

Report No. 10564-BR

Secondary Education and Training in Brazil: Adapting to New Economic Realities

(In Two Volumes) Volume II: Annexes

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Human Resources Operations Division
Country Department I
Latin America and the Caribbean Regional Office

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CURRENCY EQUIVALENTS

Currency Unit = New Cruzado (January 1989-March 1990)
= Cruzado (from February 1986 to January 1989)
= Cruzeiro (prior to February 1986)

AVERAGE EXCHANGE RATES

NCz\$ 1.00 = US\$ 0.16390 (November 16, 1989)
US\$ 1.00 = NCz\$ 6.10000 (November 16, 1989)

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1988 US\$ 1.00 = Cz\$ 262.02
1987 US\$ 1.00 = Cz\$ 39.23
1986 US\$ 1.00 = Cz\$ 13.66
1985 US\$ 1.00 = Cr\$ 6.20

FISCAL YEAR

January 1 - December 31

ISSUES IN BRAZILIAN SECONDARY EDUCATION

VOLUME TWO: ANNEXES

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MATH AND PORTUGUESE ACHIEVEMENT IN SECONDARY SCHOOLS IN BRAZIL 1/

Introduction

1. As background to this report, the Ministry of Education and the World Bank commissioned the Carlos Chagas Foundation to design and administer a standardized test of mathematics and Portuguese to a sample of secondary students in four cities (Fortaleza, Salvador, Sao Paulo and Curitiba). The achievement test was designed for students at the end of their third (and final) year of secondary school, and comprised test items that had appeared previously on vestibular examinations for Brazilian universities. The test was accompanied by a background questionnaire for each student and a questionnaire about the school that was completed by the school director. Both tests and questionnaires were administered in November, 1988. The overall purpose of the study was to explore differences in the relative effectiveness of various types of school in enhancing student achievement and in reducing performance differences between students from different social class backgrounds.

Sample

2. For each city, a stratified random sample of schools was identified, with replacements; stratification was based on school type (Federal Technical, SENAI schools, teacher training [magisterio] schools, and general secondary schools), time of shift (day or night) and ownership (public or private); it was designed to be representative of the actual distribution of schools and students in each state. Within each school, all students present on the day of test administration were requested to complete the test and accompanying questionnaire, although participation was voluntary.

3. The voluntary nature of participation may have affected the overall estimates of achievement for individuals, schools, and cities. Private school and day shift students were slightly oversampled in Fortaleza, biasing average scores upward in this city. In Sao Paulo, private schools and day shift students were underrepresented, driving average scores downward. In Salvador, public schools were oversampled. Strong collaboration from the State Secondary of Education in Parana

1/ This Annex was written by Marlaine E. Lockheed and Barbara Bruns of The World Bank. Qinghua Zhou provided expert computational assistance. Support for this research was provided by a World Bank research grant, RPO 674-84. For further analysis of the secondary school achievement tests, see "Avaliacao do Rendimento Escolar de Alunos da 3o serie do Segundo Grau - Subsidios Para Uma Discussao Preliminar," by Dr. Heraldo Vianna of the Carlos Chagas Foundation (1989).

resulted in the most representative sample for this city. Because the sample of schools was fairly small, it was difficult to capture the diversity of private secondary schools; in particular, low-tuition schools were not sampled in sufficient quantity to analyze separately. This is unfortunate, because so little is known about the effectiveness of low-tuition private schools and the characteristics of their students.

Instruments

4. Four instruments were developed: a mathematics test, a Portuguese test, a student background questionnaire, and a school questionnaire. The mathematics and Portuguese tests were designed to measure understanding of the basic secondary school curriculum in these areas, and included one or more item for each area of content. (For example, verb tenses and reading comprehension in Portuguese and linear functions and trigonometry in mathematics.) Items were selected on the basis of "item facility," a statistical measure of item discrimination. Reliabilities for the total tests were high, with Cronbach's alpha = .84 for mathematics and .75 for Portuguese. However, reliabilities calculated separately for students in teacher training programs ("magisterio" students) were substantially lower, .30 for mathematics and .58 for Portuguese.

Analytic sample

5. Data were obtained from 2648 students and 66 schools; after cleaning the data (range and logic checks) and making necessary corrections, usable data were obtained from 2611 students and 62 schools. Schools 46, 50 and 51 were deleted for insufficient student-level data (9, 3 and 10 cases respectively) and School 39 was deleted for insufficient school-level data (all fields were blank).

Differences in achievement by school types

6. On average, students enrolled in different types of school performed differently on the tests; the mean scores of students in all eight types of school are presented in Table 1 (Appendix Table 24 shows results by region). The resulting ranking of school by student performance is:

- (i) Federal Technical Schools (day shift)
- (ii) Private General Secondary Schools (day shift and night shift)
- (iii) Federal Technical Schools (night shift)
- (iv) Private Teacher Training Schools (day shift)
- (v) Public General Secondary Schools (day shift)
- (vi) SENAI Schools
- (vii) Private Teacher Training Schools (night shift)
- (viii) Public Teacher Training Schools
- (ix) Public General Secondary Schools (night shift)

7. In each region, there was a reasonably wide range in scores from the top schools to the bottom schools, and virtually the same ranking in each region. The average scores for each type of school across regions were remarkably similar.

Table 1: Mean achievement scores for students in different types of secondary schools, Brazil, 1988

School Type	Mathematics		Portuguese	
	Mean	S.D.	Mean	S.D.
Federal technical	22.60	2.18	21.11	0.88
SENAI	12.75	0.53	16.79	0.82
Teacher training*	11.24	1.56	16.79	2.04
General secondary*	13.70	5.79	17.00	3.28

Note: Maximum score in mathematics is 45; maximum score in Portuguese is 35.

*Includes public and private schools of this type.

8. On average, students in federal technical schools scored significantly higher on both mathematics (about 10 points) and Portuguese (about 5 points) than students in any of the other types of schools. Students in teacher training schools scored lowest in mathematics, with students in SENAI schools scoring only about 1.5 points higher than students in teacher training and students in general secondary schools about one more point higher. In Portuguese, performance at all types of schools other than the federal technical schools was equivalent.

9. Average differences between schools, however, do not mean that the schools are solely responsible for the differences. Differences in student selection practices can also account for differences in achievement. Since some types of schools, such as the federal technical schools, SENAI schools and the best private schools are selective, it is likely that the average ability of their students will be higher. Ideally, achievement tests should be carried out on the same students at two or more points in their education, for example as entering first year students and just prior to graduation. This "value added" approach allows a more direct assessment of school effectiveness, irrespective of student ability (although non-school factors such as changes in students' motivation or family circumstances will always play some role in determining achievement). To date, such types of longitudinal studies have not been undertaken at the secondary level in Brazil. Such studies would be a valuable next step.

Analytic Model and Results

10. The main objective of this analysis was to determine the relative impact of school type and student background on student performance. To achieve this, a multi-level modelling package, called a hierarchical linear model (HLM) ^{2/} was used. The advantage of the HLM procedure over ordinary least squares (OLS) regression analysis is that HLM can provide more accurate estimates of the importance of school-level factors (i.e., it correctly estimates the standard errors for school-level coefficients). A second advantage of the HLM procedure is that it can analyze the factors that influence differences in student achievement within schools at the same time as it evaluates the factors that influence student achievement across schools.

11. The first result of the analysis was that school differences are more important in explaining differences in student math test scores than in explaining Portuguese test scores. This result is consistent with research from other countries which shows that, as one might expect, the more abstract the subject matter, the more important formal schooling is for developing student achievement. As can be seen in Table 2, almost two-thirds of the variation in student math scores can be attributed to the schools they attend, whereas on the Portuguese test, most of the variation is attributable to individual differences.

Table 2: Results of variance component analysis: Brazil secondary school achievement, 1988

(% of Total Variance)

Score	School	Individual
Mathematics	62.38	37.62
Portuguese	36.36	63.64

12. The second result was that within any given school, socio-economic differences among students had only very small effects on their test scores. Table 3 shows this through the very low coefficients on "social class differentiation" (which refers to differences within schools), .29 for mathematics and .31 for Portuguese. The implication of

^{2/} A. Bryk, S. Raudenbush, M. Seltzer and R. Congdon, Jr. (1988) An Introduction to HLM: Computer Program and User's Guide, Chicago: University of Chicago. For further information and references, see M.E. Lockheed and Nicholas Longford "A Multi-Level Model of School Effectiveness in a Developing Country." World Bank, WPS 242 (1989).

ANNEX I

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this is that a student from a low income or low social class background who attends a good school will perform close to the average for that school.

Table 3: The HLM unconditional model

<u>Estimated Effects</u>	Coefficients	error	t-stat	p-value
School mean Achievement				
Mean mathematics	14.29	.75	19.04	.000
Mean Portuguese	17.36	.41	42.39	.000
Social Class Differentiation				
Mean mathematics	.29	.15	1.99	.046
Mean Portuguese	.31	.12	2.54	.011

13. However, it is also very clear from the data that different types of secondary schools in Brazil generally attract different types of students. Based on information from the student questionnaires which accompanied the achievement tests, all students in the sample were given a socioeconomic status (SES) index score ranging from -1 (low status) to +1 (high status). The SES score was a composite index comprised of father's occupation, father's education, mother's education, and family income.

14. As can be seen from Table 4, students in federal technical schools and SENAI schools are disproportionately male and come from higher social class backgrounds, while students in teacher training schools are disproportionately female and come from lower social class backgrounds. The average socioeconomic level for students in general secondary schools in this sample was in the mid-range, but it should be recalled that this average is composed of private (generally high SES) and public (generally lower SES) school students. Other differences are that students in general secondary schools spend more hours per week working, and students in federal technical schools spend fewer hours working than any of the others.

Table 4: Average characteristics of students attending different types of secondary schools, Brazil 1988

Student characteristic	School Type			
	Federal technical	SENAI	Teacher training	General secondary
Sex (% female)	26.0	6.8	96.1	58.7
Age in years	18.5	19.4	18.9	18.7
SES (factor score)	.18	.19	-.29	.02
Family size	4.7	4.2	4.4	4.5
Hours working weekly	5.8	8.6	8.0	14.5
Sample size	192	118	309	1992

15. In order to try to separate all of these various influences on student achievement, the analysis used three different groups of variables. First, to take individual background characteristics into account, four variables were used: sex, age, family size, and the number of hours per week that a student worked. These are presented in the first part of Table 5 as "fixed" variables.

16. Second, to analyze the effects of school type on average student performance, five different variables were used: the average SES of students in the school, and four dummy variables corresponding to the type of school. The first three are federal technical, teacher training, and SENAI schools. General secondary schools were the omitted variable, which means that the results for the other schools are in relation to the average results for general secondary schools. Similarly, because both general secondary schools and teacher training schools are found in both the public and private sector, a fourth dummy variable was used to test for public/private sector effect on achievement. These are presented in the middle section of Table 5 as "Mean Achievement" variables.

17. Finally, the extent to which different types of schools reduced the effect of social class background on achievement was studied. This was done by looking at the variations in student scores within a school in light of the variations in social class background within that school. This is presented in the bottom section of Table 5 as "SES Achievement Gap."

Table 5: Effect of school type on achievement and social class differentiation

Independent variable	Mathematics		Portuguese	
	Coeff.	t-stat	Coeff.	t-stat
<u>Fixed</u>				
Female	-1.48***	-7.06	0.58**	3.02
Age	-0.37***	-5.84	-0.48**	-8.24
Family size	0.05	0.27	0.05	1.11
Working hours	-0.03***	-4.65	-0.02**	-3.62
<u>Mean achievement</u>				
Intercept	13.92***	22.29	16.81***	43.71
Average SES	4.71***	4.74	3.82***	6.42
Federal technical	9.28***	5.20	3.68**	3.44
SENAI	-1.52	-0.63	-0.84	-0.58
Teacher training	-1.37	-1.06	-0.09	-0.12
Private	3.20*	2.12	-0.20	-0.22
<u>SES achievement gap</u>				
Base	0.11	0.54	0.21	1.26
Federal technical	0.68	1.31	-0.25	-0.57
SENAI	-0.69	-1.07	-0.37	-0.70
Teacher training	-0.35	-0.80	-0.28	-0.74
Private	0.02	0.06	0.22	0.72

* p < .05, ** p < .01, *** p < .001

18. The results are presented in Table 5. Regarding the effect of individual characteristics, the analysis showed that older students performed less well on both the mathematics and Portuguese tests than did younger students, and girls outperformed boys in Portuguese, but boys scored significantly higher than girls on mathematics. Family size was unrelated to achievement in either mathematics or Portuguese. The number of working hours had a small but highly significant negative effect on students' scores in both math and Portuguese.

19. With respect to the effects of school type, the results show that, in comparison with students in general secondary schools, students in federal technical schools score significantly higher in mathematics (by about 9 points out of a maximum score of 45) and in Portuguese (by about 3 points out of a maximum of 35). For both teacher training and SENAI students, performance differences vis-a-vis students in general secondary schools appear to be mainly due to differences in average student background. For example, although SENAI students' raw achievement scores were slightly higher, once the effect of the higher socioeconomic status of SENAI students is taken into account, there is no significant difference between these students' performance and that of general secondary students.

Conversely, students in teacher training schools had low raw scores, but when the fact that these students come from lower SES backgrounds is taken into account, the gap virtually disappears.

20. The results also show a "private school effect": controlling for school type and student background, students in private schools outperformed students in public schools in mathematics (by about 3 points out of 45). There was no significant difference in Portuguese performance, however. Finally, the results showed that, regardless of school type, student test scores are significantly affected by the average SES level of students the school. If average SES is high, all students (even those which may be individually from a lower class background) do better (by almost 5 points in math and 4 points in Portuguese).

21. The "SES achievement gap" presented in Table 5 measures the effects of social class variations within schools on student achievement. Although as discussed earlier (Table 2), these effects were very small, there was slight evidence that some schools do a better job than others in "equalizing" the achievement of students from different backgrounds. This "equalizing" effect was strongest at SENAI schools and apparently weakest at the federal technical schools. However, none of these effects was statistically significant.

Factors Explaining School Performance

22. In order to try to understand what underlying characteristics of the successful schools were most important in determining their students' performance, a further set of variables was introduced. These included: school size, number of shifts, average teacher salaries, average class size, and hours per week of Portuguese and math instruction. The results of this analysis, however, were not conclusive. The only variables that were statistically significant were hours of math and Portuguese and class size. As would be expected, hours of math and Portuguese had a positive effect on student performance. However, the effect of class size (which was also positive, meaning that schools with larger classes scored higher) is not easy to interpret, and may reflect a spurious correlation. In any event, the effect of class size was very small.

23. It is interesting to note, however, that there was no statistically significant correlation between teacher salary levels and school performance, despite the large range in average salaries across the schools sampled -- with average salaries at the federal technical schools and SENAI schools more than twice as high as the average at general secondary and teacher training schools.

Conclusions

24. The MEC/World Bank/Carlos Chagas Foundation student achievement tests offered some valuable insights into the state of Brazilian secondary education; it showed sharp differences in average student performance at different types of schools, and indicated that, at least at the secondary level, differences in average student achievement across different regions are not very significant. The test results also showed clear evidence of how students from different family income and social class backgrounds appear to be "tracked" into different types of secondary schools, and the important effect that this has on their cognitive achievement.

25. There are at least two important questions which this data set and analysis were not able to shed much light on. First, because this was a one-time test, it was impossible to control for student ability. Thus, it remains quite possible that some of the differences in average achievement levels across schools simply reflect the caliber of the students they select more than anything that the school does. Indeed, the fact that the analysis was not able to find any particular school characteristics that explained the consistently better performance of federal technical and private school students, tends to suggest that student selection is an important factor in these schools.

26. Second, because of the relatively small number of private schools in this sample (less than 25), it was impossible to break these down by tuition level, in order to see if there were any systematic differences between high-tuition and low-tuition schools in terms of student achievement or school characteristics. Although private secondary schools in general have the reputation in Brazil of being "better" than the public schools, private schools are very diverse. There is a huge range in tuition levels, which presumably are correlated with differences in quality. At present, almost nothing systematic is known about the "quality" of low-tuition private schools, which compete most directly with the public school system. It would be very valuable to be able to compare student performance in low-tuition private and public schools, controlling for student background, and, ideally, for student ability. It is to be hoped that Brazilian researchers will take up these important questions.

**THE FINANCE AND COSTS OF SECONDARY EDUCATION
IN BRAZIL 1/**

A. National Investment in Secondary Education

Relative to other Latin American countries, Brazil's public investment in secondary education is low. In 1980 the average country in Latin America allocated 25.6 percent of public education spending to secondary education, while Brazil allocated only 8.4 percent to secondary education. In Latin America, only El Salvador allocates a smaller proportion (6.0%) of public education funds to secondary education than Brazil. 2/ Furthermore, Brazil's commitment to secondary education does not appear to be increasing; secondary education's share of total education spending was even lower in 1985 (at 7.9%) than it was in 1980.

The relatively high proportion (one-third) of secondary school students enrolled in private schools, however, means Brazil's national investment is larger than public outlays alone. In 1985, for example, real public secondary school expenditures (in US\$ of 1987) were an estimated US\$ 685 million, compared with an estimated US\$ 362 million in private secondary schools, and an estimated US\$ 211 million in privately-financed instruction-related outlays for students in both public and private secondary schools. 3/ Public school outlays thus represent only 65.4 percent of total school outlays and 54.4 percent of total school plus family expenditures.

Public Expenditure

According to both the old and new federal Constitutions, the states have primary responsibility for providing public secondary education. The important role of the states in providing secondary education is demonstrated in Table 1. State spending on public secondary education represents 66.9 percent of the total, compared with the federal

1/ This Annex was prepared by Donald Winkler.

2/ Rojas (1987), Anexo 6.

3/ Since tuition and many instruction-related expenses were deductible (to a maximum of US\$ 636.45 per student in 1987) from gross income for individuals itemizing on their federal income tax returns, an estimated US\$ 43 million (in 1987 prices) of private outlays are in fact federal tax expenditures. The Ministerio da Fazenda reports total tax expenditures for all levels of education as US\$ 206 million (in 1987 prices) in 1984, the latest year for which data are available.

government's 27.9 percent share, and municipal governments' 2.6 percent. ^{4/} SENAI, an autonomous public training organization, provides some regular secondary instruction, the expenditure on which represents another 2.6 percent of total public secondary education spending.

Table 1

Total Secondary Education Expenditures, 1985

	Secondary Education Expenditures (millions of US\$)	Percent of Total Secondary Education Expenditures	Percent of Total Education Expenditures by this Level of Government
Federal Technical Schools	119	10%	5%
State Governments	458	39%	10%
Municipal Governments	18	2%	1.5%
SENAI--Secondary Schools Only	14	1%	15%
Private Expenditures			
Tuition a/	362	30%	
Instruction- Related Outlays b/	211	18%	
TOTAL	1,182	100.0%	

a/ Assumes tuition charges are equal to recurrent unit costs and that unit costs in private schools are 40% higher than those in public schools; see Table E.

b/ Assumes annual per pupil school material costs of US\$ 69.60 for students in both public and private schools (Folha de Sao Paulo, Oct. 16, 1988); average estimate clothing (US\$ 76.73) and transport (US\$ 328.87) costs not included.

^{4/} If federal secondary education transfers (US\$ 41 million) and tax expenditures (US\$ 43 million) are included, the federal share increases to 37.5% of total public spending of US\$ 733 million.

Table 2

Real Total Education Expenditures, 1980 - 1986
(in billions of 1987 cruzados, converted to millions of US\$)

Secondary Education	<u>1980</u>	<u>1983</u>	<u>1985</u>	<u>1986</u>
Federal Government*	191	183	232	321
(of which Fed. Tech. Schools)			(119)	
State Governments	372	303	458	555
Municipalities	15	18**	18**	18**
Total	578	504	708	894

Total Education

Federal Government*	2,195	2,436	3,360	4,763
State Governments	3,691	3,638	4,453	6,230
Municipalities	965	815	1,107	n.a.

Annual Expenditures per Student

Federal Government***

Expenditures (US\$ millions)			119
Enrollments			67,657
Unit Cost (US\$)			1,759

State Governments

Expenditures (US\$ millions)	372	303	458
Enrollments (millions of students)	1.66	1.58	1.78
Unit Cost (US\$/year)	\$224	\$192	\$257

Municipal Government

Expenditures (US\$ millions)	15	18	18
Enrollments	98,280	137,716	132,333
Unit Cost (US\$/year)	\$153	\$131	\$136

* including transfers and expenditures on military and other specialized secondary-level training programs

** estimated

*** Federal Technical school expenditures only.

Source: IPEA, Educacao e Cultura 1987, and MEC/SEEC, Balancos Gerais da Uniao.

After a decline in the early 1980s, real public secondary education spending has increased in recent years, as shown in Table 2. 5/ State secondary education spending per pupil increased from US\$ 192 in 1983 to US\$ 258 in 1985, an increase of 34 percent. Secondary education expenditures at both the federal and state levels increased a further 27 percent from 1985 to 1986. But, consistent with the low priority attached to public secondary education, secondary education spending increased much more slowly than total education spending, which rose 41 percent in 1985-86.

Public expenditures on secondary education include outlays on general education and vocationally-oriented education, including teacher training, and adult education (supletivo). Federal direct expenditures (net of transfers to individuals and other governments) on secondary education are mainly vocationally-oriented, including military schools, agricultural schools, and industrial technical schools. As can be seen in Table 3, the Ministry of Education represents only 62 percent of all federal outlays on secondary education; the largest component (73%) of Ministry of Education outlays is direct expenditures on the federal agricultural and industrial schools.

5/ Public education expenditure data is not typically disaggregated by level of education prior to 1980, but a study by Mello e Souza (1983) shows that state secondary education spending increased by only 4% and total public secondary education spending increased by 26% between 1975 and 1980; in the same time period total (private plus public) secondary education enrollments increased by more than 47% suggesting per pupil expenditures declined.

Table 3

Federal Education Expenditures, 1985 - 1987
(in millions of US\$)

	<u>1985</u>	<u>1986</u>	<u>1987</u>
al Education Expenditures	3,360	4,762	
Ministry of Education	2,493	3,139	3,991
al Secondary Education Expenditures	231	319	
Ministry of Education	131	198	
Agricultural Schools *	37	48	34*
Industrial Schools*	82	95	166*
Federal university-based secondary schools			17

* Capital outlays represented an estimated 19% of 1987 agricultural school expenditures and 15% of 1987 industrial school expenditures.

Note: all 1987 figures are estimated and preliminary.

ources: MEC/SEEC; IPEA, Educacao e Cultura 1987.

State expenditures are for adult education and both general and vocationally-oriented education, including both vocational tracks (habilitacoes profissionais) within general education and separate vocational/technical schools. Accounting conventions do not permit a disaggregation of total state secondary education spending by these categories. Finally, municipal expenditures are primarily for general secondary education.

In addition to the public expenditures given in Table 1, the public sector provides a large number of training activities, some of which complement academic training at the secondary level. SENAI, for example, in addition to providing some vocationally-oriented secondary schooling also provides industrially-oriented training to secondary school graduates. SENAC provides training which is commercially-oriented but SENAC does not have any secondary schools or formal post-secondary degree programs. In addition to SENAI and SENAC, several federal ministries and state secretariats offer training courses. While there is no reliable estimate of total public expenditures on secondary education-level training activities, the magnitude of the total effort is very large amounting to an

estimated 334 million student-hours of public training in 1983. 6/ Another indicator of the magnitude of the effort is the annual budget of the two autonomous public training organizations (SENAI and SENAC). The annual revenues of the two organizations taken together in 1987 were approximately US\$ 555 million, nearly as large as total state expenditures on secondary education. 7/

Private Expenditure

Private expenditures on secondary education include direct instructional outlays in private schools and family instructional-related outlays for students attending both public and private schools. In addition, there are, of course, the opportunity costs to students associated with attending school. The opportunity costs associated with foregone employment are lower than they might otherwise be due to the predominance of half-day and evening classes; over 40 percent of all secondary school students are employed at least part-time (Rosemberg, 1988).

In addition to regular secondary education, the private sector offers a wide range of instructional services which complement traditional academic instruction. Most important are the "cursos livres," courses in topics ranging from computer programming to piano lessons to hair cutting. The size of this sector is very large, but no reliable data exist on either the number of establishments or number of students enrolled in such courses.

The curso livre most closely tied to secondary education is the "cursinho" offered to prepare students to take university entrance examinations. A survey of students taking the 1987 Sao Paulo entrance examination (FUVEST) reveals that 50 percent of all applicants and 60 percent of all university entrants took a cursinho; 18.5 percent of entrants took a cursinho for over one year. The cursinho can be viewed as remedial secondary education which should be included in total secondary education expenditures. However, there are no data on either the number of students enrolled in such courses nor the matriculation fees they pay.

6/ See Annex 3; total training was 356 million student-hours, of which 21.7 million was privately financed and provided.

7/ SENAC's total expenditures in 1987 were US\$ 84 million, compared with revenues of US\$ 191 million. SENAI's total revenues in 1987 were US\$ 364 million; it does not report total expenditures. See SENAC, Relatorio Geral 1987 and SENAI, Relatorio Anual do Sistema SENAI 1987.

B. Public Finance of Secondary Education

Unlike primary education, which enjoys an earmarked revenue source in the form of the education salary tax, secondary education is almost entirely financed from government general tax revenues at each level of government. Also, unlike primary education in which federal transfers play an important role, federal transfers play a minor role in financing secondary education.

Federal Finance

Secondary education is an expenditure category for several ministries. As shown in Table 3, the Ministry of Education alone represents 62 percent of total federal spending on secondary education, which is only slightly smaller than MEC's share (66%) of total education spending. MEC is, in addition, responsible for transferring approximately US\$ 43 million (in 1987) to non-federal secondary schools. As shown in Table 4, these funds are allocated to the states and territories (43.9%), municipalities (14.1%), private institutions (38.1%), and individuals (3.9%), the latter in the form of work scholarships to students attending federal technical schools. Only 10.1% of these transfers are included in the annual work plan and agreement (PTA) between MEC and the state education secretariats; PTA transfers are typically determined on the basis of proposed work plans (submitted by the states) and subjected to objective analysis 8/ . Most transfers outside the PTA are for special programs (EDUTECH, PROTECH) to improve technical education. The criteria for allocating transfers outside the PTA are largely unknown; the fact PROTECH transfers in particular fall outside the PTA suggests political considerations are an important criterion. 9/

MEC direct expenditures are primarily for the federal technical schools; in 1986, their share of total MEC secondary education expenditures

8/ PTA transfers decreased significantly (40%) between 1987 and 1986; in addition, state finance secretariats delayed passing on transfers to education secretariats. Given high inflation, the result was to further reduce the purchasing power of federal transfers.

9/ IPEA's annual analysis of the educational sector criticizes the lack of coordination and planning in allocating federal secondary education transfers (Educacao e Cultura 1987, p. 163).

Table 4

Federal Transfers for Secondary Education, 1987
(in millions of US\$)

<u>Total</u>	<u>Current</u>	<u>Capital</u>	
Transfers Categorized by Destination			
Transfers to States (PTA)	6.23	9.94	16.17
Transfers to Territories	0.15	2.85	3.00
Transfers to Municipalities	0.18	5.96	6.14
Transfers to Private Institutions	3.65	13.00	16.66
Transfers to Individuals (FAE work scholarships)	1.70		1.70
Total	11.90	31.77	43.66
Transfers Categorized by Program			
CEFAM			1.59
PROTEC			10.57
EDUTECH			3.79
GRAND TOTAL			<u>15.95</u>

Source: IPEA, Educacao e Cultura 1987, p. 161; Fundacao de Assistencia ao Estudante.

ANNEX II

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was 91 percent 10/ . In addition to the federal technical schools, the federal government finances agricultural and industrial schools run by several federal universities. MEC transfers to states, municipalities, and private institutions are, also, heavily oriented towards technical education and mainly finance capital projects. Three transfer programs are of special importance -- (i) the Centro de Formacao e Aperfeicoamento do Magisterio (CEFAM) project, (ii) the Programa de Expansao e Melhoria do Ensino Tecnico (PROTEC), and (iii) the World Bank-financed Program de Melhoria do Ensino Tecnico Industrial e Agricola (EDUTEC).

CEFAM has the objective of improving teacher training in the secondary schools; federal transfers in the amount of US\$ 1.59 million were allocated for this purpose in 1987. PROTEC has the objective of improving the quality of agricultural and industrial training in 200 primary and secondary schools throughout the country. At the secondary level this includes financing capital improvements in 82 state, private, SENAI, and SENAC schools already in existence; in 1987 these transfers amounted to US\$ 10.57 million 11/.

EDUTEC is the result of a World Bank loan signed in December 1983 and calling for an expenditure of US\$ 43.7 million (\$20 millions financed by the World Bank and \$23.7 million financed by the Brazilian government) to improve agricultural and industrial education in both federal and state schools. In 1987 the states received federal transfers of US\$ 3.79 million under the EDUTEC program.

In addition to direct expenditures and transfers to public and private secondary schools, the federal government through the Fundacao de Assistencia ao Estudante (FAE) provides work scholarships, primarily for students in the federal technical schools; scholarships for private school

10/ Included in these expenditures is that component of the PROTEC program to construct 13 new agricultural and 33 new industrial federal technical schools. In 1987, US\$ 19.34 million was allocated for this purpose. IPEA's annual analysis of the education sector claims that actual construction costs for the 46 schools are more likely to be US\$ 428 million, twenty-two times the 1987 allocation. Thus, the objectives for this component of the PROTEC program are unlikely to be met. Also, included in these expenditures is that component of the EDUTEC program to improve federal agricultural and industrial education in the amount of US\$ 3.08 million for agricultural education and US\$ 5.90 million for industrial education (IPEA, Educacao e Cultura 1987, p. 154).

11/ The potential for technical education expenditures is immense. In response to the announcement in 1986 of the PROTEC program, MEC received requests from states, municipalities, and private institutions for aid totaling US\$ 8,182 million (in 1987 prices), more than double MEC's total annual budget (IPEA, Educacao e Cultura 1987, p. 151).

attendance; and federal tax subsidies for private expenditures on schooling 12/. The work scholarships are distributed by the schools themselves using a need-based criterion established by the school. The scholarships themselves are small, in return for working four hours per day, students receive half the minimum salary per month (US\$ 28 in 1987).

FAE scholarships for private school attendance pay part of the monthly tuition fee; the value of the scholarship is uniform and relatively low, amounting to only US\$ 22.15 per student in 1987. The criteria for allocating scholarships are primarily political; Congressmen receive an allotment to distribute as they wish. There is an index of need (based on family income and the number of dependents), but it relies on truthful answers by applicants, and there is no independent verification of answers.

Finally, until 1989 there existed a federal tax subsidy for educational expenses. Families that chose to itemize could deduct educational expenses (tuition, books, transport, uniforms, contributions to parent-teacher associations. There was a maximum deduction per student, which was roughly comparable to average private school tuition levels. In 1984, the last year for which tax return information is available, the average itemizing family deducted US\$ 934.57 (in 1987 prices) and received an average tax reduction of US\$ 361.05. Aggregate educational deductions were US\$ 535 million, and aggregate tax expenditures were US\$ 206 million. Secondary education's share of these tax expenditures was approximately US\$ 43 million. 13/

12/ The rationale for work scholarships is the residential nature of federal technical education; the cost of living away from home might prevent some students from attending the technical schools in the absence of financial assistance.

13/ This calculation assumes only families sending children to private school itemize, and deductions do not vary by educational level. Under this assumption, secondary education's share of tax expenditures is equal to secondary education's share of private school enrollments, which is 21.5%.

Table 5

State and Federal Secondary Education Spending, 1986

ate Government Education Expenditures as Percent Total State Expenditures	19.82%
ate Secondary Education Expenditures as Percent of Total State Education Expenditures	8.91%
tal Federal Secondary Education Transfers to States as Percent State Secondary Education Expenditures	2.91%
o of which,	
Federal PTA Secondary Education Transfers to States (as Percent of State Secondary Education Expenditures)	1.76%
penditures on Federal Technical Schools as Percent of Total State and Federal Secondary Education Expenditures	20.69%

Source: Annex 4,8; IPEA, Educacao e Cultura 1987, p. 161.

State and Municipal Finance

Secondary schools operated by the states and municipalities are mainly financed by state general revenue sources, in contrast with state and municipal primary schools, which enjoy both an earmarked revenue source -- the state share of the education salary tax -- and sizeable federal government transfers. Of total state and municipal primary education expenditures, 16% is financed by federal transfers ^{14/}. In contrast, as indicated in Table 5, total federal secondary education transfers to

^{14/} See World Bank (1986), Table 14. While 16 percent of primary education expenditures were financed by federal transfers including both the state and federal share of the education salary tax. If the state share of the education salary tax is defined as state, not federal, revenues, only 4 percent of primary education expenditures were financed by federal transfers.

the states represent less than 3 percent of total state secondary education expenditures, with PTA transfers representing only 1.8 percent. 15/

Table 6

Education Expenditures by Region, 1986

	<u>BRAZIL</u>	<u>North</u>	<u>Northeast</u>	<u>Southeast</u>	<u>South</u>	<u>CenterWest</u>
State Education Expenditures as Percent of Total State Expenditures	21.30	18.86	20.29	20.09	17.57	19.82
State Secondary Education Expenditures as Percent of Total State Education Expenditures	15.25	13.05	5.13	10.02	14.13	8.91
Federal PTA Transfers to States for Secondary Education as Percent of State Secondary Education Expenditures	1.8	2.8	2.7	1.7	0.7	1.0
Share of Federal PTA Secondary Education Transfers	100.0	8.7	46.2	29.1	7.4	6.9
Share of Federal PROTEC Secondary Education Transfers (for 1987)	100.0	16.6	21.7	24.5	33.3	3.9
Ratio of Students to Teachers in All Secondary Schools	13.8	21.0	15.7	12.5	13.6	16.3

Source: Annex Table B

15/ PTA transfers are those allocated through a formal, negotiated process with the states using objective allocation criteria; these transfers are included in the annual Convenio Unico signed between MEC and the education secretariat of each state. PROTEC and EDUTEC transfers are not included within the PTA.

Federal transfers represent a higher proportion of state secondary education spending in the North and Northeast than elsewhere in the country. The Northeast, also, receives a disproportionate share of federal secondary education transfers. As shown in Table 6, the Northeast receives 46.2 percent of PTA transfers and 21.7 percent of PROTEC transfers to the states. Federal secondary education transfers are, however, not quite as redistributive to poor regions (i.e., the Northeast) as is true for federal primary education transfers; the Northeast receives more than 40 percent of federal education salary tax transfers.

Federal transfers to the states and municipalities for secondary education are relatively unimportant. Federal direct expenditures on federal technical schools located in the states are six times the size of federal secondary education transfers to the states.

State expenditures on secondary education are a relatively small proportion of total state educational expenditures; as shown in Table 6, the average for Brazil is less than ten percent. In Sao Paulo, for example, secondary education expenditures represent just 6.9 percent of the total education budget and consume only 8.3 percent of state general revenues allocated to education. ^{16/} The fact that a high percentage (56%) of secondary education enrollments are in night sessions held in buildings which function as primary schools during the day sessions means it is often difficult to separate secondary from primary education expenditures. Offering secondary and primary instruction in the same classrooms also increases the fungibility of education salary tax revenues earmarked for primary education alone.

The states transfer some financial resources to municipal and private secondary schools for the purpose of improving access where state schools are either oversubscribed or nonexistent. The state of Ceara, for example, sometimes pays teacher salaries in schools where the municipality provides the building and other school resources. Ceara, also, provides scholarships to students to study in private schools when public schools are unavailable (e.g., in fast growing areas of the periphery). The size of the scholarship is sufficient only to pay for tuition at schools of mediocre quality; private schools may require scholarship students to pay an additional stipend. ^{17/}

^{16/} See Annex Table C.

^{17/} The overall magnitude of the scholarship program is small, amounting to only Cz\$ 12 million out of a total projected budget of Cz\$ 1839 million in 1989.

SENAI/SENAC and Private Training

SENAI and SENAC are autonomous public training organizations. Only one, "Habilitacao Profissional" (HP), of SENAI's many activities is regular secondary education instruction. Another SENAI activity, "Cursos de Qualificacoes Profissional" (CPQ-IV), provides supplementary vocational training to secondary school graduates.

Both SENAI and SENAC are primarily funded by a one percent payroll tax on industrial enterprises (in the case of SENAI) and commercial enterprises (in the case of SENAC). Enterprises having more than 500 employees are levied a payroll tax rate of 1.2 percent. Industrial enterprises can be exempted from the extra 0.2 percent if a special training agreement is signed with SENAI, and forty industrial enterprises are exempted from the entire 1.2 percent payroll tax because they have special accords which require them to operate their own training institutions.

The Ministry of Social Security collects the payroll tax and distributes it to the national headquarters of SENAI and SENAC, which in turn distribute funds to their regional offices, which provide the training. In principle, the manpower council within the Ministry of Labor approves the training policies of SENAI and SENAC; in practice, the two organizations are almost completely autonomous and independent.

In addition to SENAI and SENAC, private enterprises can provide their own training. Law 6297, passed in 1975, allowed enterprises to deduct up to eight percent of their income tax liability for training purposes. Participating firms submit plans to the Federal Manpower Council of the Ministry of Labor for approval. They can then either provide the training themselves, contract with private training organizations, or contract with SENAI or SENAC to provide the training. Currently, some 4,200 enterprises participate in the program.

C. Unit Costs

Secondary education expenditures per pupil vary widely across time and by type of education. Nationally, expenditures per pupil have not changed greatly since 1980, but this experience varies considerably by state 18/. In Sao Paulo, for example, public expenditures per pupil

18/ Dividing total public secondary education expenditures as reported in Table 2 by total public secondary education enrollments for the years 1980 and 1985 also shows a decrease in real per pupil expenditures from US\$ 385.26 in 1980 to US\$ 344.96 (in 1987 prices) in 1985, a reduction of only 10 percent. As noted earlier, a study by Mello e Souza (1983) also shows that real aggregate public secondary education expenditures increased only 18% while aggregate secondary education enrollments increased 47% between 1975 and 1980.

decreased by 41 percent in real terms between 1980 and 1984 and subsequently increased 77 percent between 1984 and 1986 (see Annex 6). The principal reason for sharp changes over time is lumpiness in times of high inflation in adjusting teacher salaries, the major component of educational costs. In addition to these abrupt changes in teacher salaries, there are longer-run shifts in resources received by students. A study of secondary schools in Minas Gerais, for example, shows that student teacher ratios increased from 10.8 to 16.6 in public secondary schools between 1973 and 1979. 19/

Expenditures per pupil also vary widely by type of education. As shown in Table 7, unit costs computed for private secondary education are considerably higher than the per pupil expenditures for public secondary education, but the figures are not comparable as the public sector figures understate capital costs. 20/ The only study to compare public and private school costs on similar grounds found recurrent costs per pupil to be 43 percent higher in private than public secondary schools. 21/

The largest difference in expenditure per pupil is that between general education and the technical education offered by the federal government and the autonomous training organization SENAI. Costs per pupil enrolled are at least five times higher in SENAI and federal technical schools than in general secondary education offered in the state schools. The principal factors explaining this cost difference are longer school hours, higher salaries, lower student-teacher ratios, and higher capital costs in technical compared to general secondary schools. The cost difference would be smaller if the basis for comparison were cost per student hour as the federal and SENAI technical schools offer six or more hours/day of instruction versus the five hours of instruction offered in general secondary schools. However, even on an hourly basis, the cost per student is at least twice as high in the technical versus general secondary schools.

19/ See Luscher and Mafra (1986).

20/ Capital unit costs per pupil are extraordinarily high for private (and public) schools in Sao Paulo due to the high land values associated with older schools located in the central city. Recurrent unit costs per pupil in public schools are also frequently understated because some fringe benefits (amounting to as much as 40% of base salary) are not directly paid by state education secretariats and, thus, do not enter their budgets.

21/ See the study Pesquisa Custo-Aluno carried out by the Assessoria Tecnica de Planejamento e Controle Educacional of the Secretaria de Estado da Educacao, Sao Paulo, 1988; the results of that study are reported in Annex 7.

Table 7

Estimated Annual Expenditures per Pupil
(in US\$)

	-----BRAZIL (for 1984)-----		---SAO PAULO (for 1985)1/---	
	<u>Estimated Total</u>	<u>Recurrent</u>	<u>Estimated Total</u>	<u>Recurrent</u>
	<u>Costs</u>	<u>Costs Only</u>	<u>Costs</u>	<u>Costs Only</u>
<u>Primary Schools</u>	88			
Public				
State	152			
Municipal	73			
Private			590*	382*
<u>Primary/Secondary Schools</u>				
Private			699*	426*
<u>Secondary Only</u>				
Public				
Federal Agricultural	2,795	1,512		
Federal Industrial	1,506			
SENAI(1987)	2,210	1,571		
Private			678*	365*
<u>Notes:</u>				
1/ For the city of Sao Paulo only.				

An asterisk indicates the cost figure was derived from a detailed cost analysis which included imputed values for capital depreciation; figures without an asterisk were calculated by simply dividing total expenditures by the total number of pupils; figures reported for Brazilian primary schools are for schools located in the Center-West region only.

Sources: For Brazil, Ministerio da Educacao, *Custo Direto de Funcionamento das Escolas Publicas de 1 Grau*, Brasilia, 1986; for SENAI, SENAI/Sao Paulo, 1987; for Federal Technical Schools, Ministry of Education, 1988; for Sao Paulo, Braga and Cyrillo, 1988.

D. Public Finance Policies

A significant change in Brazilian educational finance occurred with the passage in 1983 of the Joao Calmon Amendment to the federal constitution. That amendment, implemented in mid-1985 as law 7348, required the federal government to increase education's share of the national budget by earmarking 13 percent of most tax revenues for education. The amendment also required state and municipal governments to allocate 25 percent of their revenues to education. The effect of the amendment should have been to increase total education spending as well as public secondary education spending in Brazil. While real educational spending at the federal level has increased since 1985, education's share of the total budget declined from 6.1% in 1985 to 5.8% in 1986. 22/ State educational spending, too, has failed to meet the requirements of the amendment; education consumed 19.8 percent of the total state government budgets in 1986.

A second major change in educational finance occurred with the passage of the new national constitution in 1988. Article 238 of the constitution requires that 18 percent of federal tax revenues be allocated to education and that state and municipal governments continue to allocate 25 percent of their revenues to education. The new constitution, also, increased the proportion of total government revenues assigned to state and municipal governments. As a result, real educational expenditures should increase significantly at the state and municipal level as the new constitution is implemented. 23/ There is some evidence that the states are responding to the new constitutional requirements and, especially, anticipated increase in revenues, by increasing educational budgets. 24/

These earmarking requirements that the federal, state, and municipal governments spent at least some specified minimum percentage of revenues on education should lead to increased educational expenditures, which may be translated into additional funding for secondary education. There is no evidence yet on the effects of the Emenda Calmon on state and municipal educational spending. As noted earlier, federal outlays on secondary

22/ Gomes (1988).

23/ There is, however, ample opportunity for the states and municipalities to subvert constitutional intent by recategorizing expenditures as educational.

24/ The state of Ceara, for example, is planning to increase education's share of the state budget from 17 percent in 1988 to 25 percent in 1989. This is partly in response to an anticipated 83 percent increase in federal transfers.

education have already increased in 1987 and 1988, but the clear priority at the federal level has been improving technical/vocational education, especially in the federal schools. There is no prospect for increased transfers to the states to either expand or improve secondary education. If anything, anticipated reductions in federal revenues may be translated into reduced secondary education transfers.

Another factor which may influence federal government secondary education outlays is a transition paragraph in the new constitution which requires that 50 percent of federal education spending over the transition period (ten years) be allocated to primary education. If this paragraph is implemented, funds available for secondary education could be reduced.

E. Distributional Considerations

Access to secondary education is not equally distributed in Brazil. As shown in Table 6, gross enrollment rates are higher than the national average in the Southeast and South and lower than the national average in the North and Northeast. Surprisingly, public secondary education's share of total education expenditures is exactly the inverse of the enrollment pattern. The North and Northeast have secondary education expenditure shares higher than the national average, while the Southeast and South have expenditures lower than the national average. ^{25/}

Opportunities for secondary education as measured by enrollment rates are more unequally distributed across regions in Brazil than is true of primary education. For example, the secondary education enrollment rate in the Northeast is only 81 percent of the national average, but the primary education enrollment rate in the Northeast is ninety percent of the national average.

While educational opportunities in terms of access are unequal between regions within Brazil, they are even more unequal between different income groups. As shown in Table 8, families having less than two minimum salaries income represent 44.4 percent of all families but only 11.6 percent of all students in secondary schools. On the other hand, families having more than five minimum salaries represent 22.3 percent of all families and 53.4 percent of all students.

^{25/} One must be cautious in comparing secondary education's share of education spending between states or regions as primary and secondary education often share facilities as well as administrative personnel, and cost accounting conventions vary by state.

Table 8

Distribution of Families and Students by Income Group
(for children age 7 and above attending school)

Income Classification	Distribution of Families by Income Group	Distribution of Students Who Work by Family Income Group	
		Public Education	Private Education
< 1 minimum salary		3.4%	2.7%
1-2 minimum salaries	--- 44.4%	10.2	8.9
2-5 minimum salaries	--- 30.8%	38.0	33.9
5-10 minimum salaries		31.0	30.3
> 10 minimum salaries	--- 22.3%	16.2	23.1
Total	100.0%	100.0	100.0

Source: IBGE, Anuario Estatístico do Brasil, 1983; PNAD, 1982.

F. Conclusions and Policy Issues

The above analysis leads to the following conclusions:

- * Brazil's investment, especially its public investment in secondary education is small relative to other Latin American countries;
- * secondary education spending has decreased in real terms since 1980 but has recovered somewhat from the low spending levels of 1985;
- * the private sector plays an especially important role in Brazilian secondary education, both in terms of providing and financing education;
- * unlike primary education, federal transfers play a relatively unimportant role in financing secondary education provided by other levels of government;
- * federal expenditures on secondary education heavily emphasize technical/vocational education;

- * technical/vocational education in Brazil is very expensive relative to general secondary education;
- * earmarking provisions in the new Constitution may lead to increased educational spending in general, including increased spending at the secondary level;
- * opportunities for secondary education are less equally distributed than those for primary education and are very unequally distributed across income groups within Brazil.

These conclusions and the supporting analysis raise several policy questions, most of which require further study prior to offering firm policy recommendations. Among the important policy questions regarding finance of secondary education are the following:

1. Should Brazil increase its investment in secondary education, perhaps by increasing secondary education's share of total public education spending?
2. How should investment in secondary education be increased--through increased outlays on public education or increased subventions to expand the supply of private education; by expanding general secondary or technical/vocational education? To date the federal government has acted to expand technical/vocational education, 26/ especially in the public sector. The fact that per pupil expenditures in SENAI and the federal technical schools are eight times per pupil expenditures in state secondary schools, which primarily offer general education, reveals the high budgetary cost of expanding technical/vocational education.
3. Should federal transfers be increased in size to stimulate a larger supply of secondary education by the states and private sector; should those transfers, also, be reoriented from technical/vocational to general secondary education? Direct federal expenditures in 1985 were Cz\$ 7.5 billion and resulted in the instruction of less than 100,000 students. If transferred to the states, this same expenditure would have educated almost 750,000 students. Increased transfers to both

26/ Recently introduced changes in the federal income tax have eliminated the educational deduction, thereby increasing the after-tax price of private education relative to public education.

the states and private schools accompanied by incentives (e.g., matching grants) might increase the supply of secondary education still more.

4. Should enforcement of Constitutional earmarking provisions for education be encouraged and strengthened as a means of increasing secondary education investments, or should earmarking and its enforcement be discouraged as poor public finance policy in general?

5. Should equality of opportunity for secondary education be increased across regions and income groups, perhaps by changing funding priorities from expensive technical to less costly general secondary education? Had federal funds been used to fund state-provided secondary education rather than federal technical education, the overall secondary education enrollment rate could have increased from 19.7 percent to 23.8 percent. In other words, the enrollment rate in all regions could have been increased to that (23%) found in the Southeast region. Similarly, disparities in opportunities between income groups could be significantly reduced through reallocation of federal secondary education expenditures.

Table A
Total Post-Primary Education and Training in Brazil, 1983

<u>Hours</u>	<u>Enrollment</u>	<u>Annual Hours</u>	<u>Student-Program</u>
		<u>Graduates</u>	<u>Per Course</u>
<u>Academic/Technical</u>			
Federal			
Agricultural (EATF)	13,554	1,187	16,088,598
Industrial (ETF)	55,313	1,187	65,656,531
State	1,574,752	900	1,417,276,800
Municipal	137,716	900	123,944,400
Private			
Secondary Schools	1,129,845	900	1,016,860,500
Vestibular Cursinhos	n.a.		
SENAI			
Habilitacao Program		1,413*	
SUBTOTAL	2,911,180 (46.1% of total)		2,639,827,000 (188.1% of total)
<u>Vocational Training</u>			
SEFNAC	946,975	746,787	62
SENAI	496,561	400,825	249
103,698,231			
SENAR	152,544	152,544	10
FUNCEP	3,603	3,204	107
MPAS	301,000	283,006	200
Ministry of Agriculture (EMBRATER, CEPLAC)	189,174	171,704	95
Ministry of Industry and Commerce (PLANALSUCAR)	636	590	45

Table A (cont'd)
Total Post-Primary Education and Training in Brazil, 1983

<u>Hours</u>	<u>Enrollment</u>		<u>Annual Hours</u>	<u>Student-Program</u>
			<u>Graduates</u>	<u>Per Course</u>
<u>Academic/Technical</u>				
Ministry of Communications (TELEBRAS, ECT)	9,528	9,514	100	546,424
<u>Private Schools</u>	n.a.	n.a.	n.a.	n.a.
Curso Livre <u>Private Enterprises</u>	211,602	202,833	108	21,760,981
Acordos de Insencao Lei	1,193,392	1,193,392	108	128,896,340
Double-Counting 546,425	101,111	90,670		
SUBTOTAL	3,403,994	3,073,729	95	356,729,445
<u>TOTAL</u>	6,315,174 (100%)			2,996,556,000 (100%)

* SENAI/Sao Paulo.

Source: Paul Ammann, *As Teorias e a Pratica da Formacao Profissional*,
Ministerio de Trabalho, Brasilia, 1987; MEC/SEEC; SENAI.

Table B
Education Expenditures by Region, 1986
(in Cruzados of 1987)

<u>Category of Expenditure</u>	<u>BRAZIL</u>	<u>North</u>	<u>Northeast</u>	<u>Southeast</u>	<u>South</u>	<u>CenterWest</u>
Total State Government Expenditures (billions)	1,234.8	55.4	227.5	643.7	203.6	104.7
State Government Education Expenditures (billions)	244.7	11.8	42.9	130.6	40.9	18.4
State Government Secondary Education Expenditures (billions)	21.8	1.8	6.6	6.7	4.1	2.6
Federal PTA Transfers to States for Regular Secondary Education (millions)	326.0	25.1	158.2	101.1	22.1	19.4
Federal PTA Transfers to States for Adult Secondary Education (millions)	56.9	25.2	18.1	10.1	6.2	7.1
Federal PROTEC Transfers to States for Secondary Education in 1987 (millions)	1,174.8	195.1	255.4	287.5	391.6	45.3
Federal FAE Transfers to Individuals (millions)	141.2					
Federal FAE Work Scholarships (millions)	73.7					
Federal Agricultural Schools (millions)	1,901.3					
Federal Industrial Schools (millions)	3,770.0					
Total Secondary School Enrollments, 1986 (thousands)	3,142.6	131.8	745.2	1,552.2	504.3	209.2
Population Aged 15-19	15,918.3	908.9	4,640.0	6,748.5	2,508.6	1,112.3

Source: SEEC/MEC, Balancos Gerais da Uniao; IPEA, Relatorio Anual de Acompanhamento--1987.

Table C
Sao Paulo Secondary Education Expenditures, 1986
(millions of Cruzados of 1987)

		<u>Percent of</u> <u>Total Expenditures</u>
TOTAL EXPENDITURES ON		
SECONDARY EDUCATION	3,863	
Recurrent Expenditures	3,610	93.5%
Salaries	3,311	85.7
Teachers	2,733	
Administrators	413	
Others	166	
Books & Supplies	.0	
Food Program	59	
Health Program	3	
Building Maintenance	237	
Capital Expenditures	253	6.5
Construction	205	
Repairs	32	
Misc.	16	
		<u>Percent of</u> <u>Total Revenues</u>
TOTAL REVENUES FOR	55,581	
ALL EDUCATION*		
State General Revenues	46,707	84.0%
Education Salary Tax	7,492	13.5
Own-Source Revenues	1,095	2.0
Federal Transfers	287	0.5

* excluding borrowing

Note: total expenditures on primary education in 1986 was Cz\$ 49,644 million.

Source: Secretaria da Educacao, Sao Paulo.

Table D
Sao Paulo Secondary Education Expenditures and Enrollments
(state schools only; in Cruzados of 1987)

Year	Expenditures (billions)	Enrollments (millions)	Expenditures Per Pupil
1980	2.66	416,216	6391
1981	2.62	436,920	5997
1982	2.53	462,916	5465
1983	3.15	486,489	6475
1984	1.94	515,239	3766
1985	2.38	545,372	4364
1986	3.68	552,277	6664
1987	3.48	539,397	6452
1988		539,809*	

Source: Secretaria da Educacao, Sao Paulo.

Table E
Unit Costs in Secondary Education in Sao Paulo
(in Cruzados of 1987)

	<u>Public</u>	<u>Private</u>	<u>SENAI*</u>
Direct Recurrent Costs			
SEE			
1 & 2	5,030		7,193
Paro			
1 & 2	9,443		
2 only			13,551
Braga			
1 & 2		16,740	
2 only		14,353	
SENAI			
total			61,737
textiles			52,728
plastics			145,226
graphic arts			105,617
ceramics			96,960
mechanics			38,719
precision mechanics			50,284
metallurgy			39,847
Capital Costs			
Paro			
1 & 2		1,729	
2 only	6,191		
Braga			
1 & 2		10,703	
2 only		12,070	
Personnel Costs			85.7%
% of Total			
Current Costs			
SEE	89.9%		
Paro	96.5%		

*Annual cost per student enrolled in Habilitacao Profissional in 1985.

Sources: Paro (1982); Secretaria de Estado da Educacao (Sao Paulo); Braga and Cyrillo (1988); SENAI/Sao Paulo, 1987.

Notes to Table E

There have been several studies of the costs of secondary education in Sao Paulo state; unfortunately, they vary in terms of methodology, sample, and time of data collection, thereby making it difficult to compare the unit costs of different types of institutions.

The Secretaria de Estado da Educacao (SEE) carried out a study of the direct and indirect costs of education as its contribution to a national study of unit costs conducted under the auspices of a World Bank loan to the Ministry of Education. While the national study focused on primary schools, the Sao Paulo also included secondary schools in its sample. Data were collected at three different dates: April 1985, September 1986, and July 1987; high inflation combined with sharp changes in real teacher salaries result in very different nominal and real unit costs over time. The data reported in Annex 7 come from the private and public (i.e., state) secondary schools included in the SEE sample; these schools may not be representative of Sao Paulo. The only cost data included are personnel and school materials; indirect administrative costs (of SEE) and capital costs are ignored. While these data are, thus, incomplete and not necessarily representative, they do have one advantage over the other studies reported here: they include both public and private secondary schools in the same sample thereby permitting a comparison.

The study by Paro (1982), also, included a sample of primary and secondary schools but of the public sector only. The sample included twenty-eight schools offering secondary education; data on both recurrent and capital costs were collected in December 1980 or January 1981. Only equipment and building values were included in capital costs due to the lack of information on actual land values. Building values were set at the cost of new construction, and the annual rent was imputed as 1/35th of the building value. Equipment values were not directly measured but, rather, were estimated based on educational standards for primary schools; equipment was assumed to have a useful life of 6.6 years. The strong assumptions employed in calculating capital costs in this study and the unknown biases in the resulting numbers suggest caution in interpretation.

The study by Braga and Cyrillo (1988) surveyed a sample of private primary and secondary schools during the 1985 school year. The survey relied on the proprietors of the private schools to report the value of land, buildings, and equipment. These capital costs were found to be high, primarily due to high land values for schools located in urban areas. The Braga and Cyrillo study is the only one of those reported here to report relatively complete and accurate estimates of capital costs.

Finally, the Sao Paulo SENAI district has calculated the recurrent costs of secondary school instruction for different technical fields for all schools in the SENAI system. Since SENAI personnel as well as facilities are frequently used for a variety of training and instructional

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activities, costs were allocated according to the proportion of faculty time spent on secondary education; the determination of how faculty spend their time is carefully done, and the estimates of recurrent unit costs can be regarded as quite accurate. The omission of capital costs from these calculations, however, is serious. The high quality of SENAI facilities and the high capital costs usually associated with technical education suggest unit capital costs are likely to be much higher than those found for general secondary education in the Braga and Cyrillo study.

Each of the studies reviewed provides useful information, while no one study answers all relevant questions. The SEE study does not yield representative results but is the only study to allow a comparison of recurrent costs in public and private schools; unit costs in private schools are found to be about forty percent higher than in public schools. The Paro study provides a more representative estimate of unit costs in public secondary schools, and they are considerably higher than that found in the SEE study. The Braga and Cyrillo study provides a representative estimate of unit costs in private secondary schools; they are higher than those Paro found for public secondary schools. The Braga and Cyrillo study is the only one to provide a believable estimate of capital costs, and these are found to be as much as forty-six percent of total unit costs in secondary education ^{27/} and considerably higher than the capital costs estimated by Paro (which excluded land values). Finally, the SENAI results demonstrate the recurrent unit costs of technical education are between three and ten times those of general education.

^{27/} The respondents to the survey, however, had an incentive to overstate capital costs if they thought the results might be used in influencing public policy regarding private school tuition. Maximum tuition charges are set by allowing a "fair" return on capital investment.

Table F .

Secondary Education Expenditures (Current + Capital)
Per Pupil, by Provider and Program, 1985
(in constant Cruzados of 1987)

Government and Program	Total Secondary School Expenditures (billions)	Total Secondary Enrollments	School Cost/ Student
Federal, Total	7.5	99,422	75,436
• Agriculture Schools	(1.5)	13,664	109,778
• Industrial Schools	(3.2)	54,089	59,162
State, Total	18.0	1,780,155	10,111
Municipal, Total	0.7	132,333	5,290
SENAI	0.7	7,543	86,823
Private Schools*	14.2	1,004,228	14,155
TOTAL	45.8	3,023,681	

* Private school expenditures per student are calculated as 1.4 times the expenditure per pupil in state secondary schools, based on cost analyses for the state of Sao Paulo; see Table E.

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Table G

Secondary Education Expenditures by Level of Government, 1975 - 1985
(billions of 1987 Cruzados)

	<u>1975</u>	<u>1980</u>	<u>1985</u>
Federal 1/	5.3	8.7	7.5
State	20.2	21.0	18.0
Municipal	0.2	0.8	0.7 2/
Total	25.8	30.5	6.2
Total Number of Secondary School Students (millions)	1.9	2.8	3.0
Number of Secondary School Students in Public Schools (millions)	n.a.	1.5	2.0
Expenditure Per Public Secondary School Student (Cruzados)	n.a.	20,222	13,022

1/ excluding transfers

2/ estimated

**DEMAND FOR AND SUPPLY OF PRIVATE SECONDARY
EDUCATION IN BRAZIL 1/**

A. Role of the Private Sector

Private education plays an especially important role in Brazil. Twelve percent of primary school pupils, 34% of secondary school pupils, and 59% of university pupils are enrolled in private institutions. In addition, large numbers of students are enrolled in private pre-schools, private "cursos livres" offering instruction ranging from hair cutting to computer programming, and "cursinhos" which prepare secondary school graduates to take university entrance ("vestibular") examinations. 2/ Overall, the private education sector can be accurately described as dynamic, innovative, and heterogenous in terms of the quality of instructional services. Private education can be either non-profit or for-profit, and entrepreneurs have in the past found the returns sufficiently high to undertake sizeable investments in the sector.

Private Market Share

The percentage of students enrolled in private secondary schools has declined considerably during the 1980s, from 46.5% in 1980 to 33.3% in 1985. This decline is attributable to two phenomena: (i) the economic crisis that reduced personal incomes and, thus, decreased demand for private secondary education and (ii) an increase in the supply of public secondary education. Table 1 shows that after enjoying a relatively stable or growing share of secondary school enrollments in the 1970s, the private sector has suffered a serious decline in every region of the country since 1980.

1/ This Annex was prepared by Donald Winkler.

2/ In Sao Paulo alone, about 8900 private educational establishments are registered with the Private School Syndicate. Approximately half offer "cursos livres," one-quarter are pre-schools, and the remaining one-quarter offer either primary or secondary education.

Table 1

Private Share of Enrollments in Secondary Education
by Region, 1970 - 1985*

	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
BRAZIL	45.1%	45.3%	46.5%	33.3%
North	38.3	31.7	31.8	17.5
Northeast	43.2	42.0	45.3	34.1
Southeast	49.1	50.0	53.5	36.7
South	38.5	40.4	33.2	30.3
Center-West	30.6	1.2	36.8	23.1

* Enrollments at the beginning of the school year; the private share of enrollments computed on the basis of year-end enrollments shows a similar trend over time but the reduction in private share is not as large, decreasing nationally from 45.4% in 1970 to 37.7% in 1985.

Source: MEC/SEEC data.

The private sector share is, however, still very important. At current unit costs (expressed in 1987 purchasing power), the public sector would have to increase its spending by US\$ 275 million were it to decide to completely finance all private secondary school instruction. ^{3/} Another way of looking at the importance of private secondary education is given in Table 2. The secondary education gross enrollment rate was 21% of the 15-19 age group in 1985. Were the supply of private secondary education to abruptly disappear, public secondary schools could only educate 14.1% of the age group, approximately equal to the level of educational opportunity available in 1975.

^{3/} Private secondary schools enrolled almost 1.1 million students in 1986, and the per pupil expenditure in state-operated schools was US\$ 257.4 (in 1987 prices).

Table 2

Gross Enrollment Rates Including and Excluding Private
Secondary Education Enrollments by Region, 1970 - 1985

	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
BRAZIL				
Public and Private	9.8%	16.6	20.8	21.0
Public Only	5.4	9.1	11.1	14.1
North				
Public and Private	6.7	12.3	16.1	15.1
Public Only	4.1	8.4	11.0	12.5
Northeast				
Public and Private	6.0	10.2	13.9	15.8
Public Only	3.4	5.9	7.6	10.4
Southeast				
Public and Private	13.3	21.3	26.0	25.4
Public Only	6.8	10.7	12.1	16.1
South				
Public and Private	9.4	16.1	21.9	22.4
Public Only	5.8	9.6	14.6	15.6
Center-West				
Public and Private	8.1	14.2	18.6	20.2
Public Only	5.6	9.8	11.8	15.5

Source: MEC/SEEC data.

As shown in Table 3, the private sector share does increase with family income level, but a high proportion of students from even the lowest income quartile attend private schools. The heterogeneous quality of secondary education results in the provision of both low-cost instruction to low income families and high-cost instruction to high income families. As a ratio of per capita family income, the cost of private education does not vary greatly by income quartile.

Table 3
Private School Shares, Tuition Charges, and Family Income
by Income Quartile, 1982

	<u>Income Quartile</u>				
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>	<u>Total</u>
Percent of Students Enrolled in Private Secondary Schools	28.8	30.7	34.4	51.0	43.0
Average Monthly Private Secondary School Tuition Paid in 1982 (US\$)	7.36	12.13	19.07	41.96	33.58
Average Per Capita Family Income of Children in Private Secondary Schools in 1982 (in US\$)	30.50	46.94	83.52	255.67	193.79
Ratio of Tuition to Per Capita Family Income	0.241	0.258	0.228	0.164	0.173

Source: Annex A.

B. Demand for Private Education

Private education is typically supplied in one of two situations: (i) excess demand for education exists given the public supply or (ii) public supply fails to satisfy the demand for heterogeneous quality levels. ^{4/} Private secondary education in Brazil thrived initially due to excess demand; the public sector failed to provide sufficient student-places. Private secondary education still exists in part because the public sector fails to provide secondary schools and teachers; this is especially true in the rapidly-growing periphery of urban areas. Increasingly, however, private education exists because large numbers of families are dissatisfied with the perceived quality of public education.

Several factors, of course, simultaneously influence the demand for private education: the availability of free public education, the relative quality of private education, family income, and private school tuition levels. Data do not exist to estimate a formal model of private school demand and supply, but the basic model can be used to verbally analyze enrollment trends in recent years.

^{4/} See James (1987).

Availability of Free Public Education

The supply of public secondary education has increased considerably in recent years. As long as demand continued to increase apace this presented little threat to private school enrollments. But as overall demand stagnated in the early 1980's, increased public supply was reflected in decreased demand for private secondary education.

As shown in Table 2, the overall secondary education participation rate barely changed between 1980 and 1985, yet the private sector share diminished significantly. Table 4 demonstrates this for each region in Brazil. Overall, public secondary education enrollments increased by 420,000 between 1980 and 1985, while private school enrollments decreased by 306,700 in the same time period. Over the 1980-84 time period, the annual enrollment growth rate was -6.1% for private schools and +6.2% for public schools.

Table 4

Private Market Share in Secondary Education, 1985

<u>Region</u>	<u>Percent of Establishments</u>	<u>Percent of Enrollments</u>	<u>Change in Private Enrollments 1980-1985</u>	<u>Change in Public Enrollments 1980-1985</u>
North	27.1	17.5	-11,100	+33,900
Northeast	49.8	34.1	-17,100	+151,400
--Ceara	66.8	47.4		
Southeast	46.7	36.7	-249,000	+253,800
--Sao Paulo	35.4	30.6		
South	42.3	30.3	-16,300	+10,800
Center-West	21.7	23.1	-13,200	+53,800
BRAZIL 1/	43.9	33.3	-306,700	+420,000

1/ Annual enrollment growth for the period 1980-1984 was -6.1% for private schools and +6.2% for public schools.

Source: MEC/SEEC, Sinopses Estatísticas de Ensino do 2 Grau.

The public sector can expand the supply of secondary education relatively easily and at low unit costs by offering night session secondary instruction in buildings which are used for primary school instruction during the day. Sao Paulo adopted this policy in the early 1970s, and the results can be seen in Table 5. The private share of day session enrollments declined by 5.1 points between 1980 and 1985, while its share of night session enrollments decreased by 12.2 points. Furthermore, the private share of night session enrollments has not grown since 1985, in contrast to day session enrollments. While this may reflect several factors, the most plausible hypothesis is that the supply of public secondary school instruction has continued to increase much more rapidly in night than day sessions.

Table 5
Private Share of Enrollments in Secondary Education
in The State of Sao Paulo, 1960-1987

<u>Year</u>	Private Share of <u>Total Enrollments (%)</u>	Private Share of <u>Total Day Session Enrollments (%)</u>	Private Share of <u>Total Night Session Enrollments (%)</u>
1960			
1970	37.3		
1975	39.0		
1980	40.6	42.3	39.4
1981	38.7		
1982	35.3	39.0	33.0
1983	33.3	37.3	30.9
1984	31.1	35.9	28.3
1985	30.8	37.2	27.2
1986	32.8	41.1	28.2
1987	35.1	45.1	29.7
1988*	32.8	46.9	26.3

*preliminary data

Source: Annex Table C.

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Excess demand for public education is unlikely to be a primary cause of enrollment growth in private education over the next decade for several reasons. First, there is apparently some excess supply of public school places at present, in part because enrollment capacity and population growth are not located in the same place. Second, total secondary education enrollments are projected to grow at a moderate annual rate over the next decade, and the percent of the 15-19 year old age group attending secondary school is expected to grow only slightly. The modest growth projections reflect, in part, the fact that a high proportion (72-77%) of primary school graduates already enroll in secondary education.

Relative Quality of Private Education

Increasingly private education is demanded because of perceived differences in the quality of instruction. Educational observers in Brazil note the shift in enrollments by upper income families away from public to private secondary schools over the past two decades as reflecting perceived changes in the relative quality of private schools. This shift in demand is not unique to Brazil; as participation rates in public education increase, the average level of knowledge of entering students decreases, and public education is perceived to decline in quality. This perception of higher quality private education appears to exist among all income groups in Brazil, which explains in part why surprisingly large numbers of lower income parents send their children to low-cost, low-tuition private schools over no-tuition public schools.

Perceptions of quality differences do have some basis in fact. Pass rates on university entrance examinations, for example, tend to be higher for graduates of private secondary schools, and graduates of public secondary schools are more likely to need to take additional coursework ("cursinho") to pass the vestibular exams. ^{5/} Private school quality is also perceived as being higher due to the lower frequency of strikes and resulting longer effective school-year than is often found in the public sector. Student-teacher ratios are not, however, necessarily smaller in

^{5/} FUVESP, the organization which administers university entrance examinations for the University of Sao Paulo, reports a pass rate (in 1988) of 9.1% for private school graduates versus 4.4% for municipal secondary school graduates, 5.4% for state secondary school graduates, and 15% for the small number of graduates of the federal technical schools. FUVESP also reports that taking a preparatory "cursinho" makes almost difference in the performance of private school graduates but a large difference in the performance of public school graduates. In 1987, for example, only 3.2% of public school graduates not having a "cursinho" passed the university entrance examination compared with an 8.1% pass rate for those having taken a "cursinho".

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private schools. 6/ Finally, quality may be perceived as higher due to the lower dropout rate during the school year: in 1984 23.7% of students entering public secondary schools dropped out by year's end; the corresponding number for private secondary schools was 14.4%. 7/

Law 5692 to Law 7044

According to Brazilian scholars, the catalyst in altering popular perceptions about the relative qualities of private and public education was Law 5692 passed in 1971. 8/ Law 5692 required the vocationalization of secondary education in Brazil; all pupils were to receive practical, vocationally-oriented training in addition to more academic, general education. The law was widely implemented in public secondary schools, but was not rigorously enforced in private schools. 9/ The result was public schools having a stronger vocational orientation than the private schools.

The move to vocationalize secondary education was egalitarian in the sense of preparing everyone for practical work, but it was also unrealistic in that most parents send their children to secondary school in order to gain admission to college. 10/ The result was that parents began to view private secondary education as doing a better job at providing the knowledge required to gain admission to good quality universities. Access to high quality, free public universities became worth the investment in private secondary education.

Law 5692 served to increase the demand for private secondary education but, more importantly, changed the reputation and perceived quality of private education. Hence, when Law 7044 was passed in 1982

6/ See Annex Table B, which shows the student-teacher ratio as being only slightly smaller in private than public secondary schools in Brazil in 1984.

7/ Of course, none of these perceived differences in output are necessarily attributable to more school resources or higher effectiveness in private schools. Higher output in private schools may simply reflect the socio-economic and motivational characteristics of the children enrolled.

8/ See, for example, Luscher and Mafra (1986).

9/ Ambiguity in the definition of vocational education and variation in the ways in which such education can be provided made enforcement difficult in any case.

10/ This was even more true in the early 1970s, when the secondary education enrollment rate was lower.

rescinding universal, obligatory vocational education no immediate shift occurred either in terms of instructional content of the public schools or in demand for public secondary education. Law 5692 did not in and of itself cause the shift in demand by higher income groups for private education, but it helped to speed the process.

Incomes

In addition to the availability of free public secondary education and the perceived relative quality of private education, income and prices play an important role in affecting demand for private secondary schools. Part of the decline in private enrollments between 1980 and 1985 can be attributed to the economic crisis which reduced real family income. As seen in Table 5, recent enrollment data for Sao Paulo indicate an increase in the private school share of total secondary enrollments since 1985; all of the increase, however, is due to growth in daytime enrollments.

Day sessions and night sessions appear to be two distinct secondary education markets. More than half (56%) of all secondary school students attend night sessions. Higher income families, however, are more likely than lower income families to send children to private schools, and a majority of children from higher income families attend day sessions. Most children from lower income families on the other hand attend night sessions; As shown in Table 6, one explanation for the large number of students attending night sessions is the high proportion of students who work.

Table 6

Income Distribution, Enrollment Shares, and Work Experience
in Secondary Education, 1982

Income Classification	Percent of Students in Private Education	Percent of Students in Secondary Education Who Work
< 1 minimum salary	29.0%	25.3%
1-2 minimum salaries	34.9	41.0
2-5 minimum salaries	36.2	43.8
5-10 minimum salaries	41.9	45.5
> 10 minimum salaries	60.2	31.3

Source: IBGE, Anuario Estatístico do Brasil, 1983; PNAD, 1982.

Private School Tuition

Another factor which may explain resumed growth in private secondary education enrollments since 1985 is lower real prices. The Plano Cruzado froze private school tuitions at relatively low levels, and subsequent price controls kept real tuition levels low.

Table 7

Private School Monthly Tuition Rates in Sao Paulo, Ceara and Parana
by Type of Secondary School, 1987 and 1988
(in current cruzados)

<u>SCHOOL</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>TYPE OF</u>
Sao Paulo 1/				
. General Education	1	43,041	3,233	
. Teacher Training	1,937	8,980	3,924	
. Technical				
Accounting	1,408	6,480	3,234	
Data Processing	3,043	8,600	5,886	
. Adult Education (supletivo)	1,807	6,760	3,852	
Ceara (March 1988) 2/				
. Fortaleza Only				
1st and 2nd years	926	7,630	4,267	
3rd year	926	9,219	5,078	
. Interior Only				
1st and 2nd years	350	2,807	1,470	
3rd year	708	2,807	1,595	
. Total State				
1st and 2nd years	350	7,630	3,347	
3rd year	708	9,219	4,015	
Parana (November 1988) 3/				
. General Education	871	38,276	13,840	

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Sources:

Note: The same data converted into US dollars appears in Statistical Appendix Table 42 of the main report.

- 1/ Data from commissao de Encargos Sociais of the Conselho Estadual da Educacao for September 1987.
- 2/ Data from the Conselho Estadual de Educacao of Ceara, March 1988.
- 3/ Data from the Conselho Estadual de Educacao of Parana, November 1988.

There is no reliable information on how private school tuition levels have changed over time. There is evidence, however, of wide variation in tuition levels. Table 3 demonstrated how tuition paid varies with family income levels. Table 7 provides further evidence that tuition levels vary widely by location of school, type of education offered, and year of education. Tuition charges tend to be lower outside than inside the capital city, lower for the first two years than the final year of instruction, lower for teacher education and vocationally-oriented instruction than for general instruction, and lower for adult than regular instruction. There is, however, very substantial variation within each of these categories.

The price actually paid by parents deviates from published tuition rates for several reasons. First, the schools themselves typically offer discounts for families enrolling more than one child. Second, the schools offer some need-based partial or full scholarships. In Sao Paulo, 6-8% of all students receive scholarships, usually for the full amount of tuition. 11/ In Brasilia, on the other hand, approximately 20% of all private students are on scholarship. 12/ Third, until 1989 families who chose to itemize taxes could deduct a maximum of US\$ 641.5 (in 1987) in educational expenses per child from their taxable income. The value of this deduction depended on the family's tax rate, which varied from 5% to 60%; for families in the highest income category the after-tax price of private education was reduced by more than half. The elimination of this deduction has increased the relative price of private secondary education to current itemizers and can be expected to decrease the demand for private schooling. How large this effect might be, however, has not been studied.

Finally, the state and federal governments provide some scholarships for students to attend private secondary schools. The states (e.g., Ceara) sometimes provide scholarships for private schools where public schools do not exist (e.g., in fast growing areas of the periphery of Fortaleza).

11/ Braga and Cyrillo (1988).

12/ These are data self-reported by the private school syndicate-- Sindicato dos Estabelecimentos de Ensino do Distrito Federal, A Questao Salarial e a Realidade da Escola Particular no Distrito Federal, 1986.

These scholarships are usually large enough to pay only for low-cost private secondary education, and the schools may require students to pay an additional amount. 13/

The federal government provides private scholarships through the Educational Assistance Foundation (FAE--Fundacao de Assistencia ao Estudante); these scholarships can only be used in non-profit schools. In 1987 it funded 62,234 scholarships with a total value of US\$ 1.38 million; the value of each scholarship was thus less than one month's tuition charge at a low-cost private school. 14/

C. Regulation and Supply of Private Secondary Education

In 1969 the responsibility for regulating both public and private secondary schools was assigned to the state education councils (CEE--Conselho Estadual de Educacao). A year prior to opening, a new private school must register with the council, stating its curriculum, faculty qualifications, and tuition rate, which it is initially free to set. In principle, the council monitors all schools and assures they comply with all educational requirements and regulations. In practice, they only enforce regulations when confronted with consumer complaints. The council is composed of twenty-four individuals appointed by the governor; their positions are not full-time, and the council's staff is too small to consistently monitor and enforce regulations.

The Council assigns responsibility for regulation of tuition charges to a special price commission (Comissao de Encargos Sociais) which includes representatives from parents, students, public schools, and private schools. The rules adopted for regulating tuition charges vary from state to state. Parana simply allows tuition rates to rise with the consumer price index. Sao Paulo allows a 10% markup, and includes an estimate of depreciated capital in costs. Ceara allows a 10% markup; actual building rent but not imputed rent can be included as a cost. Brasilia allows a rental/depreciation charge equal to 8% of capital value and a 10% markup on total costs. Other rules exist with respect to what proportion of teacher salary increases can be passed on in the form of tuition increases.

Tuition price controls can reduce the quantity and quality of secondary education supplied privately if they are set lower than equilibrium market prices. The evidence is not clear for Brazil. The only careful study of the issue is provided by Braga and Cyrillo for Sao Paulo in 1985, who conclude that actual tuition charges are set by the market

13/ Relative to the total public secondary education budget, private school scholarship assistance is negligible; Ceara allocates less than one percent of its secondary education budget to scholarships.

14/ FAE, Relatorio 1987.

below the maximum prices set by the council. Other evidence suggests that tuition price controls do effectively constrain tuition charges. The Plano Cruzado, for example, required reductions in real tuition charges. In February 1988 the federal government removed all tuition price controls only to quickly reinstitute them when a large number of private schools responded by raising tuition levels.

The number of private secondary schools contracted slightly between 1980 and 1985, but not as sharply as the decline in enrollments, and there is some evidence of excess capacity in the sector. 15/ Braga and Cyrillo conclude that while most private schools more than cover their recurrent costs, few cover their capital costs fully, which discourages new private investments in schools.

In conclusion, tuition price controls have clearly been constraining at times in the past, but in general tuition levels appear to be more strongly influenced by market forces than binding price controls. The greatest harm done by price controls is to introduce an additional element of uncertainty into schooling investment decisions by entrepreneurs.

The new constitution will influence the supply of private education by increasing the price of labor (due to mandated worker benefits), possibly liberating price controls, and possibly increasing the supply of public education. 16/

D. Conclusions and Policy Issues

The private sector share of secondary education enrollments declined between 1980 and 1985, partly in response to increased public supply. At the same time, private schools have maintained a reputation for offering higher quality instruction than public schools. Neither of these trends is likely to be reversed in the long run.

Public policy affects private secondary education through (i) regulations, (ii) subsidies, and (iii) government competition. Aside from tuition charges, private education is not stringently regulated in Brazil,

15/ However, as noted earlier, there is also some evidence (see Table 5 for Sao Paulo) that private secondary school enrollments have begun to increase again since 1985.

16/ What the new constitution says about price controls is not yet clear; the private schools believe it eliminates them, while the state education councils believe not. The supply of public secondary education may increase as a result of increases in revenues earmarked for education, especially at the federal level.

perhaps because it receives so little funding. ^{17/} While tuition price controls are not always constraining, strong arguments can be made for their elimination. At a minimum, the existence of price controls makes it difficult for established schools to follow a strategy of simultaneously raising instructional quality, costs, and tuition charges. Also, by increasing uncertainty regarding future pricing policies, tuition price controls bring about some reduction in the supply of private secondary education.

The only important subsidy to private secondary education in Brazil has been the federal tax subsidy, which was eliminated in the recent federal income tax reform. This was a positive step as tax subsidies for education in a country such as Brazil, where only a small share of the population files personal income taxes, tend to be quite regressive. On the other hand, both efficiency and equity arguments can be made for targeted subsidies to private education. An efficiency argument is that a given amount of public funds expended in the form of subsidies can stimulate a larger supply of private education than can be directly provided by government. An equity argument is that subsidies can be targeted to lower income families, something which is difficult to accomplish through direct public provision.

Increased government supply of secondary education does not necessarily raise secondary education participation rates. The evidence for 1980-1985 in Brazil suggests that increased public enrollments were almost precisely offset by reduced private enrollments. To the extent this remains true, only ideological grounds provide a justification for increased government supply of secondary education.

Several policy recommendations follow from the above analysis:

1. Tuition price controls on private secondary education should be phased out to further stimulate private supply.
2. Government should introduce new programs to subsidize the private provision of secondary education; subsidies could be (i) institutional in the form of matching grants to cover capital construction costs and (ii) individual in the form of need-based scholarships (or vouchers) to students to attend private schools.
3. Given phased-out price controls and private sector subsidies, government should expand the provision of public secondary education only in special circumstances where the private sector response is for some reason inadequate.

^{17/} James (1987) notes the correlation across countries between the amount of public funding received by private schools and the amount of public regulation to which they are effectively subjected.

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These recommendations are consistent with the fiscal and educational environment currently facing Brazil--relatively low levels of national educational investment, constrained public expenditures for education, and a dynamic private education sector. These recommendations are not, however, consistent with the experience of many other countries, where the private sector share of secondary education enrollments declines as per capita income increases and public sector regulations increase with the level of subsidies to private schools.

The experience of other countries as communicated by James is either (i) low public regulation, low public subsidies, and low private market shares or (ii) high public regulation, high public subsidies, and higher private market shares. With only 37% of the age group currently enrolled in secondary education, Brazil's secondary education system will undergo dramatic changes in the future. It has the opportunity to develop its own unique model.

Table A

Secondary Education Statistics by Family Income Quartiles, 1982

	<u>Income Quartile</u>					
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>	<u>TOTAL</u>	
Percent of Students Entering Secondary School in 1982 Who Graduated From Public Primary School in 1981	66.1	63.3	69.8	79.0	72.3	
Percent of Students Entering Secondary School in 1982 Who Graduated From Private Primary School in 1981	60.5	62.4	74.9	81.8	77.4	
Percent of Students Enrolled in Private Schools	28.8	30.7	34.4	51.0	43.0	
Percent of Students Enrolled in Night Sessions	64.5	70.2	67.3	46.6	56.1	
Percent of Students in Public Schools Enrolled in Night Sessions	60.6	66.9	63.7	49.3	57.2	
Percent of Students in Private Schools Enrolled in Night Sessions		73.9	77.7	74.0	44.0	54.7
Average Age of Students Entering Secondary School	18.7	17.9	17.3	16.2	16.9	
Average Monthly Private School Tuition Paid in 1982 (US\$)	\$7.36	12.13	19.07	41.96	33.58	
Average Per Capita Family Income of Children in Private Schools in 1982 (in US\$)	\$30.50	46.94	83.52	255.67	193.79	

Source: Pesquisa Nacional por Amostra de Domicílios (PNAD), 1982.

Table B

Ratio of Students to Schools and Teachers in Secondary Education

	Students/ Schools	Students/ Teachers
Brazil (1984)		
Federal Schools	695.9	12.9
State Schools	416.9	15.5
Municipal Schools	195.8	12.6
Private Schools	244.2	
11.9		
Minas Gerais (1979)		
Public Schools	307.8	16.6
Private Schools	323.6	17.5
Minas Gerais (1973)		
Public Schools	221.0	10.8
Private Schools	174.7	
10.6		

Source: SEEC/MEC; Luscher and Mafra (1986).

Table C

Sao Paulo State Secondary School Enrollments
(in thousands)

Year Night	State		Municipal		Private	
	Day	Night	Day	Night	Day	Night
1975	181.4	132.4				
1980	174.8	241.4	3.0	14.4	130.5	166.5
1981						
1982	173.1	289.8				
1983						
1984	185.5	329.7	2.6	14.0	105.2	135.6
1985	184.3	361.1	1.8	14.2	109.8	140.2
1986	173.7	378.5	2.6	14.0	123.3	154.5
1987	162.7	376.7	2.3	13.9	135.7	165.4
1988	164.2	411.6	2.4	14.3	137.5	151.9

Source: SEE, Sao Paulo.

Table D

Tuition Rates and Family Income by Region, 1982
(in US\$)

	Monthly Tuition Charge Private Secondary Schools	Average Income Per Capita of Children in Private Secondary Schools
BRAZIL	\$33.58	\$193.79
. North	30.98	189.58
. Northeast	23.29	124.66
. Southeast	37.95	214.36
. South	29.55	191.61
. Center-West	38.23	236.23

Source: Pesquisa Nacional por Amostra de Domicilios (PNAD), 1982.

MODELO PARA PROJEÇÃO DA MATRÍCULA NO SEGUNDO GRAU - BRASIL^{1/}

A metodologia é constituída de duas fases. A primeira diz respeito ao ajuste do modelo, onde os parâmetros do modelo são estimados. A segunda é a fase de projeção, na qual o modelo estimado é usado para projetar as matrículas. Inicialmente a primeira fase será descrita, para depois então, explicar-se as projeções de matrículas.

Considere os seguintes valores e notações:

- M_p^t : matrícula no Primeiro Grau no ano t ;
 M_s^t : matrícula no Segundo Grau no ano t ;
 N_p^t : alunos novos no Primeiro Grau no ano t ;
 N_s^t : alunos novos no Segundo Grau no ano t ;
 a_{ij}^t : proporção de alunos do Grau i no ano t que no ano $t+1$ estará no Grau j (taxa de transição).

E' claro que o número de alunos matriculados num nível no ano $t+1$ é igual ao numero de alunos novos no ano $t+1$ adicionado do número de alunos matriculados neste nível no ano t que continuam no mesmo nível no ano $t+1$. Assim pode-se escrever

$$M_p^{t+1} = a_{pp}^t M_p^t + N_p^{t+1} ;$$
$$M_s^{t+1} = a_{ss}^t M_s^t + N_s^{t+1} = a_{ss}^t M_s^t + a_{ps}^t M_p^t ;$$

Conhecidos as matrículas no Primeiro e Segundo Grau nos anos t e $t+1$ e o número de alunos novos no ano $t+1$ é, então, possível estimar as taxas de transições (a_{ij}^t). Com isto tem-se o modelo ajustado que poderá ser usado para projeções de matrículas. As taxas de transições a_{ij}^t são calculadas como:

$$a_{pp}^t = (M_p^{t+1} + N_p^{t+1}) / M_p^t ;$$

$$a_{ps}^t = N_s^{t+1} / M_p^t$$

e

$$a_{ss}^t = (M_s^{t+1} + N_s^{t+1}) / M_s^t.$$

^{1/} This annex was prepared by João Batista Gomes-Neto.

Por outro lado se conhecemos a matriz de transição para o Primeiro Grau (no caso brasileiro é de 8 séries) podemos então estimarmos

$$a_{pp}^t = \frac{\sum_{i=1}^7 M_i^t}{M_p^t} (r_i^t + p_i^t) + r_8^t \frac{M_8^t}{M_p^t},$$

onde

M_i^t : matrícula na série i do Primeiro Grau no ano t ;

r_i^t : taxa de repetência na série i do Primeiro Grau no ano t ;

e

p_i^t : taxa de promoção da série i para a série $i+1$ do Primeiro Grau no ano t .

Esta última fórmula foi usada para estimarse a_{pp}^t , onde a matriz de transições para o Primeiro Grau foi estimada através do Modelo PROFLUXO, de Fletcher e Ribeiro.

Neste trabalho as matrículas no Primeiro e Segundo Grau foram obtidas das PNADs (Pesquisa Nacional por Amostra de Domicílios) do IBGE. Já os alunos novos no Primeiro e Segundo Grau foram obtidos usando-se as seguintes fórmulas:

$$N_p^t = T_p^t P_7^t,$$

e

$$N_8^{t+1} = P_8^t M_8^t,$$

onde,

T_p^t é a taxa de participação (de uma geração) na primeira série do Primeiro Grau e foi estimada em 90% através do PROFLUXO (Fletcher e Ribeiro), usando dados da PNAD de 1982;

P_7^t é a população de 7 anos de idade no ano t ; estes valores foram estimado através de uma regressão exponencial usando-se dados das PNADs de 1981 a 1987.

P_8^t é a taxa de promoção da oitava série do Primeiro Grau que se matriculará no ano seguinte na primeira série do Segundo Grau; esta taxa também foi estimada através do PROFLUXO usando a mesma PNAD de 1982; os valores obtidos foram de 60% (relação entre a matrícula inicial da primeira série do Segundo Grau e a matrícula inicial da oitava série do Primeiro Grau) ou 81% (relação entre a matrícula inicial da primeira série do Segundo Grau e o numero do concluintes do Primeiro Grau).

M_8^t é o número de alunos matriculados na oitava série do Primeiro Grau no ano t . Seus valores foram obtidos das PNADs de 1981 a 1987.

a_{pp}^t e a_{ps}^t foram estimados para os anos de 1982 e 1983. No modelo utilizam-se a média dos dois valores estimados a_{ss}^t foi estimado para os anos 1982 a 1986. Usam-se a média aritmética destes cinco valores estimados. Os valores obtidos foram:

$$a_{pp}^t = 88,8\%, a_{ps}^t = 3,4\% \text{ e } a_{ss}^t = 75,1\%$$

De posse do modelo já estimado e com a hipótese de que os alunos somente entram no sistema na primeira série do Primeiro Grau, podemos projetar as matrículas do Primeiro e do Segundo Grau, desde que se saiba o número de alunos novos no Primeiro Grau. Utilizando-se o valor da taxa de participação na primeira série do Primeiro Grau estimada em 90% por Fletcher e Ribeiro através do PROFLUXO, e supondo que esta participação não mude ao longo do tempo, pode-se estimar os alunos novos no Primeiro Grau desde que se projete a população de 7 anos de idade. A projeção da população de 7 anos foi obtida através de uma regressão exponencial usando-se dados das PNADs de 1981 a 1987.

Como as PNADs excluem a Zona Rural da Região Norte, é importante frisar que as projeções aqui consideradas também excluem esta Zona. Isto, porém, não invalida os resultados, tendo em vista que, de acordo com o Censo de 1980, esta Zona corresponde apenas a 3.5% da população total do país.

Usando o modelo estimado (i.e., $a_{pp}^t = 88,8\%$, $a_{ps}^t = 3,4\%$, $a_{ss}^t = 75,1\%$ e $T_p^t = 90\%$) tem-se na tabela I a projeção de matrículas no Segundo Grau para o Brasil no período de 1990 a 2010.

Tabela I - Matrícula no 2o Grau
Brasil 1990 - 2010

Ano	Matrículas (em mil)
1990	3477
1995	3848
2000	4371
2005	5060
2010	5917
