics	Expected and consistent with all previous research.
• Age/grade differential	*Negative.* As the student age is closer to the expected age for the corresponding series, achievement increases.	Expected. Older students (with higher age/grade gap) have lower achievement.
• Gender (male)	Males achieve higher in Math	Expected. Consistent with previous research in Brazil.
• Race (non-black)	White students achieve higher	Expected, despite the fact that racial groupings are less clear-cut in Brazil than in other countries such as the United States
Classroom Variables (n=2,462)		
• Proportion of students absent for testing	*Negative.* Students in classrooms where a larger proportion of students are absent on the day of the test, have lower achievement	Expected. Absences on the day of the test can be considered a proxy of general absenteeism and lack of teacher pro-activity to discourage it.
• Teacher's experience	*Positive.* Students with teachers that have longer years of experience, achieve higher.	Unexpected. Results in this regard have been mixed in effectiveness research.
• Principal's salary	*Positive.* Students in schools where the principal's salary is higher, have better achievement.	Expected. Schools that offer higher salaries to principals are mostly located in cities and are probably able to attract qualified principals with above-average leadership and creativity.
• Principal's experience	*Negative.* Students in schools where the principal has longer experience on the job, have lower achievement	Unexpected. Experience should make professionals better at their jobs. However, some job burnout can be the cause for this finding. International research findings are mixed with regards to this result.
• School equipment	*Positive.* Students in schools that are better equipped, achieve higher.	Expected. This finding is consistent with most previous research.
• School maintenance	*Positive.* Students in schools that are better maintained, achieve better.	Expected. Good maintenance can keep up minimum working materials even in schools with limited access to equipment..

Table 4.1(b): Selected Variables with Non-Significant Effects

(Dependent variable: Mathematics achievement; 9-11 grades)

Independent Variables	Effect on Math Achievement	Comment
Student Variables (n=32,675)		
• Does homework?	No measurable significant effect	Unexpected. In schools effectiveness research, doing homework is generally a good proxy for student commitment- a strong predictor of achievement.
• Works?	No measurable significant effect	Unexpected. Students who work are generally less committed to school and come to school tired, thus achieving less. In this case, it is possible that the age variable explained most of the effect of working, as the two variables are strongly correlated.
Classroom Variables (n=2,462)		
• Classroom in a night school	No measurable significant effect	It was expected that students in night schools would have achieved less. This result suggests that, all other aspects equal, students in night schools should be able to achieve at comparable levels to their day-school counterparts.
• Teacher salaries	No measurable significant effect	Expected. Teacher salary is not a good predictor of student achievement. This finding is consistent with numerous previous research findings, and may be the result of inflexible teacher salary scales having no relationship to teacher's performance or effectiveness.
• School session duration	No measurable significant effect	Research in this area is mixed. While instructional time-on-task has a strong relationship with student achievement, mere hours of schooling do not necessarily. In this case, it was assumed that school session duration could be a proxy for instructional time-on-task. This finding may suggest that in Brazil, too little of the school session duration is dedicated to instructional time. It may also mean that what happens in the classroom is more important than how many hours the student spends at school.
• Classroom size	No measurable significant effect	Expected. This variable is frequently used in policy because it is politically compelling for families. However, this study confirms what most research has indicated in this regard: class size alone has little to do with student achievement
• Teacher pedagogical effort	No measurable significant effect	Unexpected. This variable was an attempt to capture a heavily phenomenological variable into a quantitative scale. We believe that the teacher's pedagogical effort is key for student achievement (numerous qualitative research point in this direction), but suspect that our measurement was simply not robust and lacked content validity (i.e. did not fully capture the concept that it intended to measure).
• Collegial administration of school	No measurable significant effect	Unexpected. This variable tried to capture quantitatively the efforts to promote autonomy at the school level. Past research suggests that autonomous schools have increased student achievement. We did not measure the length of

		time since the reforms had been implemented in the school and, thus, may have picked up the expected invisible impacts of young reforms that may yield impact at a later time.

B. The Challenges

The education inputs currently available to Brazil's secondary schools are, at best, modest in quality and quantity. As discussed above, secondary school teachers, principals, instructional materials, facilities, instructional time-on-task, content, and delivery, and school organization and governance are all key inputs that require increased attention to enhance their effectiveness.

A recent nationwide survey of teachers confirmed that secondary school **teachers** are experienced but under-trained.[21] In fact, the lack of impact of teacher education on student achievement is likely a reflection of the inadequacy and poor quality of teacher training, experience therefore gaining in importance. According to the 1996 National Education Law (LDB), all secondary school teachers should have completed post-secondary education by 2007. In all, some 24 percent of lower and 10 percent of upper secondary teachers have not completed post secondary studies. Some 43 percent of these legally uncertified teachers are teaching in the Northeast region. This low level of teacher education is reflected in teacher compensation—average monthly salary rates for teachers in lower secondary in 1997 was R$605.07, while upper secondary was R$691.13, with significant variation among regions. Lower secondary school teachers in the Northeast, for example earn, on average, half as much as their counterparts in the Southeast, while upper secondary teachers earn 35 percent less. Salary levels failed to demonstrate an impact on student achievement. While, higher salaries may be an important incentive in attracting bright, motivated people to the teaching profession, there may be other factors (professional status, working conditions) that are at least equally important, and need to be improved. In addition to training and compensation issues, there are in Brazil (as in the rest of Latin America) existing shortages of teachers in some areas, especially math and science. These shortages are likely to be exacerbated by the predicted expansion of secondary education over the next few years.

Secondary school **principals** are usually politically appointed, with no established minimum qualifications for selection. Rather, most principals are former teachers and have received no management training to prepare them for their role as leaders. Some states and municipalities are exploring minimum selection criteria or community involvement in school principal appointments; however these policy options are not widespread nor have they been systematically evaluated.[22] Considering the evidence on principal experience, salary, and education, it appears that a capable chief administrator is someone who is motivated both financially and professionally, possibly younger, and has

[21] MEC, "Censo do Professor 1997." Brasilia, 1998.

[22] The Paes de Barros and Mendonça study mentioned above is a first attempt at such a systematic evaluation, but does not cover the full range of current experimentation in Brazil. More recently (Parente e Luck, 1999) a new study by IPEA has done a descriptive survey of the different descentralization and school autonomy options implemented by each state.

a predisposition to experimenting with administrative and pedagogical innovations. These evaluations and their findings could provide useful insights to state and municipal secretariats experiment with alternative methods for school principal selection, supervision and career planning (see Box 4.3).

Box 4.3: Competitive Selection of Principals in Minas Gerais

Within a week of inauguration of the new government, in March 1991, the State Secretary of Education of Minas Gerais drafted a law establishing a competitive system for selection of school principals (*Seleção Competitiva de Diretores*, or SECOM). The purpose of this law was to curtail clientelism, often linked to political patronage, in the appointment of principals and involve the school community in the school administration. The SECOM is a two step process. In the first step, CVs of candidates (who have to be career teachers) are compared, and all candidates take a standard test to select the three best ones for each school. The second step entails the candidates' presentation of his/her administration program to the school community and their selection of the best candidate.

Successful implementation of the law required a complex and participatory process. Once the proposed law was drafted, the Secretary of Education took great pains to include the media in dialogue with political leaders, teachers and principals' unions, and parent and community groups.

We have seen that the material conditions of the school contribute greatly to the quality of learning opportunities. The availability and maintenance of adequate **facilities and instructional inputs** is an area where Brazilian efforts have been strongest in recent years. As seen in Chapter III, the free book distribution program appears to be well targeted, and book availability is practically the only area in which state-run public schools match private schools. The minimum operational standards concept, which defines a minimum set of inputs required for student learning, has also been advanced by the Ministry of Education (MEC) by way of the FUNDESCOLA program. To date, however, this program has been limited to *ensino fundamental* (grades 1-8) schools. School inputs needed at the upper secondary level differ substantially from those needed for primary and lower secondary, notably in the need for availability of labs and teachers with specific content knowledge. Examination of the distribution of school inputs in Chapter III also revealed that while many high quality inputs have been made available to schools, their distribution is still far from equitable.

Efforts to increase **instructional time-on-task and attendance** in secondary schools is of particular importance. This challenge is especially relevant for night schools, where overall instructional time is lower and absenteeism is higher. Absenteeism occurs for practical reasons (e.g. buses run late; people are tired), and because often the relevance, content, and enjoyment of schooling is not sufficient to complete with other demands. Quality and relevance of the schooling experience are key factors to promote attendance. Alternative methods for increasing instructional time and time-on task are discussed in the policy options section, below.

Previous sections identified the prevalence of older, working students attending night schools. As mentioned above, for this specialized group of students, **instructional content and delivery** (curriculum and pedagogy) becomes a critical element for making

schooling relevant and attractive. Many Brazilian secondary students receive on the job training through their place of employment. Most of them, however, still lack basic minimum skills due to poor primary school quality. Secondary schools rarely adjust instructional practice to these student realities. National Curriculum Models for upper secondary have done much to put forth a modern and relevant vision for instructional practice and content; however these ideas are yet to be implemented at the school level (see Box 4.4). Lack of training, limited instructional resources and varying capacity of school level leadership are some of the possible explanations for this lag in implementation.

Box 4.4: New National Curriculum Guidelines for Upper Secondary Education

Along with many other countries, Brazil had for many years a two-track system of upper secondary education: a general academic track for students likely to go on to higher education, and a vocational education track. With the issuance LDB approved in late 1996, and the parallel process of reform of technical education, Brazil broke with this model and opted to phase out vocational education at the secondary level.

The new Guidelines propose a more general academic orientation to the upper secondary school curriculum, grounded in math and science, which also "contextualizes" learning. Academic knowledge and skills are developed through the exploration of issues and themes directly related to everyday life, including business and work, health, sexuality, sports, arts and culture. About 75 percent of the suggested new curriculum is outlined in the Guidelines, with 25 percent to be determined by individual schools on the basis of local needs, interests, and opportunities.

While the new Guidelines are a significant step, they remain guidelines: individual states and municipalities have substantial autonomy to interpret, shape, and implement them as they desire. More importantly, much needs to be done to provide teachers and schools with concrete pedagogical tools (teaching aides, books and educational materials) that can help translate the new guidelines into classroom practices. This is one of the main challenges of the reform of ensino médio.

See also: Berger, Ruy Leite *"O Ensino Médio: A Universalização Possível"*

Finally, secondary **school governance** still heavily depends on central decision-making for both complex and simple tasks. Community participation in school governance (through school councils, etc.) appears to be growing, but questions remain as to the level of responsibility these councils actually exercise. By 1994, 12 Brazilian states had established school councils (*colegiados*) but only a few of them actually had some autonomy for decision-making and financial management. School governance challenges include finding ways to increase school autonomy, primarily through finance structures and demand based school assistance. Schools are best able to determine their needs, and those schools where innovations in practice and organization have been implemented have been successful in increasing student achievement. Providing schools with an environment conducive to self improvement is a first step in improving student outcomes, and several states are currently taking steps in this direction.

C. Policy Options to Improve Secondary Education Quality

This section presents possible policy options reflecting the challenges described above. While some follow directly from study findings, others are drawn more broadly from other school effectiveness research. Where available, evidence of similar experiences is cited.

- **Establishment of minimum operational standards for all secondary schools, including basic standards for:**
- Instructional materials, both quality and quantity of textbooks, maps, rulers, VCRs, etc.
- Physical inputs including chairs and desks;
- Size and condition of facilities, including adequate light and ventilation;
- Human resources, including minimum standards for teachers and school principals.

As discussed in Chapter III, an option to improve both the quality and equity in distribution of educational inputs is use a minimum standards model for secondary schools. (For a description, see Policy Options for Chapter III).

- **Development of age-appropriate materials for secondary schools**

Given the large age-grade distortions in secondary education (three years on average) as well as the shared financing structure of primary and lower secondary education within *ensino fundamental*, many materials available to secondary schools are simply not age-appropriate. An option to increase the relevance of secondary schooling is the development and/or investment in such materials. As profiled in Chapter II, CENPEC developed specialized materials for the *Classes de Aceleração*. These have proven wildly popular.

Another example of investment in age-appropriate materials is São Paulo's purchase of computers for all schools serving lower and upper secondary education. While there has not yet been a systematic evaluation of the academic use and physical maintenance of these computers, anecdotal evidence indicates that student interest is very high. In a labor market such as São Paulo's, where computer skills are in high demand, the introduction of computers at the secondary level clearly enhances school relevance.

- **Design and support of creative and effective maintenance strategies for facilities and materials**
  - Community-school contracts for school maintenance

As shown earlier in this chapter, maintenance has a strong impact on student achievement. Too frequently this is an item which is overlooked and under-funded. Strategies to improve school maintenance are specially strong when they involve the community that is served by the school. Schools under the EDUCO program in El

Salvador have established contracts with the local community for maintenance of the facilities and other educational inputs (such as desks). This successful practice has reduced costs while increased community participation in and commitment to their school.

- **Give priority to effective investments to upgrade teacher skills**
  - Pre-service: special emphasis given to content training and establishment of practical training mandates;
  - In-service: content oriented enhancement courses linked to alternative delivery methods, including distance and mass-media supplementary lessons

A good example of recent policy decisions based on what is known to be effective to enhance secondary school teachers' skills is the experience of Colombia in 1996. The Ministry of Education decided that all of the secondary teacher training budget would be utilized in a demonstrated and effective training intervention. As a result, a series of strategic decisions were made: (1) To focus in Math; all secondary education Math teacher would benefit from the training program. (2) To focus on content; the training effort would be targeted to enhance the teacher's knowledge and command of Mathematics, as research has identified teacher's achievement as a key predictor of student success. (3) To transfer the funds for the training program to the departments (provinces) supporting the decentralized scheme that the Government has supported. (4) To allow each province to select the delivery option that they preferred. As a result, the delivery of the training varied immensely from province to province (from in-school experiences to university credits) while the content of the training focused solely on the material that math teacher teach in the classrooms. Most provinces established partnerships with Universities or other local training institutions. The training program, estimated in US$3 million, proved to be an important contribution to enhance classroom practice for teachers. Results on student achievement are expected to be observed in the 1998 and 1999 national tests.

- **School principal minimum standards**
  - Training and education requirements
  - Management and administrative training seminars;
  - School/community participation in selection

Efforts to influence and improve school governance in Brazil have included a number of programs geared to raising standards for principal selection. The Minas Gerais experience (see Box 4.3) included the institution of standardized testing of candidates for principal as well as a community voice in the selection of those candidates passing the test. The state of Bahia is currently designing a program to establish similar minimum standards for principals. In New Zealand, competencies and skills required for principals are carefully determined and have been established in collaboration with higher education institutions that prepare principles. Curricula for education of school leaders is closely coupled with these competency standards.

- **Enhancing the Quality of Night Schools**

- Weekend enhancement courses
- Distance education
- Increasing time on task
- Rationalizing the curriculum (reducing the number of subjects)
- Increased flexibility in the organization of instruction
- Developing age appropriate materials and pedagogical methodologies

Increasing instructional time has been a popular policy in Latin America. For example, Chile increased the hours of instruction from a yearly average of 1,300 to 1,621 hours. Given low instructional time in secondary school in Brazil (particularly in night schools), increasing instructional time is an attractive option per se, although it is inherently more difficult to do in night schools. As discussed earlier in this chapter, however, solely adding instructional time does not necessarily increase student learning. Also needed is an increase in effective time on task. In Brazil, instructional time can be added in weekends through distance education (printed tutorials, TV, radio) or through formally instituting weekend classes as Singapore and other countries have done. Aside from increasing instructional time, alternatives to increase time on task include the establishment of longer content blocks through making the organization of instruction more flexible. These longer blocks permit students and teachers to focus and allow for greater depth of content. This can be done by rationalizing the curriculum (reducing or grouping curricular areas) or by instituting a credit system whereby students can progress in fewer subjects at a time, adapting their load to their own pace and time availability.

- **Increased school autonomy**
  - Direct transfer of resources
  - Increased decision-making power

Under the FUNDESCOLA Project design, the **school development plan** is both the result of one process (diagnosis and strategy formulation) and the starting point of another (school improvement implementation and monitoring). School principals initially undergo an intense training program in strategic planning, addressing such issues as community mobilization, resource management, and teacher career planning. These skills are immediately applied in the design of their own school development plans. The entire school community (including parents, teachers, and school staff) meets to identify, analyze and prioritize the problems at the school, establish and quantify specific school improvement objectives, and agree on an action plan. The expression of this overall diagnosis and agreement on actions and targets is the **school development plan**. Equally important is the process of cooperation, in which students, parents, teachers and school directors work together at every stage of the plan's development to reach concrete goals for their school. Initial experiences have shown that this participatory process not only results in increased loyalty and support to the school on the part of parents and staff, but serves as a rich and highly practical professional development program for the school principal as well as for teachers.

The **school development plan** includes a section called the school improvement project *(PME).* This is a specification of an action plan the school stakeholders have identified as

necessary for the school to achieve its agreed targets. It also estimates the financial support the school needs to carry out their school improvement project. Schools use their school improvement projects to inform municipal and state education authorities on which inputs or training they need help in financing. Schools then purchase services and activities that they determine are important for achieving their school development plan goals, i.e. upgrading library or lab equipment, or improving teacher practice in math.

- **Full Implementation of the National Curriculum Standards**
  - Limited early diversification
  - Emphasis on basic academic skills

The National Curriculum Standards for *Ensino Medio* (see Box 4.4) proposed an emphasis on general skills, as a vehicle to produce a flexible and competent work force graduating from the education system. The process of implementation of these standards can be accelerated by establishing a stronger outreach and dissemination program to states, municipalities, and schools as well as investing in the development of educational materials that are aligned with the new curricular vision. A first step in this direction is the "Programa de Melhoría e Expansão do Ensino Medio" (PROMED), a federal program which provides matching grants to states for investments and educational materials needed to implement the curricular reform in upper secondary schools as well as for strengthening the institutional capabilities of State Education Secretariats to support and monitor the process of reform.

- **Public-Private Partnerships to Improve Quality**

Another option which merits consideration is establishing and fostering partnerships with the private sector to improve school quality. There are numerous efforts by private foundations and businesses working in conjunction with individual schools in Brazil. Another model is the formation of school networks involving public and private schools in which high quality private secondary schools can provide materials, technical assistance, and teacher training to public schools. Several large-scale experiments in this direction are already operating under franchising schemes. For example, the Paraná-based Red Positivo is comprised of almost 1,500 schools throughout Brazil and provides technical assistance, materials and teaching methods developed by a private education group. Numerous schools serving low-income students have benefited from being part of this network.

V. SYSTEM FINANCING: FUNDING SECONDARY SCHOOL EXPANSION

A. The Story

In this chapter, we outline the basic characteristics of public secondary education financing in Brazil as well as cite critical challenges for the sector. Education financing has changed radically in recent years, partly due to innovative efforts on the part of the federal government to reduce disparities in expenditures for *ensino fundamental*. These changes will have a profound impact on secondary education in coming decades as the boom in *ensino fundamental* enrollments generates increased demand for upper secondary education. Confronting the dual challenges of expanding access and improving education quality will be the major task of education managers in the first decade of the next century.

1. Overview of Public Expenditure in Education

Public sector spending in education in Brazil (4.7 percent of GDP) exceeds the Latin American average (3.7 percent). Within the sector, 36 percent is spent on primary education, 33 percent on secondary, and 26 percent on higher education (see Table 5.1). Distribution of these expenditures is not, however, proportional to enrollments. While higher education claims 25 percent of the resources in education, this sector represents less than 2 percent of education enrollments. Substantial spending on higher education reflects both the higher per-student costs of providing education at this level, and a policy of public financing of tertiary education.

Table 5.1: Brazil Public Spending on Education, 1995

Sub-sector	Enrollment (%)	Millions of US$	Millions of R$	%
Pre School	10.8	1.930	1.761	5.5
Primary (1-4)	48.2	12.834	11.711	36.3
Lower Secondary (5-8)	**28.2**	**8.292**	**7.566**	**23.4**
Upper Secondary (9-11)	**10.9**	**3.285**	**2.998**	**9.3**
Higher Education	1.9	9.002	8.214	25.5
Total	***100***	***35.342***	***32.250***	***100***

Source: Calculated from MEC/INEP/SEEC and IPEA/DIPOS/MPO

As discussed in Chapter I, the responsibility for the supply and financing of both lower and upper secondary education falls primarily on state governments (68 percent of lower and 72 percent of upper secondary enrollments) Private participation is important in upper secondary education, accounting for 20 percent of enrollments and more than a third of all upper secondary education establishments in 1997. However, enrollment trends show slow growth in enrollments in the private sector, compared to exploding growth of public enrollments, an indication that private schools cater to a particular socio-economic group of the population. In this chapter, we will focus on public secondary education.

Tables 5.2(a) and 5.2(b) show the structure of public education spending by education sub-sector and government administration.

Table 5.2(a): Structure of Education Expenditures by Sub-Sector (%) 1996

	Federal	State	Municipal	Total
Pre-school	0.0	0.6	18.5	5.6
Ensino Fundamental	11.2	77.7	71.8	58.6
Upper Secondary	9.4	9.7	7.8	9.0
Higher	79.4	12.0	1.9	26.8
Total	100.0	100.0	100.0	100.0

Table 5.2(b): Structure of Education Expenditures by Government Administration (%)1996

	Federal	State	Municipal	Total
Pre-school	0.0	5.2	94.8	100.0
Ensino Fundamental	5.1	59.7	35.3	100.0
Upper Secondary	27.3	48.0	24.6	100.0
Higher	77.9	20.1	2.0	100.0
Total	20.2	49.1	30.8	100.0

Source: World Bank Expenditure Review
Excludes special education, physical education and administrative support.

Despite decades of mandatory education financing and federal transfer programs, sharp regional and intra-state disparities in per student expenditures persist. This distribution is especially important when analyzing initiatives in education finance reform. In 1995 for example, municipal per student *ensino fundamental* (1-8) expenditures in some Northeast states were just one fourth the national average, compared with three times the national average spent by some Southern states. Within-state differences were also notable: in Rio de Janeiro, municipal systems spent less than one-third that of state systems. Federal efforts to increase equity through geographic targeting and redistribution policies are described later in this chapter.

2. Calculating Unit Costs

For the calculation of unit costs, this study uses educational expenditure data. As such, "unit cost" can be equated to "unit expenditure" throughout the financial analysis. Calculation of unit costs for Brazilian education is divided into unit expenditures for each of three cycles: 1-4 (primary), 5-8 (lower secondary) and 9-11 (upper secondary). Each of these cycles is distinct and the educational approach varies substantially from one to the other. While primary education is mostly based on a single "home teacher" approach, secondary education has a departmentalized approach that adds elective subjects and specialized teachers in upper secondary education. As a result, unit expenditure calculations must be differentiated for these three cycles.

Because of the nature of financing of *ensino fundamental*, it is not easy to separate the unit expenses for grade 1-4 (primary) from those of 5-8 (lower secondary). *Ensino fundamental* expenditures are frequently reported as a single expense even though enrollments for primary school are very different from those in lower secondary

education. Arithmetic adjustments have been made to estimate unit expenditures for each of the three cycles. More importantly, the traditional calculation of unit costs (that is a per year, per student expenditure) is necessary but may be quite misleading in the Brazilian case, as explained below. The traditional and two alternative means of calculating unit cost are discussed below.

Traditional Unit Cost (per student/per year expenditures). IPEA and OECD calculate the per student/per year to be (1998)US$482.85 for *ensino fundamental* and (1998) US$564.98 per student/per year for upper secondary schooling. Calculations in this analysis will be reported in (1998)US$ but can be converted to PPP or (1998)R$ through conversion rates calculated by IPEA and OECD.[23] The unit cost for *ensino fundamental* is then adjusted based on enrollment data (from PNAD) to obtain a unit cost for each of the two cycles (primary and lower secondary). Table 5.3 presents the resulting unit costs that are used for calculation.

Table 5.3: Per Student, Per Year Unit Costs by Education Cycle, (1998 US$)

Cycles	US$ (1998)
1-4	441.78
5-8	544.45
9-11	564.98

Source: Fletcher 1999

Cost Per Student, per Attained Grade Level (based on number of years of instruction that an average student needs to complete a single grade level). Given the high repetition rates in Brazil that are documented throughout this paper, a unit cost calculation (per year, per student) hides the fact that the average Brazilian student requires more than one year of instruction to obtain one year of attainment. In fact, on average Brazilian students need 5.4 years of instruction to reach 4th grade, 10.3 years of instruction to reach 8th grade and 14 years of instruction to reach 11th grade. As such, the unit cost of a single year of instruction is not the most appropriate measurement to evaluate education expenditures. Instead it is better to use the cost of the total years of instruction that an average student needs to successfully attain a grade level. Table 5.4 presents the unit cost per student that completes a grade level, considering the probability of repetition.

Table 5.4: Average Cost of One Year of Attainment (1998 US$)

Course of Instruction	Average years to complete cycle	Estimated Cost per Year	Average. Per Cycle Graduate	Cost per student per grade
1-4	5.4	441.78	2,385,61	596,40
5-8	4.9	544.45	2,667.81	666.95
9-11	3.7	564.98	2,090.43	696.81

Source: Klein 1999

[23] OECD, *Education at a Glance* (Paris: OECD, 1998). In 1998, at the official exchange rate, R$1.17 = US$1, however, this tends to understate the purchasing power of the Real. Considering the fact that non-tradable goods are relatively cheap in Brazil, the purchasing power parity was estimated to be R$1 = US$1.54.

Cost Per Graduate (based on number of enrollments that the system needs to produce an upper secondary graduate): Aside from repetition, dropouts also add to the system's effort to produce a graduate. A dropout consumed educational resources without achieving the objective of graduating. In fact, because cyclical repetition is a strong predictor of dropping out, frequently dropouts consume a very significant portion of educational resources without graduating. As such, unit cost (per year, per student) and even cost per graduate calculations hide the fact that the Brazilian system deploys significant additional effort (i.e. resources) in educating students that eventually drop out before distilling those that finally "make it" to upper secondary graduation. In this case, the average course duration is based on the total *number of enrollments* required to produce one graduate. This includes all the instruction that failed to fulfill course objectives (either by drop-outs or repetitions). Thus, total enrollments also include all instructional years consumed by students who were unable to complete the regular course of study. Table 5.5 shows that it takes 5.8 enrollments to produce a single 4th grade graduate, 13.6 enrollments for one person to finish the 8th grade and 22.7 enrollments before the first secondary school graduate appears. Obviously, those who graduate do not spend that many years in school. Rather, this is the average level of effort required by the system before a graduate is obtained.

Table 5.5: Cost to Produce a Graduate (1998 US$)

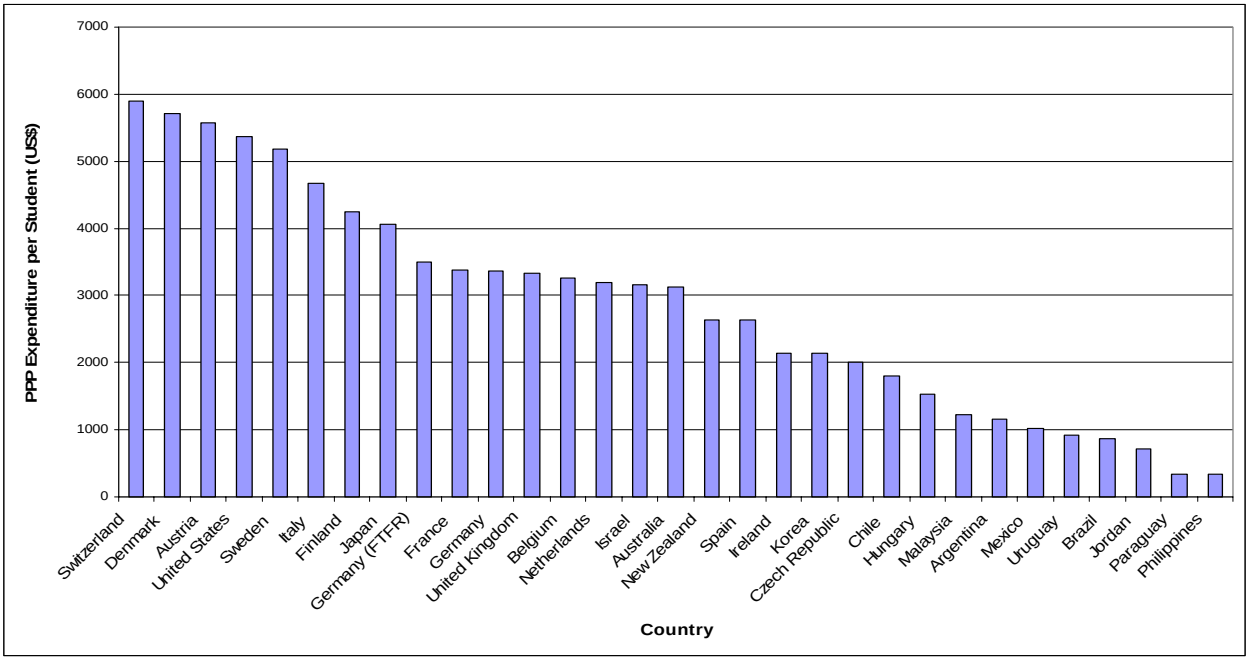
Course of Instruction	Number of Years to Produce a Graduate	Estimated Cost per Student Year	Total Cost per Cycle Graduate	Cost per student per grade
1-4	5.8	441.78	2,562.32	640.58
1-8	13.6	482.85	6,566.76	820.84
1-11	22.7	494.51	11,225.38	1,020.49

The questions that arise from alternative cost calculations such as those presented here relate to whether the same general amount of money could be spent in another fashion, permitting students to go farther in school and enabling a larger number to complete the regular course of study. One cannot help wondering if a doubling of unitary costs would enable nearly everyone to finish the eight grades of *ensino fundamental*, with little or no increase in total expenditures, due to a corresponding reduction in repetition.

Indeed, if we examine unit costs from an international perspective, it at first appears that Brazil spends relatively little on schooling. Figure 5.1 presents such an international comparison of expenditures for primary and lower secondary schooling, drawn from OECD data. Once unitary costs are considered in relation to educational attainment, however, the per student cost of an 8th grade graduate is increased by 70 percent to(1998) US$820.84 (see Table 5.5) In this case, Brazil's position in the international ranking also rises from US$744 (in PPP) to US$1264 (in PPP, the equivalent of US$820.84), reaching expenditure levels like those found in Hungary, Argentina, or Malaysia. These countries are widely recognized to have solid education systems. With better results from current expenditures, Brazil could one day find itself in the company of Korea, a country

that has attained international acclaim for fulfilling extremely high academic standards, universal first level schooling, and virtually no grade repetition whatsoever.

Figure 5.1 Primary Per Student Expenditures in Selected Countries, 1997



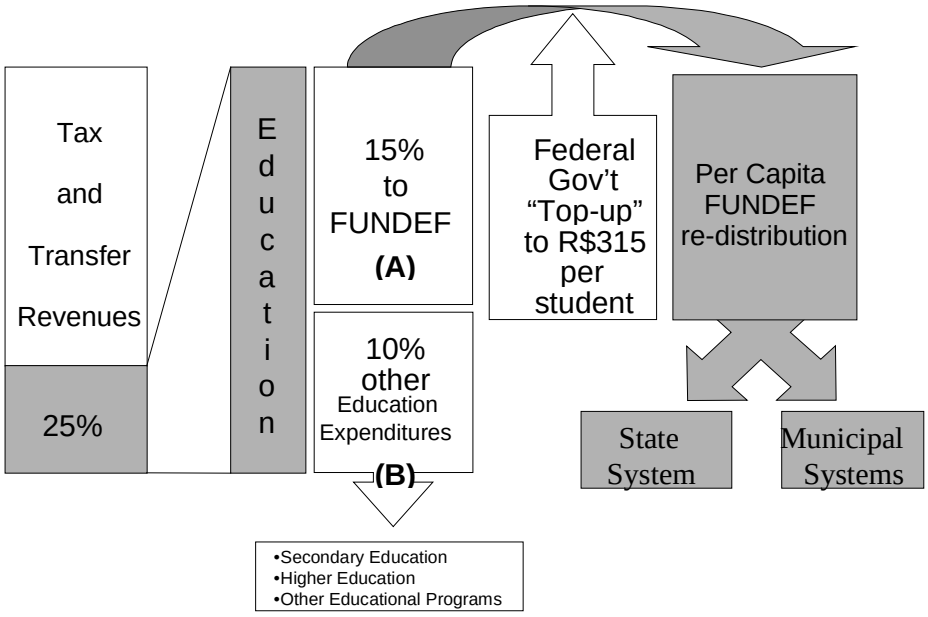
3. Lower Secondary Education Financing

In an effort to equalize *ensino fundamental* education financing, the Brazilian government launched the Fund for Development of Fundamental Education and Valorization of Teachers (FUNDEF) in 1997. The FUNDEF operates as follows:

- 25 percent of all tax revenues and constitutional transfers in any given state comprise the minimum constitutionally-mandated state investment in education. At least 60 percent of that total must be invested in the state's FUNDEF, with the remaining resources going to other education investments, including Upper Secondary and Higher Education.
- If the fund's total value divided by the initial enrollment in first through eighth grades is less than R$315 per student (about US$300 in 1998), the Federal government complements the state fund until it reaches that amount, drawing on resources from the general budget.
- The FUNDEF is then distributed equally to the state and its municipal systems on a per pupil basis. In an effort to improve teacher quality, 60 percent of the FUNDEF must be used to fund teacher salaries and teacher training programs.

Figure 5.2 illustrates the basic workings of the FUNDEF program:

Figure 5.2: Tracking the FUNDEF in a given State



The principal result of the FUNDEF is that every child in Brazil's *ensino fundamental* will study in a school system spending at least R$315 per child per year (adjusted annually by the Federal Government). The immediate impact of the program has been substantial, including: i) a 50 percent increase in average teacher salaries in the Northeast; ii) a 6 percent increase in initial enrollments; and iii) nearly 11 million students benefiting from increased educational expenditures within their systems. Incentives for expanding access for lower secondary (grades 5-8) are built into the FUNDEF, as each additional student represents additional income. Given the historical inequities in education investment in Brazil, the FUNDEF has been a significant first step in improving equity within states, and, through the establishment of a floor for per pupil education spending, reducing between-state disparities.

4. Upper Secondary Education Financing

States are responsible for the provision and financing of upper secondary education in Brazil. Given that the law mandates a minimum investment of 25% of state revenues for education (of which 15% is earmarked for FUNDEF), the remaining 10% (or more, if the state exceeds the established minimum 25%) represent the financial resources that could be utilized in funding upper secondary education; however, upper secondary schools compete for these funds with other education-related expenses such as higher (post-secondary) education, preschool education, culture, and sports, as well as with payment of pensions to inactive teachers. The absence of earmarked funds has left upper secondary particularly vulnerable at a time when demand is rapidly increasing.

Upper secondary education's chief competitor for funds is higher education. State-level investment in higher education also varies from state to state. Bahia, for example, spends approximately 12% of its educational expenditures for an estimate of 17,500 students (there are almost 4 million students enrolled in the other educational levels) while São Paulo invests nearly 30% of its educational expenditures for 73,300 students (there are almost 8.3 million students enrolled in the other educational levels). Pressure for investment in higher education at the state level frequently results in significant reductions of investment in upper secondary education. These funding priorities are inequitable: though typically attending to only 12 percent of the relevant age cohort, less than 5 percent of the total population, and virtually none of the poor, higher education in Brazil draws on about 26 percent of all education sector resources.

As mentioned in Chapter I, the 1988 Constitution and the National Education Law (LDB) of 1996 also encourage the division of responsibilities among states and municipalities for various educational outputs. While *ensino fundamental* remains the joint responsibility of state and municipal governments, in some states, the municipalization of state-*ensino fundamental* schools (typically those serving primary grades) has been an important step in clarifying the lines of responsibility between these jurisdictions, as well as a means for states to focus additional attention and resources on secondary education.

B. The Challenges

The principal challenges for secondary school financing are expanding access and improving school quality. As seen in Chapter II, improving student flow in *ensino fundamental* will have a significant impact on the provision of additional school spaces and should allow for considerable cost savings. As discussed in Chapter III, lowering repetition in *ensino fundamental* and financing the expansion of the secondary system is also crucial for ensuring education equity. As secondary enrollments expand, it is expected that these students will increasingly come from poor backgrounds. Finally, as shown in Chapter IV, school quality is one of the most important factors in ensuring success in school.

Based on current student flow projections, in general, all Brazilian states will experience a decrease in demand and enrollments for primary education (1-4 grades) over the coming decade. Only states with more developed educational systems, however, will also experience a decrease in enrollments in lower secondary education (5-8 grades). Less developed states such as those in the Northeast will see an increase of demand and enrollments in lower secondary education (5-8 grades) over the coming decade due to gradual correction of student flows in the lower grades. Demand and enrollments for upper secondary education (9-11 grades) will have a constant growth in Brazil over the next decade, with a few states such as São Paulo reaching peaks and most others expecting a continuous growth pattern. The cost implications of these projections are discussed below.

In analyzing these projections, however, several caveats should be kept in mind:

- Potential savings from increased efficiency represent a hypothetical calculation which, in itself, provides no answers about how to get from a costly and inefficient system to a higher performing, more cost-effective one.
- Improving system efficiency may be inextricably linked to increasing the availability of school quality inputs which will require increased expenditures before the savings from increased efficiency can be realized.
- These cost projections are based on fixed per student expenditures and assume that the necessary increases in quality can be obtained solely by reallocating resources and directing them to the most cost-effective interventions. This generally applicable economic principle should not be interpreted as a policy recommendation or judgement about the adequacy of current per student expenditures.
- Reallocating resources is far more complex in reality. Despite the fact that primary enrollments may be falling, it is not always easy to reallocate or retrain teachers, consolidate classes or close schools.

Thus, the main objectives of this exercise are twofold: i) to call the attention of policy makers to the costs of internal efficiency problems and the potential savings from continued reductions in repetition and flow correction efforts underway; and, ii) to put secondary education in the spotlight of fiscal and education financing discussions by projecting the order of magnitude of the financial effort required by the mere expansion of enrollments (maintaining constant unit expenditures). The calculations of this chapter should not be interpreted as estimates of the true size of investments that are likely to be required over the next decade to expand and improve the quality of upper secondary education in Brazil or in any particular state, or as recommendations as to the appropriate levels of per student investment.

1. Lower Secondary Education

There are no reliable estimates of what a high quality secondary education costs. Depending on how schools and systems are managed, as well as regional factors (such as teacher labor markets), it is often possible get different results with the same level of financing. Nonetheless, improving quality at the lower secondary level may well entail some additional investment and/or redistribution of current spending, particularly for underdeveloped regions and/or jurisdictions with low revenues and per-student expenditures. As described above, the FUNDEF has made enormous progress in setting a minimum floor for education expenditures in *ensino fundamental*. There is still, however, a large gap between the current spending floor of US$300 per student and even average nationwide per-student expenditures at the secondary level: for children in grades 5-8, unit costs for lower secondary average US$544.45 per student.

With regard to the expansion of access, if we assume that current per student costs are sufficient to finance quality schooling for students in *ensino fundamental* (based on better use of existing resources) calculations are straightforward. Figures 5.3, 5.4 and 5.5 below

document the expected lower secondary expenditure in the states of Bahia, Rio Grande do Sul and São Paulo through 2007. Predicted enrollments (assuming probable scenarios for reductions in repetition of 1% for each state) are multiplied by per student expenditures. These are rough estimates, and should in no way be construed as policy prescriptions. Important conclusions, however, such as the relative weight of required investment, can be drawn from these estimates.

For Bahia, the expected cost over the next ten years in lower secondary education is (1998)US$7.2 billion . In Sao Paulo it is (1998)US$15.6 billion and in Rio Grande do Sul it represents (1998)US$4.6 billion. Notice that while Bahia's expenditure is expected to increase and become stable by 2006, Sao Paulo's and Rio Grande do Sul's costs could begin to decrease in 2000 and 2001, respectively.

It is most interesting to note that the costs for expanding access in lower secondary can theoretically be covered through the expected decrease in costs in grades one to four in each state, thus generating important savings and promoting higher system efficiency and better outputs. It is expected that over time, the total investment in primary will converge with that of lower secondary as the system becomes more efficient. This is so because the size of the cohorts should tend to be very similar as repetition is decreased and the age/grade disparities are diminished.[24]

Figure 5.3: Bahia Expected Ensino Fundamental Education Costs 1998-2007

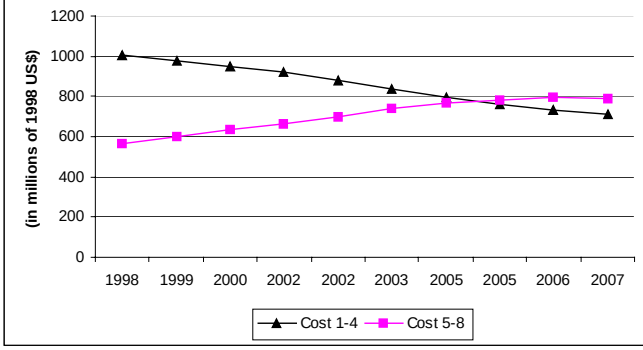


Figure 5.4: São Paulo Expected Ensino Fundamental Education Costs 1998-2007

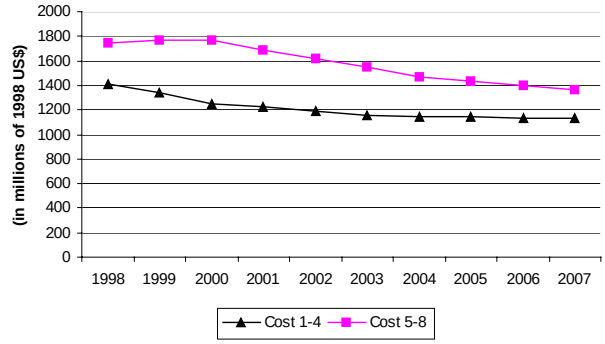
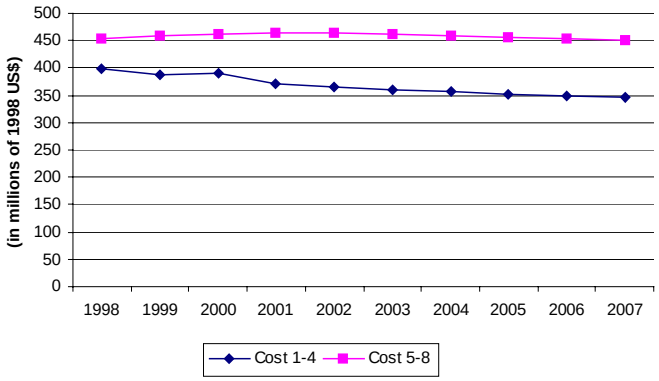


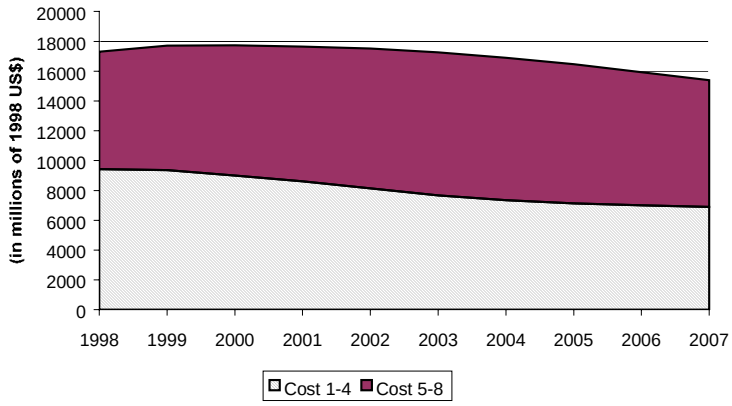
Figure 5.5: Rio Grande do Sul Expected Fundamental Cycle Education Costs 1998-2007



[24] Savings from zation of primary schooling actual quired to separate grades 5-8. The rocess.

For Brazil as a whole, the cost of lower secondary education in 1998 reached and estimated US$7.8 Billion. Over the next few years, as expansion continues, the yearly cost can be as high as US$9.6 Billion (estimated for 2003). In Figure 5.6 it is evident that the cost of this expansion could theoretically be fully financed with increased efficiency in *ensino fundamental*, even allowing for an over time decrease that could eventually be used to increase per-student allocations, or contribute to financing the costly expansion of upper secondary education (discussed below).

Figure 5.6: Expected Ensino Fundamental Education Costs for Brazil 1998-2007



2. Upper Secondary Education

As with lower secondary education, the principal challenges for upper secondary school financing are expanding access and improving school quality. These challenges have significant fiscal implications, especially in the absence of earmarked funds for upper secondary education. Moreover, there is limited flexibility to convert savings from gains in efficiency in *ensino fundamental* into investment in upper secondary education.

The expected costs of delivering upper secondary education are estimated based on the current per student expenditures for upper secondary education (see section A.2 above) and the expected enrollments for each of the three states of this study and for Brazil as a whole. Some adjustments are made for capital investments for those new students that will be joining the system[25]. On this basis, the expected cost for the next ten years is

[25] The capital cost adjustments were made considering the number of new students entering the ninth grade. It is assumed that a new space in *ensino médio* must be created for each of those new students. Over and

approximately US$ 56 billion. Figure 5.7 compares the expected cost of upper secondary for the three states of this study over the coming 10 years, taking into account the predicted expansion rates for each. Similarly, Figure 5.8 plots the expected cost of upper secondary for Brazil over the next 10 years.

Figure 5.7: Expected Upper Secondary Education Costs in Bahia, São Paulo and Rio Grande do Sul 1998-2007

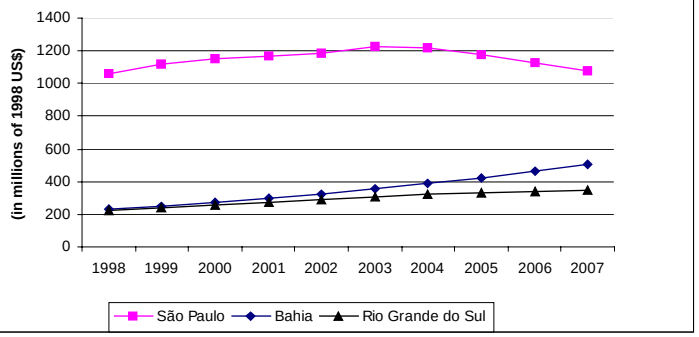
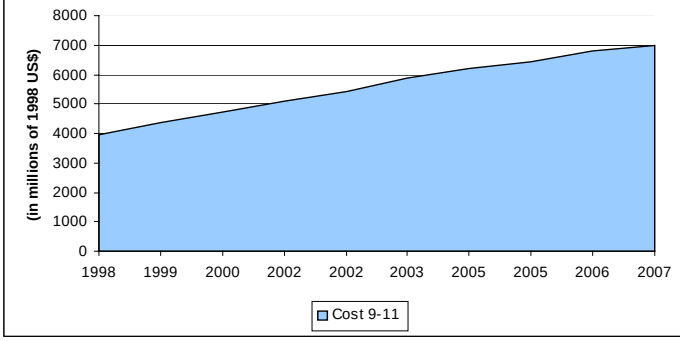
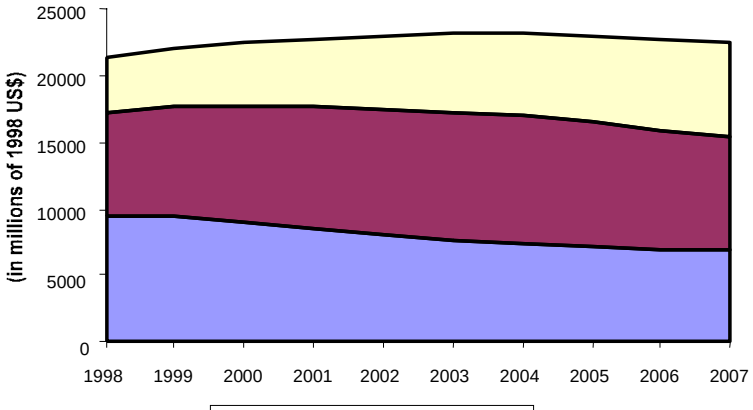


Figure 5.8: Brazil Expected Upper Secondary Education Costs 1998-2007



How shall these increasing costs be met? A possible answer surfaces when the expected costs over the next 10 years for both *ensino fundamental* and *ensino médio* (including primary, lower secondary, and upper secondary) are added and plotted. Figure 5.9 shows these for Brazil. Also**,** Annex 3 includes these same graphs for each of the three states in this report.

Figure 5.9: Brazil Expected Education Costs 1998-2007



above the recurrent costs (teachers, materials, etc.), we calculate a one time additional cost covering infrastructure investment, equivalent to US$1,000 per student. This dollar amount per student was estimated based on the average cost for construction of a school with capacity for 600 students operating in two shifts. An equivalent amount is used in other studies (Wolff and De Moura Castro, 1999). Although this calculation assumes the need for new infrastructure, it is quite likely that in certain regions improved cooperation between states and municipalities and overall reorganization of the system may result in lower infrastructure needs and a correspondingly lower cost.

It is important to notice that the overall investment in education in Brazil is expected to remain almost constant over the coming years. Therefore, significant reallocations within the education system should be able to ensure that resources are spent efficiently as enrollments and demands shift over the coming years.

The analysis in this chapter suggests that there may be ample room to reallocate resources and to increase quality through effective investments, while there can be ample space to expand access through increased efficiency. This holds true for Brazil as an aggregate, but may be widely different for each state. Some differences can be observed in Annex 3 and are clearly related to the current level of development (enrollments and efficiency) of the educational system of each state. While the costs of projected total enrollments in São Paulo could reach a maximum around the year 2000, total enrollments in Rio Grande do Sul and Bahia will continue to grow over the next 10 years.

C. Policy Options for Financing the Expansion of Secondary Education

1. Policy options for financing lower secondary education

The improvement of quality throughout Brazil and the expansion of access especially in developing states (where demand and enrollment are expected to increase) are the major challenges that will demand financing in lower secondary education. Policy options to respond to these financial challenges center on reducing existing inefficiencies. There are two main policy options for financing these objectives in lower secondary education:

- **To increase access where it is needed, gains from decreased demand and lower repetition at the primary level (grades 1-4) could theoretically be reallocated to finance the expected growth in grades 5-8. These savings may vary greatly from state to state; in Bahia, for example, such reallocation would provide the needed resources, thus maintaining the total expenditures in *ensino fundamental* basically constant (see Figure A3.1). It is to be noted, however, that with the trend toward municipalization of 1-4 grade schools, reallocation of savings in these grades to the lower secondary level will likely face institutional barriers. Municipalities may prefer to redirect these savings to preschool education, which is also administered by them, rather than surrender additional resources for the expansion of lower secondary education, which is mostly managed by the states.**
- **The need for expansion in grades 5-8 over the coming years is unique to the developing Brazil and is a response to a short-term gap. This gap will last while flows are regularized and the bulk of over-aged students move through the system and ultimately transition to upper secondary education. Once this has happened, the demand for school places in 5-8 should stabilize at a lower level than that of this critical transition period. In this sense, temporary financing options (such as international loans or long-term local credit lines) are a suitable source of financing to respond to this short-term gap. Also, alternative methods for provision of education (such as distance education and modular curricula) may assist in responding to this strong but transitory demand.**
- **To increase quality throughout Brazil, gains from a one percent reduction in repetition in all of *ensino fundamental* could be used to increase the FUNDEF per student floor thereby guaranteeing a higher minimum investment level which may translate into higher quality. Cost**

savings from this reduction of repetition would increase the per student allocation by nearly 16%, bringing high quality education for all at closer reach.

As a word of caution, policy makers should immediately take measures to ensure that FUNDEF money is used in accordance with the designers' intentions. There are strong incentives for misuse, as each additional student enrolled in grades 1-8 represents revenues for the system. In some states, this has produced some rather creative solutions to expanding *ensino fundamental* enrollment, including the "transformation" of supplemental courses (typically attending to 15-21 year olds) into regular *ensino fundamental* courses. "Ghost" students have also been reported in some systems, and governments should step up efforts to audit educational census and statistical information.

2. Policy options for financing upper secondary education

The improvement of quality and expansion of access throughout Brazil are the major challenges that will demand financing in upper secondary education. Policy options to respond to these financial challenges must bear in mind the following considerations:

- It must be possible to finance improvements in quality and expansion of access without adding greatly to the overall fiscal burden of investment in education which, has been said earlier, is already high;
- It is viable for the Federal Government to provide incentives to states to increase educational investment over and above the minimum mandatory 25%;
- It is important to keep equity in the forefront of the agenda. In this regard, it is clear that financing the expansion of the secondary system is a key element to ensuring education equity. As secondary enrollments expand, it is expected that new students will increasingly come from poorer backgrounds;
- It must be understood that the challenges of increasing access and quality are closely related to the enhancement of efficiency and effectiveness of the investments: Improving student flow in *ensino fundamental* should have a significant impact on the provision of additional school spaces and allow for considerable cost savings. Utilizing scarce resources in financing inputs that have documented effect on student learning is a more effective way of directing investments.

Key financing options are described below.

- **Savings from increased efficiency of the educational system**

A promising source of financing for upper secondary education expansion in Brazil will come with the correction of flows in *ensino fundamental.* As this flow correction takes place, new students will be reaching secondary education, releasing places in *ensino fundamental*. These newly released places may not be used by the next cohort, given the increasing correction of age/series distortion that is taking place in Brazil even at early cohorts. Our estimates are that Brazil's student population in *ensino fundamental* reaches

its peak in 1999 and will begin to decrease starting in the year 2000, with two effects: releasing the burden on state and federal government in their input to FUNDEF and releasing educational inputs (teachers, classrooms, etc.) to be converted for use in secondary education.
Increasing system efficiency through reduction of repetition will have a direct impact on upper secondary school enrollments as well as education financing. In 1995, some US$9 billion was spent on repeating students. This amount is roughly equivalent to all Brazilian municipal expenditures in education for that same year. Using current per-pupil expenditures in *ensino fundamental* and *ensino medio,* the savings from increased efficiency can be estimated. A yearly improvement of 1% in efficiency in *ensino fundamental* over the next ten years (that is, a yearly reduction of 1% in repetition in each grade, which is by all accounts a conservative estimate), would yield savings of about US$ 1.69 billion. This amount would suffice to cover the cost of enrolling 3 million students in upper secondary education, that is 47% of the expected increase in enrollments over the coming 10 years.

There is, however, a cautionary note to be made. Increased efficiency in *ensino fundamental* will yield savings that are difficult to allocate to upper secondary education. As discussed above, a first natural destination for savings would be increasing per-student expenditures in *ensino fundamental*. Institutional and political barriers will also likely make the reallocation of resources difficult, especially if the savings are generated in municipal-administered systems. Alternatives to reliance on savings are therefore discussed below.

- **Fiscally neutral options: reallocate state-level resources**

On the basis of the estimated growth of upper secondary education in Brazil, we were able to estimate the resources needed to finance this level of education in Brazil (see section B2). According to the LDB, states have the responsibility of financing upper secondary education with the remaining resources left after FUNDEF contribution is discounted. (see Figure 5.2, area marked as “B”). Are these resources sufficient to cover the costs? Table 5.6, below, attempts to answer this question.

Table 5.6 Financing Upper Secondary Education: Estimating State Resources

	a Expected 9-11 Enrollment	b Current Cost of 9-11 b=(564.98)(c)	c Expansion Cost 9-11 c=US$1000 Per New 9th Grade Student	d Total Cost d=b+c	e FUNDEF Remainder 10% of Estimated State Revenues	f Total EM Cost as % of (e) f=d/e
(Unit)	(Students)	(Millions of US$)	(Millions of US$)	(Millions of US$)	(Millions of US$)	(%)
1998	6728333	3801	135	3937	7439	53%
1999	7298534	4124	233	4357	7142	61%
2000	7903603	4465	259	4724	7392	64%
2001	8576162	4845	251	5096	7664	66%
2002	9249073	5226	219	5445	7961	68%
2003	9947448	5620	259	5879	8329	71%
2004	10606493	5992	205	6197	8683	71%
2005	11188524	6321	136	6458	9069	71%
2006	11741555	6634	189	6823	9488	72%
2007	12203336	6895	109	7004	9945	70%
TOTAL			1995	55919	83113	67%

In fact, over the next ten years, if an average of 6.7% of the state's revenues and transfers (equivalent to 67% of the education minimum investment level mandated by the LDB, after contributing to FUNDEF) were directed to upper secondary education, states could cover the cost of meeting expected demand and still have a third of those resources leftover for investment into other education sub-sectors. While this is an aggregate calculation that may vary from state to state, Brazil's aggregate demonstrates that a reallocation of current spending would suffice to attend the demand. Moreover, it is important to keep in mind that 25% of revenues is the minimum level of aggregate education spending established by LDB: states could choose to devote higher percentages of their revenues to education, thus boosting per student allocations at each level to increase quality. Because these internal reallocations within state's fiscal policies may not occur spontaneously, the federal Government must explore offering incentives to promote them. The following option explores a few of many possible strategies that the federal government could follow to provide such incentives.

- **Limited additional federal investment targeted as incentives** to promote additional public investment in education and/or better targeted investments at the state level.

As indicated above, it may be difficult to get states to reallocate (or increase) their investments for secondary education unless financial incentives to do so are in place. This equalizing/brokerage role has been played by the federal Government in the past, with the FUNDEF being its most salient example. Below, we discuss four options that can be considered.

i. The Fundo de Desenvolvimento do Ensino Médio (FUNDEM)

This option would entail the creation of a secondary education fund that operates with some of the same parameters as those of the *Fundo de Valorização do Magisterio* (FUNDEF). That is, a fund which operates by (1) a contribution equivalent to a given percentage of state revenues and (2) a minimum per student allocation that, when not reached by the state's contribution alone, will require a federal contribution. This fund would mandate a minimum investment in secondary education while providing some resources for states with low revenues. A simple simulation for such a fund in three states is presented in Annex 2. Further simulations including all Brazilian states would be necessary to estimate the fiscal impact on the federal budget.

ii. Incentives to encourage further state investment in Ensino Médio

This strategy would use existing educational finance policies in order to promote investment in *ensino médio*. For many states it would also contribute to closing the gap between the FUNDEF's per student allocation floor and a more realistic estimated per student cost, thus providing for higher-quality basic education. The idea would be for the federal government to top off the state's FUNDEF under a scaling system, based on the investments that the given state makes in *ensino médio*. As such, under certain assumptions of floor per student investments in *ensino médio*, a Federal additional contribution to the State's FUNDEF assignation could be made. This would ensure that the *ensino fundamental* per-student allocation for that state be increased both for municipalities and the state, with important implications for educational equity and quality. A simulation of this scheme is presented in Annex 2 for three states (BA, SP,

and RS). Further simulations including all Brazilian states would be necessary to estimate the fiscal impact on the federal budgets.

The Ministry of Education (MEC) has started implementing a program to provide temporary incentives to induce states to invest more of their own resources in *Ensino Médio*. This program, the *Programa de Melhoria e Expansão do Ensino Médio* (PROMED) provides matching grants to states for selected investments that are deemed crucial to implement upper secondary education reform. In this case, the MEC transfers grant resources to the states which, in turn, are responsible for providing counterpart resources. The amount of resources transferred is based on a formula including the share of enrollment in upper secondary education; internal efficiency in *Ensino Fundamental*; as well as differential counterpart requirements to favor states with less financial resources.

iii. Contribution discounts to FUNDEF

Another strategy that could be adopted by the federal government as an incentive for increased state expenditures in upper secondary education is a program of FUNDEF contribution discounts. Through such a program, states meeting a minimum per student expenditure in upper secondary would receive discounts on their contributions to FUNDEF. This mechanism would also use existing educational finance policies to promote investments in upper secondary. In contrast to the option mentioned above, this strategy would maintain the responsibility for investment in upper secondary solely at the state level, as established by the LDB. Implementing this option, however, would require modyfing the current Constitutional mandate which established FUNDEF. For this reason, it represents a medium term option. A simulation of this scheme is presented in Annex 2 for three states (BA, SP, and RS). Further simulations including all states of Brazil would be necessary to estimate the fiscal impact on the federal budget.

- **Private-public school delivery partnerships**:

Private schools account for 13% of the enrollments in lower secondary education and for 20% of the enrollments in upper secondary education. This significant level of participation suggests that the private sector has contributed and can continue to do so in the expansion of the secondary system. It is clear that as the system expands to lower socioeconomic quintiles of the population, families will likely be less able to pay for secondary schooling and, as such, private provision of education may not be viable. However, government supply subsidies and charter school alternatives should be explored as opportunities for the government to use existing infrastructure and know-how in the private sector. These partnerships have some history in Brazil and should be further explored in order to determine the best design for their most effective implementation (see also Policy Options in Chapter 4, referring to *Red Positivo*).

Conclusion

A. Challenges and Policy Options

As demonstrated in previous chapters, Brazil has made significant progress in improving basic education indicators over the last two decades. Average educational attainment of the population is increasing, and demand for enrollments is gradually shifting from the primary to the secondary level. Night schooling, rather than a problem, emerged as a natural response to the traditional school-work tradeoff, and is likely to remain a feature of Brazilian secondary education for some time.

There remain substantial challenges, however, if the goal of universal completion of a **quality** basic education through the secondary level is to be achieved. Major challenges discussed in this paper include reducing repetition and dropout, expanding access for hard-to-reach students (including the rural), improving school quality and relevance (particularly in night schools, which are likely to cater to the poorer segments of the population), and financing the projected expansion of secondary education. Although federal assistance will be important, the bulk of these challenges will fall squarely on states. The time to focus on them is now.

Large differences within Brazil also mean that certain challenges will weigh differently in different regions and states. No state can afford to ignore the issue of repetition, for example. In more developed regions such as the Southeast, however, improvements in repetition rates in primary grades have already prompted a broad-based expansion of access at the secondary level. Attention to repetition in these areas could help smooth transitions between levels of the system (primary to lower secondary, and lower to upper) and address equity issues (repeaters are disproportionately from poor families). In less developed areas, such as parts of the North and Northeast, massive repetition in the primary grades is still effectively constraining further expansion of secondary education, with the possible exception of fast growing metropolitan areas where this growth is driven by migration from rural areas. In these cases, both access and equity objectives at the secondary level might be best met by focussing attention on improving education quality and student flows in primary and lower secondary.

It is important to keep in mind that beyond regional differences and differences between developed and developing states, there is a large heterogeneity within states. Rural, urban and metropolitan areas are different realities that may require tailored approaches. In addition, each state is a mixture of more developed and developing areas. For this reason, rather than prescribing different menus for different states we have tried to distinguish different target groups within states.

- In summarizing policy options in the table that follows, we have tried to take into account these different realities, as well as political and financial viability considerations. The options presented are not meant to be prescriptive, but are rather a selected menu of possible strategies for meeting the challenges discussed in this

paper. In order to more accurately inform state-level policy making, however, more state-level research is still needed.

POLICY INTERVENTION / PROGRAM **Main Program Objective**	**Target Population/ Stage of Educational Development**	**Targeted Level**	**Reference**
EXPAND ACCESS TO SECONDARY EDUCATION			
Flow correction / *Classes de Aceleração*: *Why?* Repetition limits the number of students completing *ensino fundamental* and results in large age-grade gaps. Both limit the demand for *ensino médio*. *How?* Modular/flexible curriculum; contextualized learning materials; grade cycles without repetition; students progress at their own pace; continuous assessment system.	Both developed and developing states. **Particularly critical in less developed systems**.	Grades 5-8	Chapter II Box 2.3 Page 15
School Reorganization / Vertical Integration / Joint State-Municipal Educational Planning: *Why?* Optimize use of existing infrastructure; promote efficient use of resources; take advantage of space resulting from falling primary enrollments; improved school organization and use of teacher's time; pedagogical advantages of grouping students of similar ages; strengthens school identity. *How?* Integrate lower and upper secondary in one school (*escola de jovens* in São Paulo); municipalization of primary education; microplanning, school networks and school feeder systems.	Both developed and developing states.	Grades 5-8 and 9-11	Chapter II Box 2.4 Page16, 20
Expansion and Enhancement of Equivalency Exam (*Supletivo*): *Why?* Provides recognition of skill levels and potential access back into formal education system for dropouts and school leavers; provides incentive for self-directed learning; cost effective solution to improve flow problem. *How?* Establishment of clear rules; development of high quality tests; application of tests at no cost in a wide range of geographic locations and with very flexible scheduling.	Both developed and developing states.	Grades 5-8 and 9-11	Chapter II Page 19
Alternative Delivery Options: *Why?* Expand access to under-served population groups, in cases where it is not	Both developed and developing	Grades 9-11	Chapter II

viable to have a regular secondary school. Disperse rural communities, scale, lack of teachers. *How?* Distance Education; modularized curriculum (Ceará); credit system; alternatives to regular *supletivo* (Telesalas in Sao Paulo); public-private collaboration.	states. Large rural populations, remote communities, overcrowded urban schools.		Page 21
IMPROVE EQUITY			
<u>Targeted Quality Improvement programs for poor or under-performing schools:</u> *Why?* Schools catering to the less privileged have fewer quality inputs. Disadvantaged students are in greatest need for targeted interventions (positive discrimination). *How?* Quality educational materials; curricular improvements/ flexibility; contextualized learning.	Poorer communities. Marginal areas in large metropolitan centers. Overcrowded urban schools.	Grades 9-11	Chapter III Page 37
<u>Improve Quality of Night Schools:</u> *Why?* Schools with night shifts serve poorer segments of the secondary school population and are generally more precarious in their operations than exclusively day-shift schools. *How?* Quality educational materials; curricular improvements/flexibility; increase instructional time and time-on-task through weekend enhancement courses and distance education.	Both developed and developing states.	Grades 9-11	Chapter IV Page 54
<u>Flow Correction / *Classes de Aceleração:*</u> *Why?* The poor are disproportionately represented among repeaters and dropouts. *How?* See above.	Both developed and developing states.	Grades 5-8	Chapter II Page 15
<u>Alternative Delivery Options:</u> *Why?* Poor tend to be disproportionately represented in isolated rural communities and night schools, and thus would stand to benefit from alternative delivery options. *How?* See above.	States with large rural populations. States with overcrowded urban schools.	Grades 9-11	Chapter II Page 21
<u>Incentives/ In kind subsidies to poor families:</u> *Why?* Family variables have a strong effect on educational attainment. Family expenditures in education are very regressive, the rich spend a much higher share of their income on education. Education expenditures are income inelastic among the lower income quintiles. Books and school supplies represent the lion's share of limited educational expenditures by the poor.	Universal program for poorer states and targeted programs for poor communities within more affluent	Grades 5-8 Greater targeting risks at grades	Chapter III Page 40

How? Subsidizing school supplies, books and educational materials (i.e. textbooks), and transport is likely to be more effective than giving cash transfers to families. However, may be costly to sustain.	states.	9-11	

INCREASE QUALITY OF SECONDARY SCHOOLING			
Progressive adoption of Minimum Operational Standards for Secondary Schools: *Why?* –Public secondary schools lack a minimum of quality inputs and operation characteristics that favor student learning. Quality inputs have a strong impact on student achievement. *How?* Introduce minimum standards for physical and human resources; provide a minimum package of instructional materials. However, may be costly and may require a selective and phased approach.	Start in poorer states and disadvantaged schools. Gradually extend to other schools.	Grades 5-8 and 9-11 Start with 5-8	Chapter IV Page 53
Implementation of Curricular Guidelines in the classroom: *Why?* New curricular guidelines for upper secondary are yet to be implemented. New curriculum is competency based, emphasizes basic skills and provides flexibility to adapt to local conditions. *How?* Contextualized teaching practices; develop age appropriate materials; emphasize content and basic skills; develop school materials for adapting curricula to school and local needs.	All states.	Grades 9-11	Chapter IV Page 52
Competitive selection of Principals / Innovative in-service training of teachers: *Why?* Principals are key actors that need to be strengthened. *How?* Qualification of principals; competitive selection; training of principals through development of school improvement projects (Minas Gerais experience). Requires further research to identify best practices.	All states.	Grades 5-8 and 9-11	Chapter IV Box 4.3 Pages 51
Strengthening school autonomy and school governance: *Why?* Greater school autonomy strengthens principal leadership; strengthens school identity and community involvement in support of the school. Successful experiences with federal programs. *How?* Strengthening community participation in school decision making; transfer of resources to schools; preparation of school development plans (PMEs) for	All states. However, allow flexibility for states to choose the decentralization modality.	Grades 5-8 and 9-11	Chapter IV Page 55

competitive financing.			

FINANCING / RESOURCE OPTIMIZATION			
<u>Invest savings from efficiency gains in primary in improving quality of lower secondary:</u> *Why?* Resources liberated can be more readily applied for *ensino fundamental*. Quality improvements in primary and lower secondary are the foundation for academic success in upper secondary. *How?* Invest in inputs and innovations shown to have strong effects on educational outcomes (i.e. educational materials, maintenance, efforts to improve school governance and autonomy, practical in-service training for teachers, etc.)	Both Developed and Developing States. Potential savings larger in mature systems.	Grades 5-8	Chapter V Page 68 Chapter IV for discussion of effective investments
<u>Incentives for States to increase their financial commitment to upper secondary:</u> *Why?* Facing the challenge of expanding and improving the quality of upper secondary will require increased financial resources. Currently states have other commitments (higher education, pensions). *How?* Extending FUNDEF to *ensino médio* (FUNDEM). Institute financial incentives for states to increase expenditures on upper secondary (FUNDEF incentives).	Developing states (FUNDEM). Developed states (FUNDEF incentives).	Grades 9-11	Chapter V Page 71

B. A Research Agenda

In addition to more focussed research on secondary education at the state level, there are a number of issues that this study suggests deserve further exploration. A wide variety of policy questions remain unanswered or only have tentative answers. This section suggests a number of future research topics which should be studied in order to assist in designing future secondary education policies.

School Based Studies

- A first issue is that of night schooling. While we know a fair amount about the characteristics of the students attending, more needs to be learned about the characteristics and actual teaching practices in night schools and particularly about effective investments for improving quality in those schools (best practices and effective night schools studies). More detailed review of night schools and their operations, leading to proposals for changes to improve their quality and effectiveness.

- Research on the effects of improved school governance and autonomy, on school practices in "effective schools", and on the connections between achievement, repetition and dropout. Qualitative methodologies may be particularly useful for these endeavors.

- Research on how income-support programs (such as *bolsa-escola*) at the primary level are affecting educational outcomes. In particular studies using carefully designed control groups so as to be able to measure the educational impact of such interventions would be welcome additions to the current policy debate.

5. STUDIES ON TEACHERS

- Studies of the labor market for teachers differentiated by subject matter. For example there is anecdotal evidence of a shortage of science and mathematics teachers that would need to be documented, with implications for policies providing incentives for teachers in shortage skill areas. In this context, studies of teacher subject matter knowledge are important.

- Better case studies of effective teacher training programs, both pre-and in-service, as well as detailed reviews of teacher incentive systems, particularly non-monetary

incentives and group incentives (incentives to schools).

- Studies on teacher careers and incentives and how these can be changed to encourage excellence. Many teacher-related issues will be addressed in the context of a forthcoming World Bank study on teachers and teaching in Brazil; others may need to be addressed in state-level or other research, for instance, cost-effective utilization and deployment of teachers.

Studies on Learning and the Labor Market

- Interviews with entrepreneurs to determine what elements of their employees who are secondary school graduates they most value and what is most lacking in their preparation.

Management and Systems Studies

- A review of the impact of distance education in secondary education, especially through *Telecurso 2000*.

I. Another area where research is needed is that of access to secondary education for rural students. As mentioned in this study, it is difficult to know how much of the drop-off in rural enrollments between the primary and lower secondary levels is due to repetition and dropout, to problems in physical access, and/or to migration. This could lead to the design of specific programs targeted to these students, including distance education.

- Further studies on the interplay of demand factors vs. supply constraints of daytime schools and their relative weight in determining choice of schools, between night and day schools.

- A complete review of the *supletivo* programs, its content and beneficiaries.

ANNEX 1: ANALYTICAL METHODOLOGY: HIERARCHICAL LINEAR MODELING (HLM)

Whenever student characteristics, school input and learning techniques are similar within schools, but different between them, the use of traditional estimation techniques produces distortions in the error term, the standard error, and consequently, of the significance levels of the estimates. The multilevel techniques, in the analysis of academic achievement, can help us determine how much of achievement is explained by the school and how much is explained by the student. The systematic steps for HLM analysis as well as the standard regression equations are discussed below.

A. The "Empty" Model

The estimation of the empty model, or fixed effects model, is the starting point in every multilevel analysis. This attribute enables us to estimate the overall mean of achievement, and determine the deviations of the students' scores and of the schools' averages around that mean. The model is described by the following equations:

$$Y_{ij} = \beta_{0j} + r_{ij}$$
$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$
$$Y_{ij} = \gamma_{00} + \mu_{0j} + r_{ij}$$

The first equation, or level 1, describes the score of each student (Y_{ij}) as a function of the average achievement of the school it attends (intercept β_{oj}), plus an error term (r_{ij}). The second equation, or level 2, describes the behavior of the student performance variable, as a function of the performance of the school they attend. Here, the average achievement of each school (β_{oj}), is a function of the overall mean of achievement (γ_{00}), plus the random effect of the school. Given that in the level 1 equation we estimate a single parameter (β_{oj}), the level-2 model has a single equation. Substituting the second equation into the first one, we obtain the third equation, which tells us that the score of each student is equal to the overall mean of achievement, which is a constant term, plus the error terms for students and for schools.

The variance of the students' achievement is thus:

$$\text{var}\left(Y_{ij}\right) = \text{var}\left(r_{ij} + \mu_{0j}\right) = \sigma^2 + \tau_{00}$$

where σ^2 represents the variance within the school (among students) and τ_{oo} the variance between the schools. The weight of the student factors and the schools factors in explaining the achievement can be estimated dividing each component by the total variance. Hence, the variability in student achievement explained by school factors would be given by the following equation:

$$\rho = \tau_{00} \,/\left(\tau_{00}/\sigma^2 + \tau_{00}\right)$$

B. The Expanded Model

Greater precision in the estimation of the different parameters, which would necessarily imply a decrease in the variance of achievement (Y_{ij}), is obtained with the introduction of additional variables, both at the student level and at the school level. According to the number of variables included in each level, we can differentiate between the various models.

For the case of one explanatory variable at the student level (X_{ij}) and one at the school level (W_j), the model would be described with the following equations:

$$Y_{ij} = \beta_{0j} + \beta_{1j} X_{ij} + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01} W_j + \mu_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} W_j + \mu_{ij}$$

X_{ij} represents the socioeconomic level or other characteristics of student i in school j, and β_{1j} represents the effect that X_{ij} has on the achievement of this same student. The random nature of the β's makes them, in turn, depend on certain school characteristics (W_j's), such as sector, zone, infrastructure, etc. The Level-1 model is described by the first equation, and the second and third equation describe the Level-2 model.

ANNEX 2: SIMULATIONS

A. FUNDEM Simulation

Table A2.1 1998 FUNDEM Simulation

Unit	a State Gov't Tax and Transfer Revenues (Millions US$)	b Proposed Contribution to FUNDEM (%)	c Proposed contribution to FUNDEM c=a(b) (Millions US$)	d Ensino Medio Enrollment (Students)	e Per Student Expenditure in EM for 1998 e=c/d (US$)	f Federal contribution per student f= (585.14)-e (US$)	g Federal contribution g=f(d) (Millions US$)
Bahia	2709	7%	189.6	391916	483.85	101.29	39.7
São Paulo	15510	7%	1085.7	1875344	578.93	6.21	11.6
Rio Grande do Sul	3233	7%	226.3	373614	605.73	0.00	0.0

The creation of a FUNDEM provides the opportunity to (a) set a fixed contribution in each state for *ensino médio*, (b) promote increase of enrollment in *ensino médio*, and (c) allow the Federal Government its role of "equalizer" as it tops off any state's fund with a per-capita lower than a certain threshold. In this simulation, the FUNDEM contribution was set as 7% of the Tax and transfer revenues (column b). For each state, the equivalent per capita based on this contribution was calculated (column e). The Federal top off is calculated based on a minimum (in this case equivalent to US$585.14—the average Brazilian cost for an *ensino médio* student, including capital and recurrent expenditures). The Federal contribution to FUNDEM (in US$ millions) is calculated in column g. In this scenario, the per student investment in secondary education in Bahia would have increased by 21% with the federal contribution to FUNDEM.

B. Incentives to FUNDEF

Table A2.2 1998 FUNDEF Incentive Simulation

Unit	a EF Enrollments (Students)	b Total Cost EF (Millions US$)	c EF Per student Cost c=b/a (US$)	d State Gov't Tax and Transfer Revenues (Millions US$)	e Proposed Minimum Investment to EM (% Revenues)	f Value of Proposed Min. Investment to EM f=d(e) (Millions US$)	g State Simulated Investment in EM (Millions US$)	h Simulated Investment in EM h=g/d (% of revenues)	i Incentive i=h-e (%)	j Increase in EF per Student Allocation (US$)	k Federal incentive contribution to FUNDEF (in millions US$)
Bahia	3303296	1565	473.87	2709	7%	190	161	5.9%	0.00%	0.00	0.00
São Paulo	6483809	3188	491.71	15510	7%	1086	194	1.3%	0.00%	0.00	0.00
Rio Grande do Sul	1729329	849	491.07	3233	7%	226	250	7.7%	0.73%	3.60	6.22

The purpose of this simulation is to illustrate a creative way in which the federal government can generate incentives for investment in secondary education. In this case, the federal government would use as incentive a bonus amount to be added to the state's FUNDEF when the state reaches adequate levels of expenditure in secondary education (as set by a threshold). In this hypothetical case, the federal government would be suggesting that 7% of taxes and transfers are the minimum accepted to invest in secondary education (column e), and that any percentage above this threshold would be rewarded. Column f translates this threshold into dollars for each state. The investment in *ensino médio* for 1998 (column g) is converted into a percentage of taxes and revenues (column h). This percentage is compared to the minimum threshold to obtain the incentive (column i). This incentive will be added to the per-student expenditure in ensino fundamental as an additional federal contribution to FUNDEF. In our simulation, only Rio Grande do Sul would receive an incentive bonus, because both Bahia and São Paulo would have spent in secondary education less than the 7% threshold (i.e. 5.9% and 1.3% respectively).

C. Discount to FUNDEF

Table A2.3 1998 FUNDEF Discount Simulation

	a EM Cost	b State Gov't Tax and Transfer Revenues	c FUNDEF State Contribution c=b(0.15)	d Base EM Investment (% Revenues)	e Value of Base Investment e=(d)(b)	f State Simulated Investment in EM	g Simulated Investment (% Revenues) g=f/c	h Discount h=g-d	i Discounted State FUNDEF Contribution i=e-((g)(e))
Bahia	230	2709	406	7%	190	161	5.9%	0.00%	406
São Paulo	1059	15510	2327	7%	1086	194	1.3%	0.00%	2327
Rio Grande do Sul	222	3233	485	7%	226	250	7.7%	0.73%	481

The purpose of this simulation is to illustrate another creative way in which the federal government can reward state's adequate investment in secondary education. In this case, the federal government would use a discount to the FUNDEF contributions as reward when the state reaches adequate levels of expenditure in secondary education (as set by a threshold). In this hypothetical case, the federal government would be suggesting that 7% of taxes and transfers are the minimum accepted to invest in secondary education (column d), and that any percentage above this threshold would be rewarded with the discount. Column e translates this threshold into dollars for each state. The investment in *ensino médio* for 1998 (column f) is converted into a percentage of taxes and revenues (column g). This percentage is compared to the minimum threshold to obtain the discount to FUNDEF that will be used as a reward (column h). The discount would be subtracted from the state's contribution to FUNDEF and the federal government would cover the cost of the discount such that FUNDEF remains undiminished. In our simulation, only Rio Grande do Sul would be benefited with the discount because both Bahia and São Paulo would have spent in secondary education less than the 7% threshold (i.e. 5.9% and 1.3% respectively).

ANNEX 3: EXPECTED STATE EXPENDITURES IN EDUCATION 1998-2007

Figure A3.1 Bahia Expected Education Costs 1998-2007

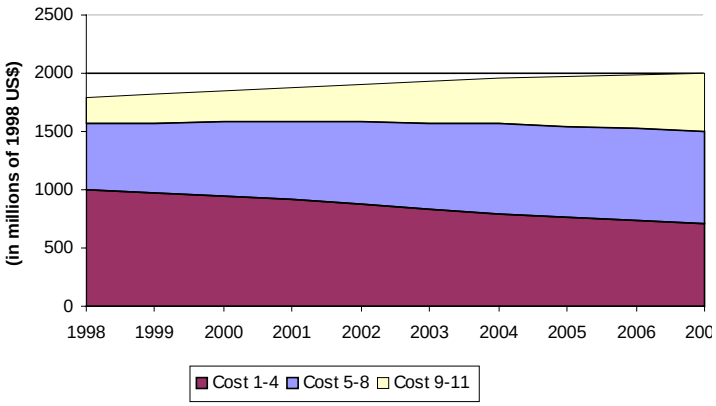


Figure A3.2 São Paulo Expected Education Costs 1998-2007

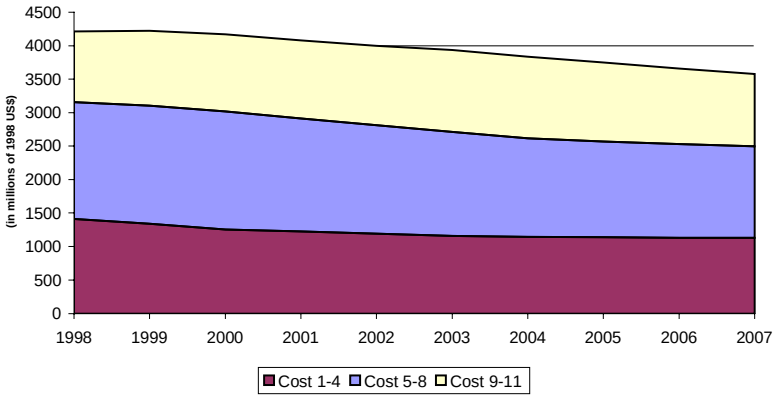
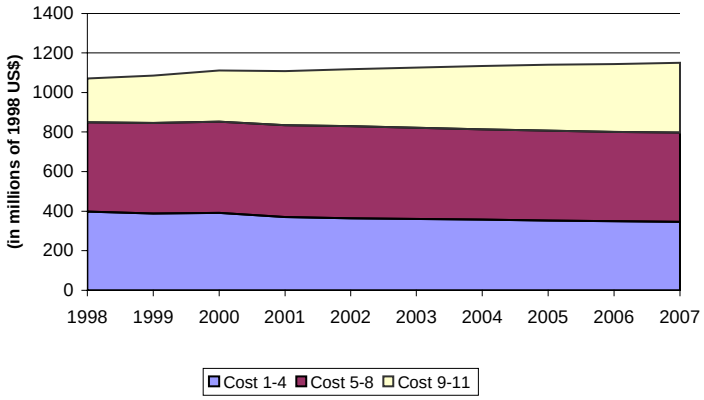


Figure A3.3 Rio Grande do Sul Expected Education Costs 1998-2007



These figures indicate the total expected educational investment for Bahia, São Paulo, and Rio Grande do Sul in the next 10 years, based on maintaining the current level of expenditures in each level (primary, lower secondary, upper secondary). Even though the figures hide the fact that a higher level of per student expenditures is needed to achieve quality inputs for all public schools, they are an important indicator of the opportunities for enhancement of the system that will arise from reduced repetition, and thus, reduced wastage in expenditures.

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