

# **Sector Study for Education in Brazil**

## **Summary**

November 2005

### **Consortium of:**

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Tendências Consultoria Integrada

Núcleo de Estudos de Políticas Públicas da Universidade Estadual de Campinas

**For**

**Japan Bank for International Cooperation**

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## Acronyms

CEB	Basic Education Council
CEFET	Federal Technical Education Centres
CET	Technological Education Centres
CNE	National Education Council
CONAES	National Committee for Evaluating Higher Education
EAD	Distance Education
EJA	Education of young people and adults
ENADE	National Student Performance Examination
ENEM	National Secondary School Examination
FUNDEB	Fund for Development of Basic Education and Enhancement of Education
FUNDEF	Fund for the Development of Fundamental Education and Enhancement of the Teaching Profession
GDP	Gross Domestic Product
HEI	Higher Education Institution
HRCT	Human resources in science and technology
IBGE	Brazilian Institute of Geography and Statistics
IDB	Inter-American Development Bank
IFES	Federal Higher Education Institution
IMF	International Monetary Fund
INEP	Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Anísio Teixeira National Institute for Educational Studies and Research)
INPC	National Consumer Price Index
INPI	National Institute of Industrial Property
IPCA	Extended Consumer Price Index
IPEA	Institute of Applied Economic Research
ISI	Institute for Scientific Information
LDB	Law of Guidelines and Foundations of National Education
MEC	Ministry of Education
NOG	Non-Governmental Organization
NSI	National Science Indicators
OECD	Organization for Economic Cooperation and Development
PAAIS	Affirmative Action for Social Inclusion
PAS	Process of Continuous Evaluation
PCN	National Curricular Parameters
PEC	Proposals for Amendments to the Constitution
PISA	Program for International Student Assessment
PNAD	Brazilian Household Surveys
PNE	National Education Plan
PROEP	Programme for the Expansion of Professional Education
ProUni	The University for all Programme
SAEB	Basic Education National Evaluation System
SAT	Scholastic Aptitude Test
SENAC	National Commerce Service
SENAI	National Industry Service
SINAIS	National Higher Education Evaluation System

## 1. Overview of the education sector

### 1.1. Achievements and Challenges<sup>1</sup>

The educational situation in Brazil in the middle of the last decade of the 20<sup>th</sup> century can be summarized as follows:

- Basic Education:
  - 87.5% of children in school; 12.5% not in school
  - 17% of the population age 15 or over were illiterate
  - 25% of children in the Northeast were not in school
  - 25% of poor children were not in school
  - 20% of black children were not in school
  - Juvenile illiteracy (15 – 19 years old): Brazil: 6.8% - Northeast: 16.3%
  - The difficulty poor children had in entering compulsory primary education
  - High rates of repetition and dropout, resulting in a negative impact on the flow through school
  - Low quality of teachers and absence of adequate teaching materials
- Vocational and Higher Education:
  - Vocational education system was extremely small
  - Higher education system coverage was too modest
  - Accreditation of new institutions was a heavily bureaucratic and paper-laden process
  - Low-quality system where competition was nonexistent
  - Captive markets earned education entrepreneurs huge profits;
  - No comprehensive system to evaluate undergraduate education;
  - Inefficient use of public funds by federal institutions

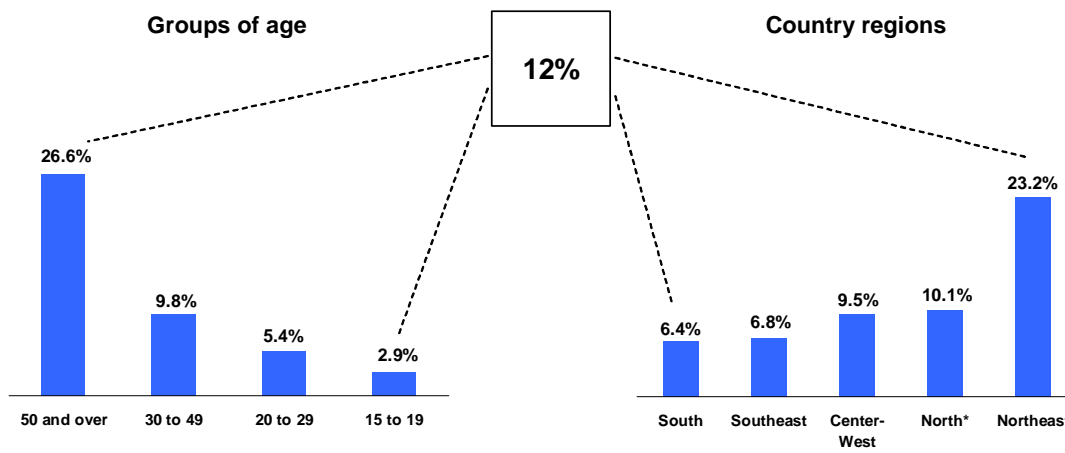
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<sup>1</sup> The development problems in the Brazilian educational system have their roots in the country's history, as far back as the colonial period. Contrary to what occurred in other parts of the New World, Portuguese colonialism paid little attention to the area of education and public instruction. The first time concern was shown for organizing a public system of education was in the second half of the 19<sup>th</sup> century. With the advent of the Republic, interest in public instruction was rekindled. It was, however, only in the 1930s, with the creation of the Ministry of Education (MEC) that a consistent educational policy began to take shape. At that time, in a country that was essentially agrarian, education was available to only a few. In 1930, only two in every ten children attended schools in Brazil; and most of these went as far as the 5<sup>th</sup> grade of elementary school, because only the larger cities had the *ginásio* level (5<sup>th</sup> to 8<sup>th</sup> grades). Of the Brazilian population aged 15 and older, 60% were illiterate. In the first 30 years of the MEC's existence, great emphasis was placed on building a good quality public education system. This objective was achieved to some degree at the cost of not having basic education available to all. Brazil has, however, greatly advanced over the last 70 years. A broad and diversified educational system has been created, based on public education. Brazil has one of the most important educational systems in developing countries, which has contributed fundamentally to modernizing the nation; this system ranges from early childhood education to a modern and sophisticated postgraduate and research level system created in the 1970s. However, the educational system is still elitist. In many aspects, at the end of the 20<sup>th</sup> century, the Brazilian educational system continued to reproduce and widen the enormous social inequalities in the country. The great and age-old social inequalities generated by the process of development in Brazil, explain for the most part the huge educational development problems of decades and the low average level of education of our population. This is shown by the fact that 45% of the heads of households in low-income families have never attended school or dropped out before completing one year of studies.

Over 30% of the students from the 1<sup>st</sup> to 8<sup>th</sup> grade level failed the school year and more than 5% dropped out. This led to a situation where 44% of the students in 4<sup>th</sup> grade were two years behind their age group, a proportion that rose to 53% among students at 8<sup>th</sup> grade. As a result, in the 3<sup>rd</sup> grade of secondary education, only 40% of all students were at the appropriate age, that is, 17 years old. For this reason the flow through school was very badly interrupted and held back pupils in the first grades of primary school. As a result, there were enormous deficiencies in the system. Less than half the students who started 1<sup>st</sup> grade completed 8<sup>th</sup> grade. Those who did complete this level took an average of 12 years to do so, making them 18 years old by that time. Not having the economic means to continue their studies at secondary school, they would go straight into the workforce.

Figure 1, shows the percentage of illiteracy in 2003, according to age groups and regions. The illiteracy rate is far greater among older groups than among young ones, nine times greater among those aged 50 and over (27%) than among 15 to 19 year-olds (3%). Besides that, illiteracy has a strong regional concentration, with the average rate in the northeast being four times greater than that in the south.

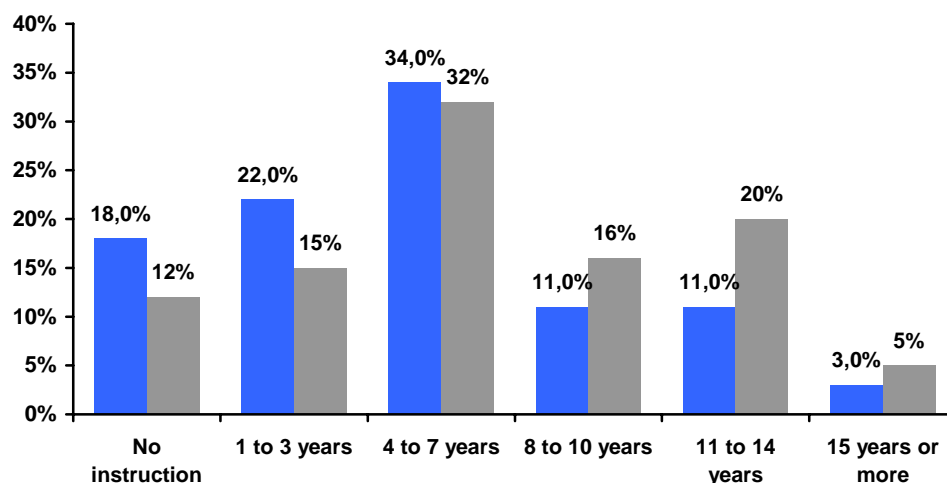
**Figure 1: Illiteracy rates in Brazil (among those aged 15 and over), 2003**



Source IBGE/PNAD

On the other side, as may be seen in Figure 2, the educational situation of the Brazilian people has improved appreciably in the last ten years. The percentage changes on the total population of over 10 years old are significant if we take into account the short period of time that has passed, the historical backwardness in education in Brazil, the size of the Brazilian population overall and the huge regional disparities of the country.

**Figure 2: Population over 10 years old according to years of completed education**



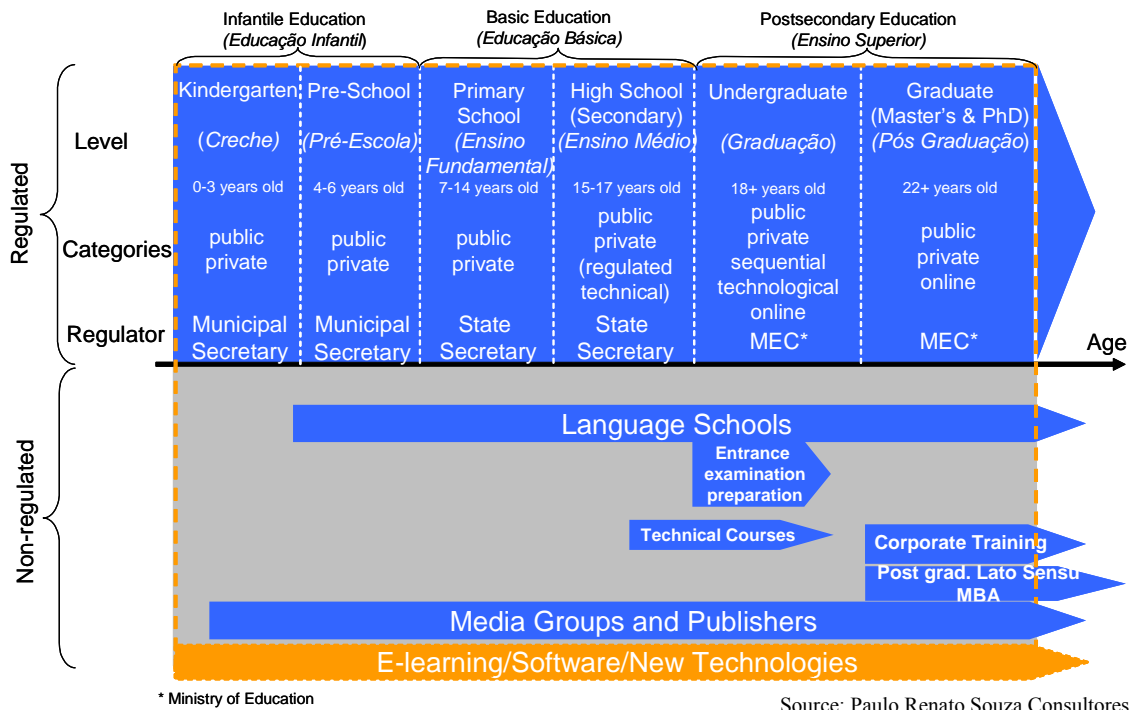
The burden of the past has not yet been overcome and there are still very important issues to be addressed in terms of access and quality at all levels of education. The main problem of the public finance system in Brazilian education continues to be its regressive nature. Directing a great part of the educational budget to financing federal higher education institutions reduces the amount of resources available for the other levels of education. Also, it is necessary to significantly increase the funding dedicated to the three levels of education, taking into account also the question of equality.

## **1.2. The organization of the Brazilian Educational System**

The Federal Constitution of 1988 and the General Law of Education in Brazil (LDB) of 1996 attributed to the Federal Government, states, Federal District and municipalities the responsibility of administering the Brazilian educational system, considering three educational public systems as a basis for collaboration between these federal systems. Each of these public educational systems is responsible for its own maintenance, which administers funds as well as mechanisms and sources for financial resources. The new Constitution reserves 25% of state and municipal taxes and 18% of federal taxes for education.

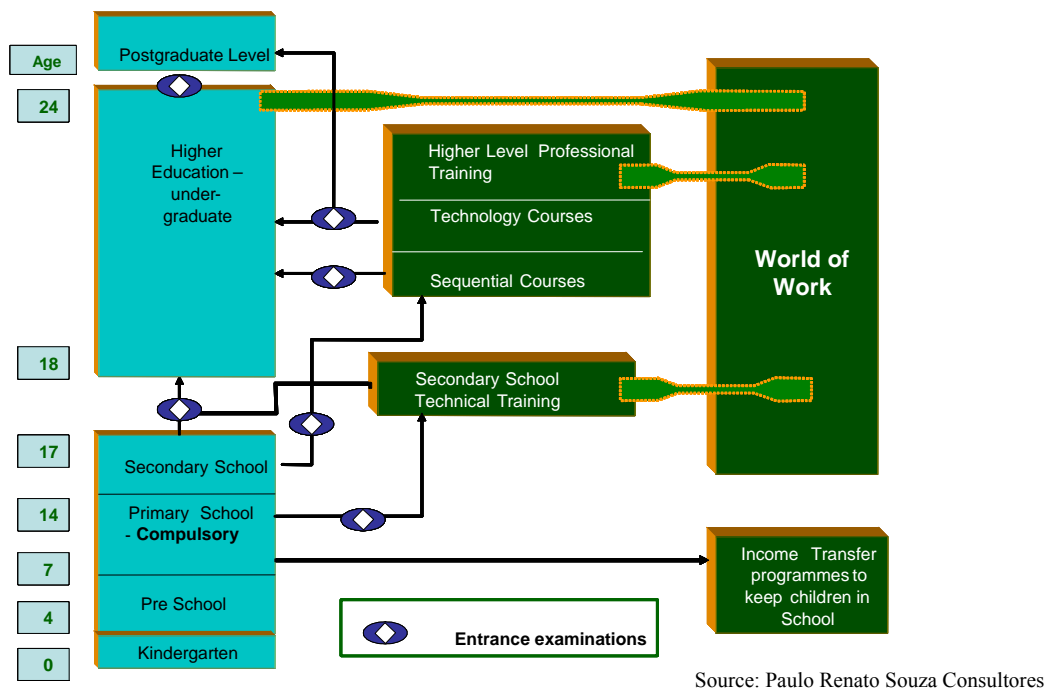
As laid down by the Constitution, responsibility for basic education lies with the states and municipalities. Because of this, a historical feature of Brazilian basic education is its extremely decentralized nature, which gives great organizational autonomy to sub-national governments (27 states and 5,546 municipalities) in organizing their educational systems. Early childhood education, from 0-6 years, is the sole responsibility of the municipalities. Responsibility for compulsory primary education from 1<sup>st</sup> to 8<sup>th</sup> grades is shared between states and municipalities. Kindergarten and pre-school education are the responsibility of local levels of government, while secondary schools are the responsibility of the states. Maintenance of the system, including salaries, the definition of teacher career structures and supervision of early childhood, primary, and secondary levels (which make up basic education) is decentralized, and these levels are responsible for defining their respective curriculum content. Figure 3 shows the Brazilian educational system and regulation.

**Figure 3: The Brazilian educational system and regulation**



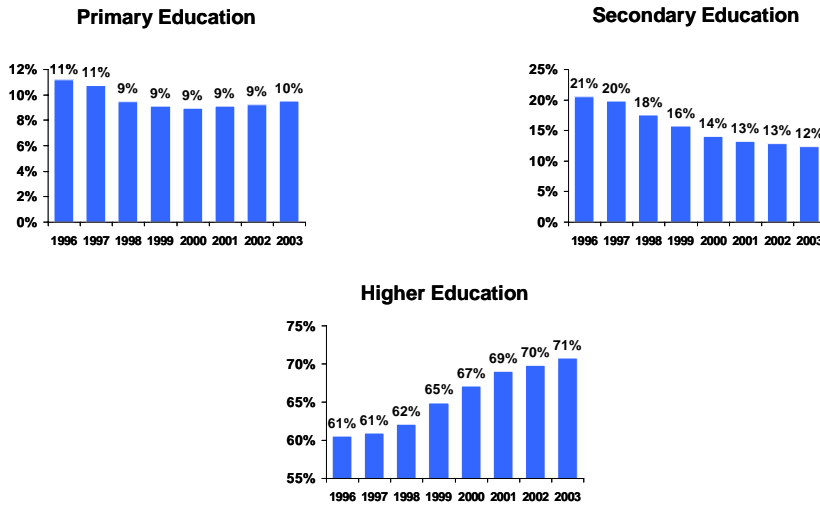
Brazil has 61 million students in the regulated sector. Figure 4 shows the structure of the Brazilian educational system as a whole and its correspondence with the labour market. Figure 5 shows the recent evolution of the shares of private sector in the enrolments for the educational system.

**Figure 4: Relation between the educational system and the world of work in Brazil**





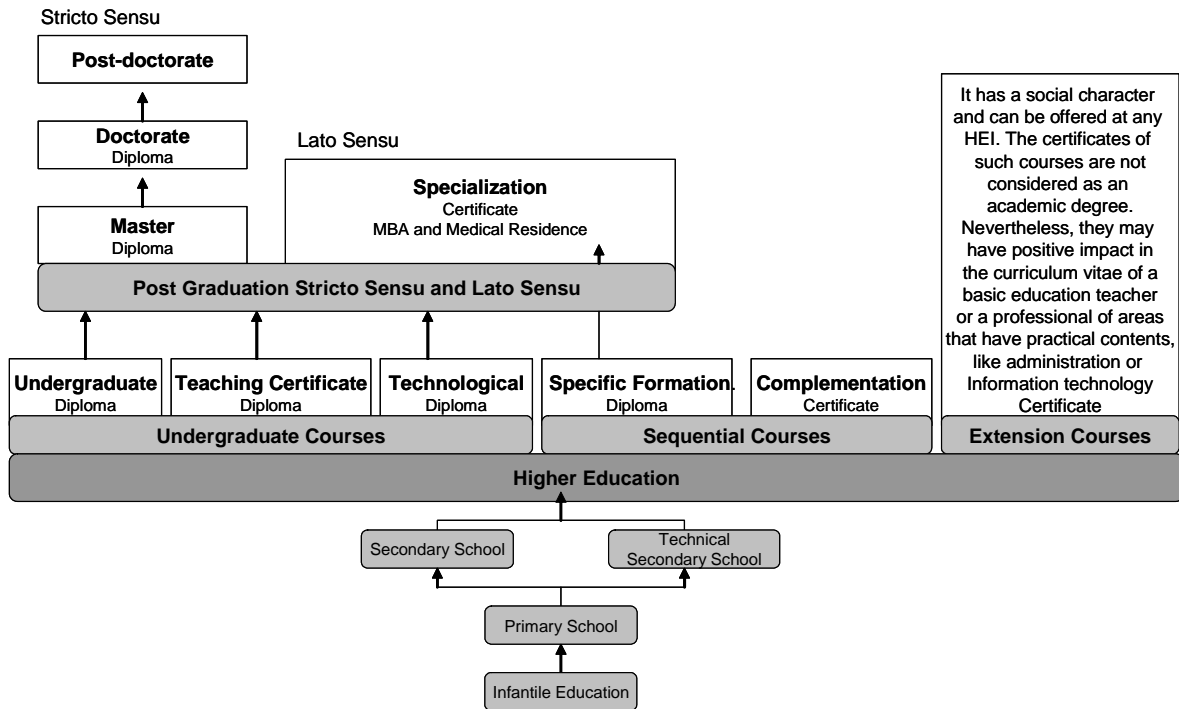
**Figure 5: Private sector share, according to number of enrolments**



Source: MEC/INEP and Paulo Renato Souza Consultores

Higher education begins with undergraduate or sequential courses, which may offer different specialization choices such as academic or vocational education. Depending on choice, students may improve their educational background with postgraduate courses *Stricto Sensu* or *Lato Sensu*. Higher education has three bases: teaching, research and extension, each with their own specific contribution to make to a particular course. Diplomas and certificates are proof of having passed through higher education. Figure 6 below describes this organization.

**Figure 6: Details of the structure of higher education**



Source: MEC

### 1.3. Financing Education in Brazil

#### 1.3.1. Distribution of Responsibilities

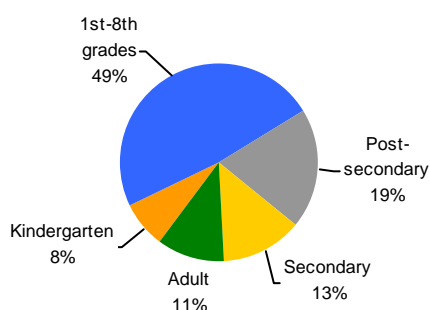
Total expenditure on education in Brazil corresponds to 5.2% of Gross Domestic Product (GDP), while public spending related to education corresponded to 4.7%, which is not a small amount. Developed countries such as the United States and Japan invest a similar proportion in education.

The Federal Constitution of 1988 gave more autonomy to the municipalities, allowing them to organize their own educational systems, independent of state or federal supervision. However, there were no legal criteria for the division of tasks in education; and financing of the educational network was chaotic. The new Constitution mandated that 25% of state and municipal income and 18% of federal government income go to education. In the years that followed, non-commitment to these constitutional provisions became generalized. The law had reserved the resources, but had not introduced efficient supervisory and control mechanisms. State and municipal governments made use of all types of artifices to include other administrative expenses in the educational budget. The accounting laws made it possible to conceal these artifices, through which resources that should have been invested in education disappeared. Another aspect that should be considered is the fact that Brazil is a country of great regional contrasts. In the poorer regions, the capacity of the public sector to invest in education is much lower than that of the wealthier regions such as the Southeast and the South.

To make these regional imbalances even worse, historical characteristics have led to an unequal distribution of students between the state and municipal educational system. The states have always been able to invest more than the municipalities, especially in the poorer regions. However, it was in these poorer states – especially in the Northeast – that the municipalities had to deal with the majority of the students in basic education, since the financial contribution of the state government was negligible. In the wealthier regions, the opposite occurred, with the presence of the state government predominating.

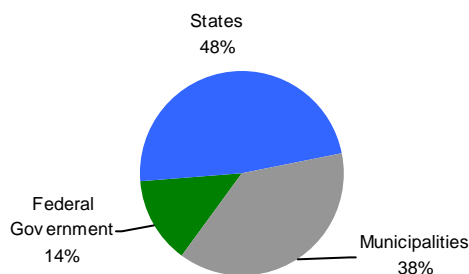
#### Public investments in education were approximately R\$76 billion in 2003

Figure 7: Breakdown of public investments in education per sector – 2003Est.



Source: BGU and FIMBRA/ STN

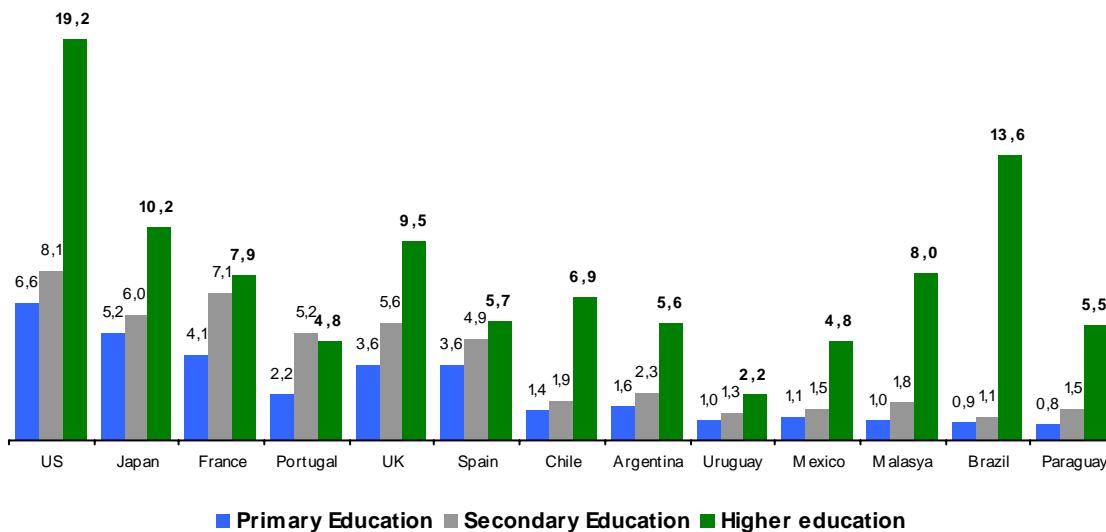
Figure 8: Breakdown of public investments in education per governmental sphere – 2003



Source: BGU and FIMBRA/ STN

Based on data from the OECD, Brazil is one of the countries with the greatest disparity in public investment per student according to the various levels of education, as shown in Figure 9 below.

**Figure 9: Education investments in US\$('000) per student – 1999**



Source: OECD Education at a Glance 2002

Compared with other countries, the financial effort Brazil is making to channel resources to education is relatively small in relation the proportion of children and young people in the population. According to OECD data for 2000, public education investment in Brazil in terms of GDP (4.1% of GDP) is significantly less than Argentina’s 4.8% because 31% of Brazil’s population is aged from 5-19, while Argentina has only 28% of its population in this group. In the case of Mexico, where 33% of children are in this age group, public investment in relation to GDP is 5.1%.

### **1.3.2. The Fund for Development of Fundamental Education and Enhancement of the Teachers’ Profession - Fundef**

In 1995, the newly installed government made basic education its priority. The central point of the policy implemented for basic education was the approval and implementation of the Fund for the Development of Fundamental Education and Enhancement of the Teachers’ Profession – Fundef. It was created by the 14<sup>th</sup> Constitutional Amendment and approved on 13<sup>th</sup> September 1996, with an expiry date of December, 2006. In essence the Amendment promoted a substantial redistribution of money and responsibilities among states and their municipalities. Its main points were the following:

1. For 10 years 15% of the fiscal revenues of states and municipalities must be only spent on elementary education (1<sup>st</sup> – 8<sup>th</sup> grade).
2. This 15% is to be redistributed among the states and their municipalities according to the number of students enrolled in municipal or state primary schools.
3. The Federal Government guarantees a minimum expenditure per student (R\$ 551,00 as of 2004).
4. 60% of those resources must be used only to pay the salaries of active teachers.

5. No bureaucracy. The amendment only fixed new criteria for the distribution of resources
6. The Fundef money is deposited in a specific account which may only be used for expenditure on primary education

The Fundef had a revolutionary impact on Brazilian education in a short time. Besides making education accessible to all, the regional differences were dramatically reduced. This process was led by the 5,562 mayors in Brazil: in 1994 there were only 12 million students in municipal schools as compared to 18 million in the state schools. In 2002, municipal schools had 18 million students and numbers in the state system had decreased to 14 million. This occurred due to a process that gave the responsibility of the 1<sup>st</sup> to 4<sup>th</sup> grade education to the municipalities, and to a powerful movement to create new municipal schools and increase the number of students in those already existing. Teacher salaries in municipal educational systems in the Northeast increased 70% over a period of three years, in nominal terms, between 1997 and 2000. It is worth noting that during the same period inflation, as measured by the INPC (National Consumer Price Index) /IBGE (Brazilian Institute of Geography and Statistics), was about 12%. In conclusion, the use of educational resources in the states and municipalities increased significantly, which reduced wastage and diversion of public resources.

The current government has proposed a Constitutional Amendment to create the Fund for the Development of Basic Education - Fundeb, aimed at expanding the means of financing primary education from 1<sup>st</sup> to 8<sup>th</sup> grades for the whole of basic education (from pre-school to the 3<sup>rd</sup> year of secondary school). The proposal for the creation of the Fundeb, as a substitute for the current Fundef aims to improve the financing issue in basic education. The new Fund will create the means for the necessary growth to occur in secondary and early childhood education, which are stages of basic education not included in the Fundef.

## **2. Basic Education**

During the last years, Brazil has been able to put into practice a wide-ranging and successful process of educational reform involving educational, financial and administrative aspects. In spite of the short time that has passed and the long time that is needed for educational investments to mature, the indicators that are available already show very significant advances in both qualitative and quantitative aspects. There has been a dramatic process of expansion in basic education and in bringing large new groups of the population into the teaching system. At primary level, 10% more children came from precisely the poorest sections of the community, raising the attendance rate to 97% of the total in the age range. At secondary level, enrolments increased to 88% in the same period. Normally, we would expect a decline in the quality indicators of the system due to the speed with which this expansion occurred. Fortunately, this has not been the case since all quality indicators have also shown significant improvement. However, Brazil is still a long way from reaching the educational level necessary for a fairer society which is better adapted to meeting the needs of the age of knowledge.

Brazil has more than 43 million people in primary and secondary education, of whom only 37 million are children and young people between 7 and 17 years of age. There is a surplus of 6 million people in the system who would already have left school if they had not had to repeat grades. The national aim of universalizing the completion of primary and secondary education can be achieved if only effective actions for substantially reducing repetition and dropout rates are maintained within the management of educational systems at the sub-national level. Because of that the gross enrolment rate in primary education is more than 100% and at the secondary level the figure is double the net enrolment rate.

The need now is to continue what has been started. There are two very distinct areas of concern that require an immediate solution. On the one hand there is the question of financing education. The question of universalizing the access to primary education has been solved, but it needs to be consolidated and adequate mechanisms must be formulated for preschool and secondary education. On the other hand, policies for improving quality must be continued, such as teacher-training programmes, improving access to reading books, introducing new technologies into basic education, lengthening the school day, etc.

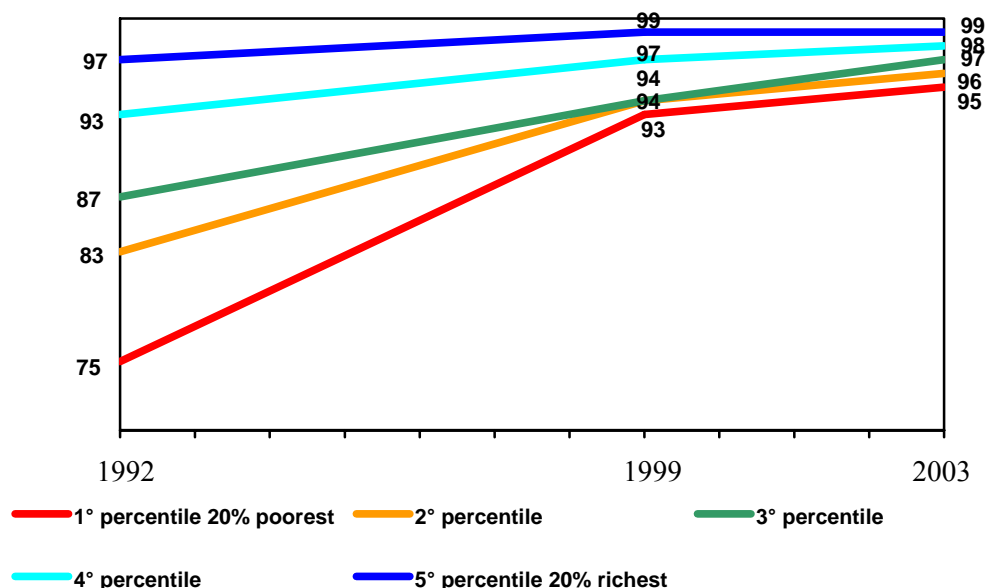
Summing up, the challenges Brazil must face in the immediate future in relation to its basic education system are the following:

- Invest more resources in education
- Improve the quality of Basic Education
- Expand access to infant education, especially to pre-school
- Make access to Secondary Education universal
- Improve the means of financing Basic Education
- Use the results of the Evaluation System in managing the public sector
- Invest in initial and in-service teacher training
- Improve access to new technologies in basic education

### **2.1. Recent expansion on access and enrolments in basic education**

During the 1990s, Brazil made a great effort to overcome the deleterious effects that had accumulated during the decades in which education was neglected. Today, 97% of children aged between 7 and 14 are in school and illiteracy rates are falling dramatically. Figure 10 shows clearly that the difference between levels of education between the 20% of the richest and the 20% of the poorest people decreased dramatically. The figure shows how provision of schooling for 7 to 14 year-olds developed, by quintiles of income. In 1992, only 75% of poorest children between 7 and 14 years of age were in school – that is, out of every 4 poor children one was not in school – as opposed to 97% of the children of the richest sector of society. In 2003, 95% of the poorest children were going to school, compared to 99% of the richest. The difference between rich and poor fell from 23% in 1992 to only 4%. With the poorest rapidly growing closer to the richest in terms of access to primary education, measures can be taken in terms of the social differences that derive from access to knowledge as expressed in the fact that 45% of heads of poor families have never been to school or dropped out before finishing one year of study.

**Figure 10: School attendance<sup>2</sup> of children in the 7-14 age group, according to income levels (%)**



Source IBGE/MEC

The fundamental instrument in getting all children between 7 and 14 into school was the Fundef, already mentioned, which had a huge effect on Brazilian education by reason of the short period of time between its creation and the signs of its first results.

To maintain the momentum and ensure that children remain in school, the *Bolsa Escola* programme was launched by the Federal Government in 2001 to help keep the children of poorest families studying. The aim was to provide a monthly grant in money for all families whose per capita income was less than R\$90.00 (at that time the equivalent of half a minimum wage) and who had children between 6 and 15 years of age enrolled in and attending primary school. The aims were: to make sure those children from low-income families remain in school; to transfer money directly to improve the situation of absolute poverty in families all over the country as long as those families kept their children in school, and to help eradicate child labour, which is an enormous social problem in Brazil even today. Under the present government, the *Bolsa Escola* programme has been linked to other already existing Federal Government grant programmes which have been combined as far as possible with state and municipal initiatives. With its new format, it was renamed the *Bolsa Família*.

The demand for secondary education is coming from lower-income students. Middle and high-income students have always been in the classrooms at this level. Since lower-income students do not have means to pay for private schooling, the need for expansion in the services provided by the public sector was implied. The LDB contained another meaning for the constitutional concept of “progressive universalizing of access to free secondary education,” by including secondary education as the final stage of basic education in Brazil and inducing the states to create the necessary conditions, including the building of schools.

<sup>2</sup> Data concerning the scale of provision for this segment of the population, that is, the initial enrolment of pupils from a specific age group at all levels of education. The rate of provision makes it possible to identify the percentage of the school-age population that is going to school, regardless of the grade they are in.

Secondary education has grown in this way during the last ten years when compared to previous period because in former times there simply were not enough pupils who had completed primary education to create the pressure for places at secondary level. Between 1994 and 2003, ordinary secondary education absorbed 4.1 million new enrolments after 14 years of stagnant growth. In the period 1980-94 the system had grown by only 1.8 million on top of those already existing. Also, the number of pupils completing this level of education increased. From 1991 to 1994, the number of completions had increased by 40%, rising from 660 thousand to 917 thousand. After 1994 the flow through school improved and in 2003 the total number of completions reached almost 1.9 million.

The recent growth in basic education enrolments is revealing another very important aspect, which is the decrease in differences between regions in terms of access to and completion of education, at both primary and secondary levels. The expansion of these levels of education between 1993 and 2002 was significantly greater in the Northeast and North than in the rest of the country.

In addition, in recent years pupils who are behind in school and are over 18, and those who have needed to leave school, are increasingly seeking Education for Young People and Adults – the level of education that has seen the highest level of growth in Brazil during the last ten years. By law, the young person over 18 years old is allowed to obtain the certificate of completing secondary education by means of highly condensed and quick preparatory courses if he or she can pass an official examination. Enrolments in this level of education tripled between 1995 and 2001, to 3.4 times what they had been in 1995 – about 1.2 million enrolments. Success in completing education at this level has also increased. In 1995, calculations of flow through school estimated there were 71 completions for every 100 entrants

The enormous expansion of secondary education has had two important consequences in Brazil: the high rate of unemployment of young people with this level of education, and the great differences in rates of return on education between those who only have secondary education and those who have continued their studies in higher education. As a consequence of the expansion in basic education and the relatively low rate of economic growth, the marginal return on primary and secondary education, in spite being still very high, has decreased in a relatively discrete manner faced with the relative increase in the supply of workers in these groups during the last decade of the 20<sup>th</sup> century.

## **2.2. The quality issues**

The inclusion of new educational cohorts in schools has thrown up evidence of problems in the quality of teaching. Educational evaluation in Brazil plays a central part in the strategy for reforming the teaching system and the process of improving quality. The contribution of evaluation procedures to monitoring policies implies an advance in the implementation of those policies. Until the mid-1990s it was not even known how big the problem was. The progress made until now, even with the realization that there are still many challenges left to face, has benefited enormously from the new culture of evaluation which began to gain ground in Brazil from the 1990s and from the use of evaluation results in formulating public policies.

Quality in education led to serious problems on the transition rates in the system:

1. Rates of year repetition and dropout in Brazilian schools are very high
2. Rates of promotion, repetition and dropout in basic education are developing satisfactorily in general if seen from a long-term perspective starting from the 1980s.

3. Nevertheless, the rates of promotion have begun to decline, repetition rates are stable after a sharp decline during the 1990s and dropout rates are showing worrying signs of increasing, both in 4<sup>th</sup> and 8<sup>th</sup> grades of primary school as well as in the 3<sup>rd</sup> year of secondary. The change in the evolution of the transition rates from 1998 on coincides with the vigorous incorporation of new segments of the population both in fundamental and secondary education.

The same pattern may be identified through the analysis of the evolution of the Sistema Brasileiro de Avaliação Educacional – Saeb. The Saeb, as a central element of the National System of Basic Education, promotes the valuation of education systems and tries to identify the main problems in order to provide policies to improve the quality of teaching. The achievements of the Brazilian students from 4<sup>th</sup> and 8<sup>th</sup> grades of fundamental education and 3<sup>rd</sup> grade of secondary education are very low in general in comparison with the expected achievements according to the National Parameters for the Curricula (PCN). These results are differentiated according to regions. Although there is a certain uniformity in performance of pupils between the critical and intermediate levels (between 80% and 90% of results are found within this range), the critical level is higher in the North and Northeast regions.

The process of making primary education universal that was carried out during the 1990s and the expansion of secondary education due to the entry into school of children and youngsters from social groups with the lowest incomes and lowest educational background led to a discrete fall in the average achievements of the students in the tests. Nevertheless, the latest measurement in 2003 showed a recovery from 1999 and 2001, due to the initial impact of quality policies implemented since 1995. In other words, the fact of there not having been a very significant fall in the performance levels of pupils in evaluations made after 2001 and that there was even found to be a rise in recent years in spite of the rapid inclusion of new students in the education system, may be attributed to the positive effect of the following factors:

- Better-qualified teachers
- National Curriculum Parameters
- Better textbooks available to more students (8 grades)
- The distribution of reading books
- Parent participation in schools

Besides the Saeb, two other instruments are components of the assessment system for basic education: the Enem and Brazil's participation in Pisa. By building a framework of competencies and competences to be a measure for evaluation, the Enem laid down for the first time in Brazil a benchmark for the end of basic education in the same way that other international examinations like the SAT (Scholastic Aptitude Test) in the United States, the French Baccalaureate, and others.

Pisa is a comparative assessment programme whose ultimate aim is to assess the performance of pupils at the age of 15 in order to produce indicators concerning the effectiveness of educational systems. The most recent tests were held in 2003 and given to 250 thousand 15 year-olds in 41 countries, most of them members of the OECD, which included the 30 member nations as well as invited countries. Brazil, Uruguay, and Mexico represented Latin America.<sup>3</sup>

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<sup>3</sup> The theoretical framework for the Pisa is based on the concept of literacy in a broad sense, including the educational philosophy in the PCN, and curricular proposals in the states and municipalities in Brazil. The concept of literacy is defined as the ability of an individual to master the task of writing for various situations as required in every day life. According to the PCN, the ability to read and write texts – of the most varied genre and themes – with proficiency - is the most significant



Among the factors that can be highlighted as contributing to the improvement of the basic education students, is the decrease in the age/grade discrepancy, still high in Brazil, although lower than in 2000, which was the last year of the Pisa evaluation. The difference between the grades of the 15 year-old Brazilian students compared to those of other countries is pointed out as being the main cause of the relatively low Brazilian performance in this evaluation. Only half of the population, from which the sample was taken, was at the secondary level, while practically all of the 15 year-olds in the other OCDE countries were at the secondary level and had had an average of ten years of schooling. However, the improvement that began to occur in the lower grades that is correcting the discrepancy should, over the next few years, reach the higher grades.

Even though there was improvement, in the Pisa evaluation as well as in the Saeb, the results are not satisfactory. Brazil occupies one of the lowest positions in the international evaluation and the proportion of students that demonstrate adequate grade-level competency is low.

Because of those quality problems, while Brazil has almost achieved universal completion of 4<sup>th</sup> grade, it is still far from achieving universal completion of primary education – 8<sup>th</sup> grade, and secondary school. At current rates, 89% of pupils are finishing 4<sup>th</sup> grade of primary education, 65% the 8<sup>th</sup> grade of primary and 45% 3<sup>rd</sup> grade at secondary level. Enrolments at secondary and primary levels should correspond respectively to the more or less 27 million children aged between 7 and 14 and to the 10.4 million young people aged between 15 and 17.

### **2.3. The content of Basic Education**

From 1995 on, in basic education great attention was given to formulating the curricular guidelines for all levels of education and to evaluating the textbooks that were bought and distributed by the Ministry to basic education institutions in the country. Systems for information and educational evaluation were developed which made it possible to take decisions at all levels of government in a timely manner. New technologies were systematically introduced into the public schools. Changes were also made in the programmes the Ministry traditionally carried out, such as the school lunch programme, where complete decentralization occurred.

From 1995, the Ministry established National Parameters for the Curricula (PCN) for all levels of basic education, including education for indigenous nations and for older children and adults. The Parameters were defined for every subject of the curricula and for transversal themes that covered the interdisciplinary content aimed at educating the citizen. The curricular reform carried out in primary and secondary education emphasized the development of competences and skills in problem-solving and logical thinking, and the rationalization of curriculum content that required memorization to the detriment of reasoning. The basic training looked for in secondary education came to be achieved more by building competences, skills and behaviours than by quantity of information. Learning to learn and to think, relating knowledge to facts about everyday experience, giving meaning to what has been learned and capturing the meaning of the world, making a bridge between theory and practice, providing the basis for criticism, arguing on the basis of facts, dealing with the feelings that learning arouses, were the aims of the reforms.

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indicator of good linguistic performance and thus literacy. Results of PISA 2003 showed that the Brazilian students had the greatest growth rate in two areas of Math, they improved in Science, and they remain at the same level in Reading in comparison with the last one Brazil participated in 2000.

## 2.4. Situation of teachers at the basic education level

The LDB sanctioned in December 1996 and the Constitutional Amendment that created the FUNDEF, although very far reaching in their impact on education in Brazil, presented ambitious objectives related to teacher training. The LDB dealt specifically with two important topics: hiring of teachers only by *concurros* (public examination/selection process) in the public schools, and minimum teacher qualifications to be required for teachers at all levels of education including early childhood education. The Law set the deadlines for teachers to receive their higher education degrees, and defined criteria and norms for the teacher training programmes. The training of teachers to work in basic education should take place at the higher education level, in a teacher certification programme, that is a full four-year programme, at universities and higher education institutions.

The Fundef, on the other hand, has allowed, during the first five years, part of its resources to be used to train lay teachers. This is due to the legal permission given to utilize a portion of the 60% payment of the Fundef (related to teacher pay), to train lay teachers, that is, teachers without any prior teacher training. Approximately 85% of all the education systems showed a decrease in non-certified professionals on their staff. Thus, one of the priorities for the creation of the Fundef, the extinction of the category of lay teachers, resulting in the improvement in qualifications of the teaching staff, is rapidly being achieved throughout the entire country. See Table 1. There are also evidences that show important real increase in the salaries of the teachers because of Fundef in the country as a whole, and especially in the municipal systems of the Northeast region.

**Table 1: Teaching Posts according to their educational level**

Teaching Posts with Basic Education (lay teachers)	1995	2003
Early Childhood Education and 1 <sup>st</sup> to 4 <sup>th</sup> grade		
In thousands	262.5	23.0
Proportion	24%	2%
Teaching Posts with University Education		
In thousands	898.4	1,453.3
Proportion	44%	61%
5 <sup>th</sup> to 8 <sup>th</sup> grade	72%	77%
Secondary Education	82%	90%
Total number of teachers (in thousands)	2,026.1	2,336.1

Source: MEC/ INEP

In the case of many teacher training programmes, it is necessary to correct low quality, as well as to guarantee greater opportunities for a good education, in order to satisfy the increased demand for teachers with high-quality training. To improve the quality of teachers, it is not enough to guarantee that they all have sufficient training, nor is it enough to change course content to train new teachers; programmes must be developed to bring them up to date and train them. One important aspect of the curriculum content in educational subjects is to require practical experience and to focus more on teaching experiences and results of student achievements than on education theories and ideologies

## 2.5. Gender in Brazilian Basic Education

Educational indicators in recent years have shown a significant advance in the educational situation of the female population of Brazil in relation to their male counterparts. In ten years there has been a

marked improvement in the educational level of children and teenagers aged between 5 and 17 years and these results have been even more impressive within the female population.

There is a clear difference between illiteracy rates of boys and girls aged 10 to 14 even though both rates have declined over the years. Among those aged 10 or over, male and female illiteracy rates were close to each other because, among the older age groups, female illiteracy was higher than men and the contrary occurs among the younger age groups. From 1993 to 2003, in the 10 to 14 year-old group, male illiteracy fell from 14.1% to 4.7% and female illiteracy from 8.5% to 2.2%.

The higher rate of education among the female population compared to men is confirmed when we observe the total number of people attending school in 2003. The female population is more highly represented than the male both in secondary school (54% and 46% respectively) and in higher education (57.2% and 42.8% respectively). The only exception is in primary education where the percentage of boys is still a little higher (50.8% and 49.2% respectively). The higher rate of repetition among male pupils should be taken into account.

## **2.6. Race and social imbalances**

Increasing access to basic education for the poorest sectors of the population has been of particular benefit to the poorest sections of the population, especially Afro-Brazilians. In 1992, school attendance among black children aged between 7 and 14 years was only 79%, a proportion that rose to 95% in 2003. Differences in access to education and school performance in Brazil are associated more with economic and social factors than with racial ones *per se*.

Special data on the frequency of attendance in school by pupils who are at the correct age for the grade in which they are studying, according to age-groups, family income levels and self-declared race of the individual in the population census shows the following conclusions:

- In general, within each income per capita group, when it comes to school attendance at the correct grade, differences between races are small or imperceptible. The only exception is found in the systematically higher percentages of those of oriental origin in relation to their respective family income group.
- In general, the differences in percentages of school attendance at the correct grade among the white, black and mixed-race groups of each family income group per capita are far less than those found among individuals of whatever race among family income groups.

## **2.7. Technical and Vocational School at secondary level**

The concept of preparing for work is present in the Parameters for the Curriculum of secondary education. That preparation must be basic, in other words, it should be one that can serve as a basis for the training of everyone and for all types of work. The LDB assumes that there is a difference between “general preparation for work” and “vocational training”. This general preparation for work therefore, embraces the general content and skills needed to enter the world of work and those that are relevant or indispensable for entering a course of vocational training and practicing a technical career. In the first case, content would include general notions concerning the role and value of work, the end-products of work and conditions of production, among others.

At the beginning of the 1990s, the structure of the vocational education system in Brazil was very precarious and heterogeneous. There was a segment that contained Federal Technical Education Centres (CEFETs) and federal technical schools of good academic quality, although it was very small in relation to the country's needs and largely unrelated to the employment market requirements of the regions where the institutions were located. In relation to this part of the system, a paradoxical situation existed: the better the school, the more dysfunctional was its role in light of its original mission of training technical manpower. The segments of the "S" system – SENAI, SENAC, SENAR (National Service for Rural Training) – had expanded and as a rule maintained good standards and close ties with the employment market. Nonetheless, they were still very small in terms of meeting social demands and their interconnection with the educational system as a whole was still difficult.

According to the guidelines of the Reform of Technical Education implemented after the new LDB was approved, vocational training should complement basic education and be organized flexibly to allow frequent returns to the system of those that have left it, to guarantee that they will keep abreast of technical evolution. This new paradigm, which guided most of the educative reforms of secondary and vocational teaching in the world during the 90s, was the basic inspiration of the Brazilian reform.

The main change in the legal situation under the current administration since January, 2003 was on the interface between vocational education and secondary education that now may occur in three ways: integrated, in the same educational establishment, with a single enrolment for each student; concomitantly, in the same educational establishment or in separate educational institutions, taking advantage of the educational opportunities available, or a complementary partnership; and finally, offered only to those who completed secondary education considered fundamental for obtaining a professional license of secondary education level.

According to the 2004 School Census, technical vocational education in Brazil is offered by public and private institutions in 20 areas of training. There are 3,047 institutions with 676 thousand students. Most of the institutions offering technical courses in Brazil are private. In all, there are 2,172 private establishments, representing 71% of the total. Then there is the state sector with 600 establishments (20% of the total). The number of federal institutions is 143 (5%) and municipal institutions totalled 130 (4%). When we look at the distribution of enrolments, it is clear that most of them are in the private sector, accounting for more than half the number of students (585); while the state sector accounts for 27% of students and the federal and municipal sectors provide for 27% and 3% respectively.

### **3. Higher Education, Labour Market and Human Resources Development**

The main problems the Brazilian higher education system is facing at present are the following:

1. Access: in spite of the rapid expansion during the last ten years, the system is still small compared with those of other countries in Latin America. Also, most students in higher education come from medium- and high-income groups. The poorest sections of the population can only enter higher education today as a result of the great expansion at secondary level.
2. Finance: the new sections of the population trying to enter higher education lack sufficient financial backing. Places in the free public institutions are very restricted and the cost of private education is very high in terms of the incomes of these new groups aspiring to enter higher education.

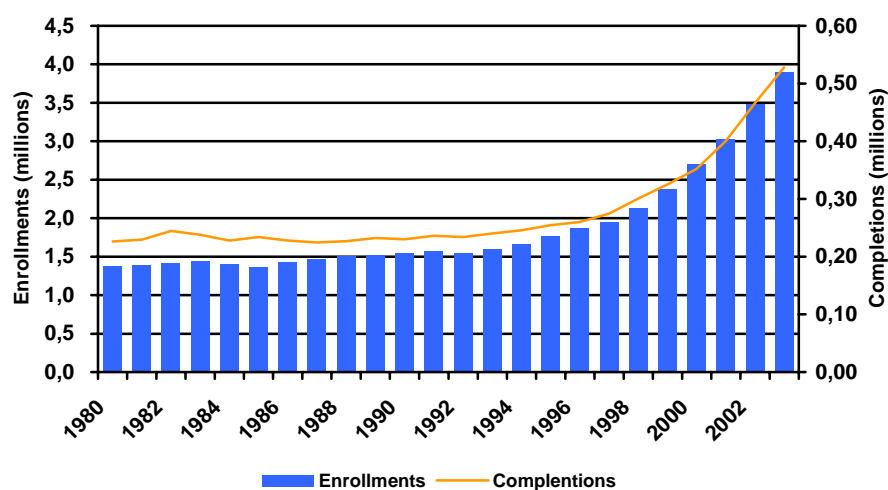
3. Quality: the quality of higher education institutions in Brazil is very variable. Alongside institutions with international reputations we find many with low levels of teaching and little encouragement to undertake research.
4. Efficiency: public institutions - usually of better quality than the rest - suffer great problems of inefficiency in the use of public resources, resulting in a relatively small number of students attending them in terms of the amount of funds invested.
5. Curricular structure unrelated to the needs of the labour market: the content of higher education courses in Brazil lacks the flexibility to adapt to the needs of the labour market.
6. Little connection with the productive sector: in general, technological research and development is carried out in universities with little connection with the productive sector.

### 3.1. Expansion and access to Higher Education

Higher education enrolments more than doubled in the last ten years. In spite of this significant growth, the gross rate of enrolments at the higher level in Brazil is very small when compared to international levels, even when compared to some of other comparable countries in Latin America. Nevertheless, there is a reasonable consensus of opinion on the need to settle on the most effective way to provide a more lasting solution to the problems of access and equity in higher education.

In the 1980s growth in enrolments did not even keep up with population growth. Between 1980 and 1994 expansion of higher education was quite restricted: growth of only 20% in enrolments; reduction of 3.5% in the number of higher education institutions and 26% growth in the number of courses. In 1994, total enrolments on undergraduate courses were 1.7 million. The higher education system at that time consisted of 851 institutions. As may be seen in Figure 11, there was a significant increase in enrolments and completions of higher education courses in Brazil after 1995.

**Figure 11: Number of enrolments and completions in higher education in Brazil**



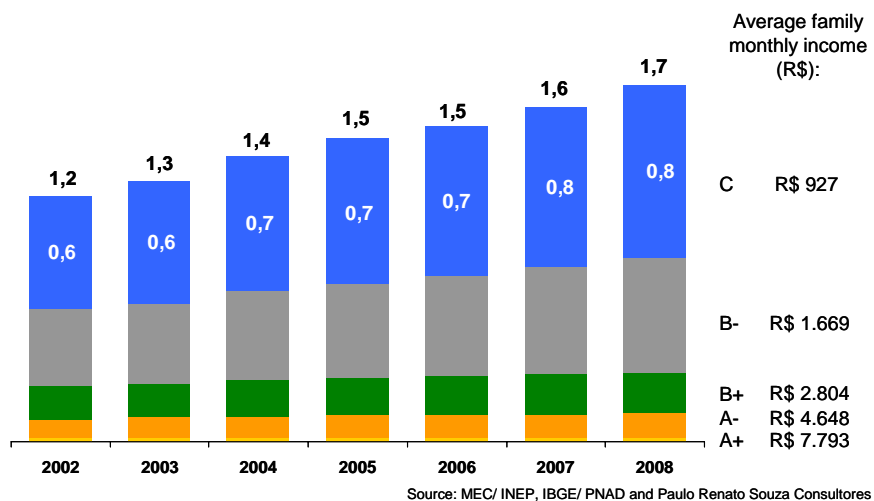
Source: MEC/INEP

The growth in supply of courses in recent years has been greater in towns in the interior than in state capitals. That an ‘interiorization’ of higher education is occurring because of an appreciable growth in the numbers of courses, so that many towns which previously had no HEI now have one. This has brought great benefits to students who had been excluded on a regional basis. Many who had not been able to move to the state capital to study at the higher level and now have the chance to do so in their hometown.

Socio-economic data concerning students in Brazilian higher education institutions show the marked presence of those coming from social groups with average and high incomes. It can even be stated that the supply of places is basically a response to the demand for higher education that these classes have created. With the ever-growing demand and a far greater number of students able and desiring to enter higher education, private institutions have had ample room to increase their supply.

The growing expansion of secondary education and the increase in the number of students leaving this level of education suggests that there is greater pressure for obtaining chances of education at a higher level coming precisely from the poorer classes in society. The growth in supply of courses in recent years has been greater in the poorest states and in towns in the interior than in the southwest or south and state capitals. Projections concerning access to higher education indicate the growth among students from lower-income families in the total numbers of new entrants to higher education, as may be observed in Figure 12. This is happening due to the increased flow of students coming from public secondary education and the increasing demand for better-qualified personnel with university degrees for jobs which previously did not require them.

**Figure 12: Number of students entering higher education**

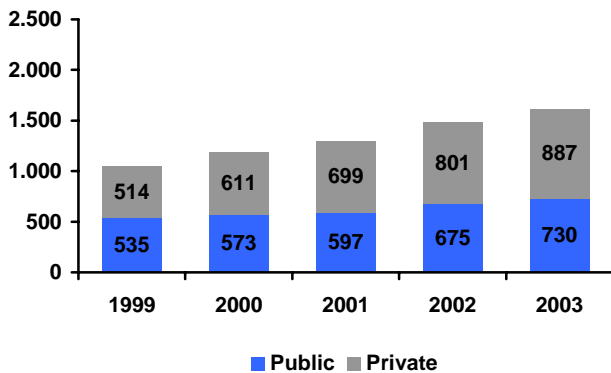


One of the main areas for public policy in relation to access is the design of the means of financing studies and maintaining lower-income students in the system. The policies of increasing rates of schooling at higher level with improved quality at this level, especially in public institutions, increasing the number of places on evening courses, the broad re-design of the means of financing studies and maintaining lower-income students in the system, are some of the possible initiatives being put into place. The country has experienced several mechanisms for increasing access to higher education,

including student loans programmes, scholarships in private institution in exchange of tax exemption and, quotas. The policy of quotas, which is very controversial, appears in this context as a transitional strategy. It is also important to emphasize that the expansion of evening classes in the public sector is still insufficient to meet the potential demand from students who are finishing their public secondary education during the evening ‘shift’. A great part of this potential demand has been met by the private sector. In Brazil, 68% of private enrolments are for the evening period, in which most courses do not require full-time attendance. (See figures 13 and 14)

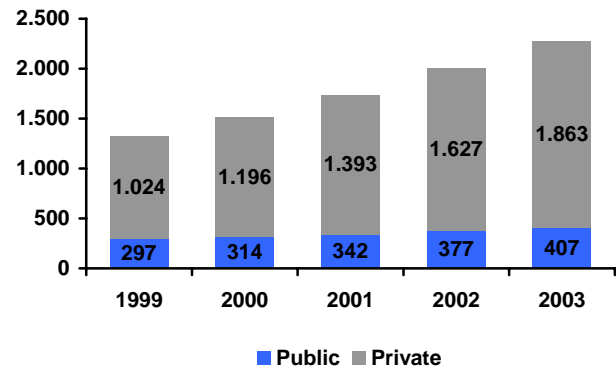
### Number of Public and Private Enrolments by ‘Shift’ (Daytime or Evening Courses)

Figure 13: Daytime Enrolments



Source: MEC/INEP

Figure 14: Evening Enrolments



Source: MEC/INEP

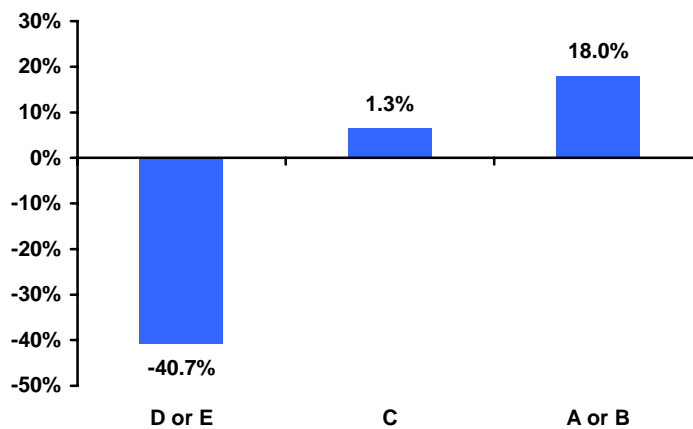
### 3.2. Quality in Higher Education

In 1995, the higher education system in Brazil suffered from very low quality in a significant number of institutions. This low quality was associated with the accreditation process for new institutions which was bureaucratic and hindered by the red tape, a situation that created a system without competition and of low quality, with oligopolies that provided huge profits for the owners of private educational institutions. It would be natural to assume that such a rapid expansion in the system would have been detrimental to its quality, that there would not be a sufficient number of qualified academic staff; that general teaching conditions would have deteriorated in comparison with the past; that the new institutions would be of worse quality than the old ones. In spite of the short time during which it has been possible to evaluate significant changes in quality, all the available indicators show precisely the opposite: (1) the higher education system today shows quality indicators better than those of 1995 and (2) the new institutions have received better appraisals than the old ones. Clearly, this does not mean that there is good quality in general nor that the present level of quality is satisfactory in relation to the country's needs. It merely means that some of the measurable quality indeed improved during the process of expansion.

The higher education evaluation system showed that the process of expansion took place along with a general improvement in the quality of the system. Quality of teaching staff showed impressive improvement, as did indicators of better infrastructure. In the private sector, competition based on the search for quality and efficiency in providing the service also contributed to the overall improvement in the system.

The supposition, which proved to be correct, was that in dealing with a selected part of the population, both in terms of the clientele of the system as well as future users and employers of graduate personnel, the existence of objective evaluation criteria would exert an enormous social pressure on the worst institutions. The most important point was certainly the reaction of society to the information concerning the evaluation of HEIs. Students reacted in a surprisingly swift manner. Judging from demand – measured by the relationship of candidates to places – for private courses with grades A and B, this grew approximately 18% between 1996 and 2002, while demand for courses graded C and D in the test dropped approximately 41% during the same period, as we may see from Figure 15 below.<sup>4</sup> This shows that the mere spread of information produces a social reaction which has a far greater force than possible administrative punishments.

**Figure 15: Percentage development of the relationship between candidates and places between 1996 and 2002 to in courses evaluated by the Provão**



The improvement can also be observed in the case of qualification of teaching staff. Given the great expansion in private education, the number of teaching staff working in this area has doubled in the last 8 years. While in 1995, only 25% of them had master’s or doctoral degrees, by 2003 more than half of them had this level of qualification. In federal universities, only 21% of teaching staff had doctorates in 1995, a figure which rose to over 40% in 2003. If we include those with master’s degrees, they account for 70% of total teaching staff in this sector. Table 2 shows this very clearly.

<sup>4</sup> The results of the *Provão* were presented in five grades (A to E, being A the highest). Those grades corresponded to the relative average of achievements of the students attending the last year of each school into 24 different careers. Those averages were grouped according to a normal curve.



**Table 2: Active faculty in higher education by level of education**

Qualification	1994		2003	
	# professors	%	# professors	%
<b>total (public+private)</b>				
total	141.482	100	268.816	100
master's or Ph.D.	54.858	39%	152.748	57%
doctorate	21.327	15%	56.238	21%
<b>private institutions</b>				
total	66.197	100	172.953	100
master's or Ph.D.	16.742	25%	87.928	51%
doctorate	4.477	7%	19.973	12%
<b>federal institutions</b>				
total	43.556	100	52.106	100
master's or Ph.D.	24.046	55%	37.552	72%
doctorate	9.147	21%	21.327	41%

In the same way, topics relating to the condition of infrastructure in institutions show a gradual improvement in quality. Access to computers, for example, although still insufficient for the majority of students, has been improving year by year. From 1997-2002, several careers have shown an increase in the number of students who say they are using computers in their educational establishments. Institutions have been adopting computerized programs in their libraries and most students use local systems for bibliographical research. Computerized access to bibliographical research networks, both national and international, as well as by the Internet, is still low on some courses but is increasing. Aspects of the curriculum are also dealt with and the questionnaires are showing that supervised work-experience is being used more frequently in various areas of higher education. This provides another quality indicator because work-experience allows students to live and work under supervision in conditions of working life. Table 3 summarizes the replies of students to some of the most relevant questions.

**Table 3: The surveys applied to students taking the Provão**

	<u>1997 Vs 2001:</u>	
▪ Proportion of professors who use teaching plans	20%	31%
▪ Proportion of teachers who dominate their subject	73%	78%
▪ Student access to computers	23%	36%
▪ Student online access to national and international libraries	16%	27%

Source: MEC/INEP/DAES

Finally, it should be noted that the expansion of the system has in itself also contributed to improving quality. There came to be for the first time in Brazil healthy competition between teaching institutions. This competition is based on two motivating factors: the search for quality, and efficiency in providing a service. Efficiency is crucial for two main reasons: in public universities, because we are dealing with

public money and we do not have the right to waste it or to fail to use it to the best possible advantage; in private universities because fees have to be reasonable and in line with the level of income of the students.

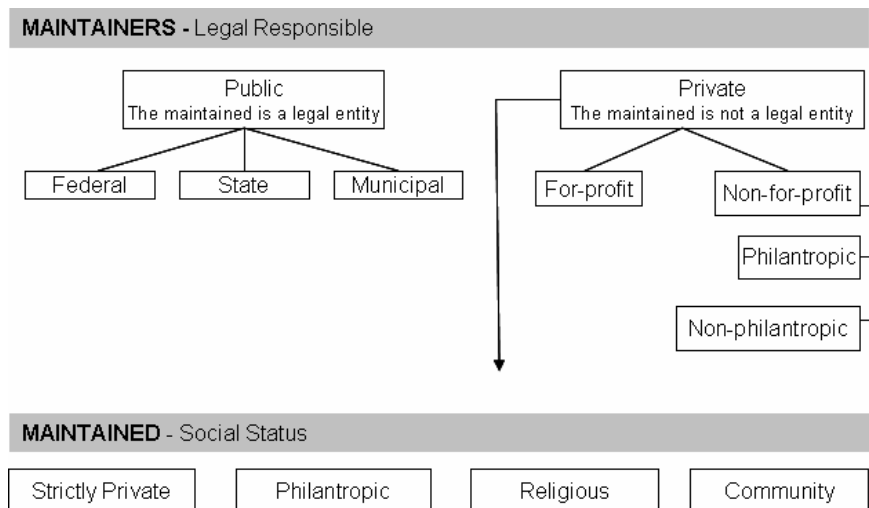
### 3.3. Structure of the system and management

Brazilian educational law distinguishes between two separate legal bodies: the maintainer and the educational institution (the maintained). The maintainer is the owner of the educational institution. The maintainer may be the owner of one or more educational institutions and there are specific characteristics and prerogatives for each of the two legal entities, as will be explained below.

As is shown in Figure 16, higher education institutions are classified according to the legal nature of their maintainers as:

- Public – created by draft law initiated by the Executive Power and approved by the Legislature. They are created or incorporated, maintained and administered by the government and are classified as federal, state and municipal.
- Private – created by means of accreditation from the Ministry of Education. They are maintained and administered by individuals or legal entities in civil law and are divided into profit-making or non-profit-making private institutions. In terms of their social status they are further categorized as:
  - Strictly private, those that are purely commercial,
  - Community, those that include representatives of the community in their decision-making bodies,
  - Religious, those instituted for religious or ideological reasons,
  - Philanthropic, those whose non-profit-making maintainer has obtained the Certificate of Social Assistance from the National Council for Social Assistance.

**Figure 16: Organizational administrative structure of private and public HEIs**



Source: MEC

The federal system of higher education is made up of 83 federal HEIs and 1.652 private institutions. It is the duty of the Federal government to maintain the public federal institutions as well as to regulate the private ones, in order to guarantee the quality of education. The MEC Secretariat for Higher Education plans, guides, coordinates and supervises the formulation and implementation of national higher education policy. State and municipal institutions do not belong to this system.

Theoretically all Brazilian universities enjoy administrative and financial autonomy guaranteed by the Constitution. Strictly speaking this also applies to private universities and some public state institutions. Some state universities (like those of the State of São Paulo) have had full autonomy since 1988 and the results have been highly positive, including those linked to services to the community. In the case of federal public universities however, this autonomy is quite limited in practical terms because of the rules governing the functioning of public services. In practice federal institutions do not have any administrative and financial autonomy. They were – and still are today – subject to strict public service rules concerning both personnel and other expenses, and this is the main reason for their high costs and for the inefficiency of the system.

#### DEFINITION OF THE BRAZILIAN HIGHER EDUCATION INSTITUTIONS

Universities: These are multi-disciplinary public or private institutions that train high-level personnel, and carry out normal teaching, research and extension activities.

Specialized Universities: These are public or private higher education institutions working in a specific area of knowledge or professional training which have to offer high-quality teaching and opportunities for obtaining qualifications to the teaching faculty and adequate working conditions for the academic community.

University Centres: These are public or private multi-curricular higher education institutions that must offer high-quality teaching and opportunities for updating qualifications to the teaching faculty and working conditions for the academic community

CEFETs and CETs: Federal Technological Education Centres (CEFETs) and Technological Education Centres (CETs). These are public or private multi-curricular higher education institutions specializing in offering technological education at different levels and through different types of teaching, whose main characteristic is to give priority to the area of technology. They can deliver technical education at secondary level. The aim of the CET is to train workers in higher-level technological education courses to fit into various sectors of the economy and to carry out research and technological development of new processes, products and services closely linked to the manufacturing sector and society and also offering the means for continuing education.

Integrated faculties: These are public or private higher education institutions with curricular interests in more than one area of knowledge. If the institution has a unified programme and is directed by a director general. It may offer courses at various levels, undergraduate, sequential and specialization courses and postgraduate programmes (master's and doctorate).

Isolated faculties: These are public or private educational institutions. With curricula linked to more than one area of knowledge, they are connected to a single maintainer and enjoy independent administration and direction. They may offer courses at various levels including undergraduate, sequential and specialization courses and postgraduate programmes (master's and doctorate).

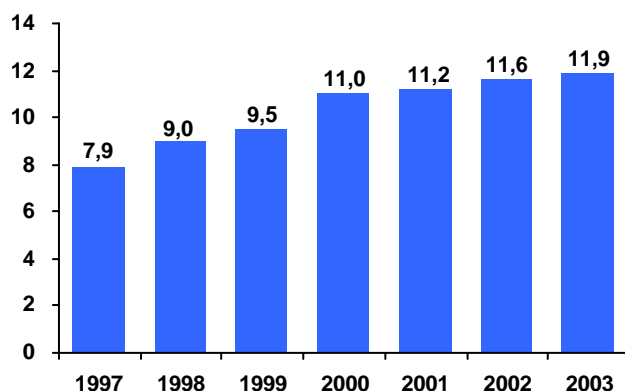
Higher education institutions: These are public or private institutions that offer courses at various levels, including undergraduate, sequential and specialization courses and postgraduate programmes (master's and doctorate).

The inefficiency of public HEIs in their use of resources is reflected in a high student/year cost. The OECD carries out international comparisons in this area, which show that the cost per student per year in Brazilian public universities is about US\$ 13,600, second only to the United States among all the countries studied. Federal universities are part of the backbone of our research and postgraduate system and the quality of their undergraduate courses is higher than the national average. Nevertheless there was – and still is – notorious wastage, excess numbers of teachers and support staff in relation to student numbers and lack of attention given to undergraduate students – which is shown in the absence

of the most highly qualified teachers on those courses, in the frequent absences of teachers, in the lack of adequate laboratories and in the lower level of academic demand made on students.

Between 1995 and 2002, the MEC followed a policy of encouraging federal institutions of higher education to be more efficient in their use of public resources. (see figure 17) This was attempted both by establishing clearer means for monitoring institutional management as well as by defining norms to reward good performance.

**Figure 17: Student/Faculty Ratio in Federal HEIs**



Source: MEC/INEP

As a consequence the average cost per student in real terms in the 1995-2002 fell from R\$ 38,171 in 1995 to R\$ 21,583 in 2002 that values expressed in *reais* as at January, 2005, that is to say, a reduction of 44% in this period. (See table 4).

**Table 4: Total expenditure of Federal HEIs/ total number of undergraduates enrolled in Federal HEIs**

(In *reais* related to prices as at January, 2005)

Year	Total costs (R\$ Millions)	Number of students	Total costs/ students
1995	13,483	353,235	38,171
1996	11,281	373,880	30,173
1997	10,655	380,980	27,968
1998	10,631	392,873	27,060
1999	11,463	442,562	25,902
2000	11,294	482,750	23,396
2001	10,838	502,960	21,549
2002	11,474	531,634	21,583

Source: Original Data from MEC, Presented by Paulo Renato Souza Consultores

### **3.4. Research and technological development**

Most efforts in technological development and innovation have been concentrated in certain of Brazil's universities and not in the business world. Research and development is a strength of higher education of Brazil. Today, almost all states have federal universities, and foundations to encourage research. However, these institutions do not have the same kind of autonomy, especially in terms of continuous, regular and guaranteed financing.

On the other side, Brazil's scientific and technological development in the area of business is still at an initial stage. Brazilian companies have been late in incorporating and developing technology. It is also a consequence of the weakness of business sector's own capacity of research. On top of that, the collaboration between academia and industries is also very insufficient taking into account the needs of Brazilian development. Besides the poor performance of the Brazilian companies in relation to innovation, there is some prejudice that exist among Brazilian scholars in relation to the cooperation with the private sector.

Brazil shows a paradox: on the one hand, there is in the business sphere a low capacity for absorbing human resources into Science, Technology and Innovation (S&T&I); on the other hand, the system of training these resources has shown a large increase in supply especially in terms of postgraduate programmes. In the last two decades, Brazil's scientific capacity has grown systematically year by year at an increasingly faster rate. The ranking of countries, according to their participation in world scientific production – Institute for Scientific Information (ISI) of the National Science Indicators (NSI) – is evidence of Brazil's progress in this field. In 1981, Brazil was in 26<sup>th</sup> place; in 2001, it already occupied a worthy 18<sup>th</sup> position. On the other side, from 2000 to 2003 a slow growth was observed in technological development and innovation in Brazilian industry.

The fact that national research being concentrated in universities - in particular at the postgraduate level - makes it very dependent on the training of those with master's and doctoral degrees. In this context, the importance of new strategies to bring the network of universities together with the world of business becomes more important. An important step in this direction was taken by the recently voted and approved Innovation Law. New means of finance – Sector Funds – and identification of priority sectors in industrial policy, as well as the formulation of the post graduate development plan by CAPES, indicates the desire to continue these trends.

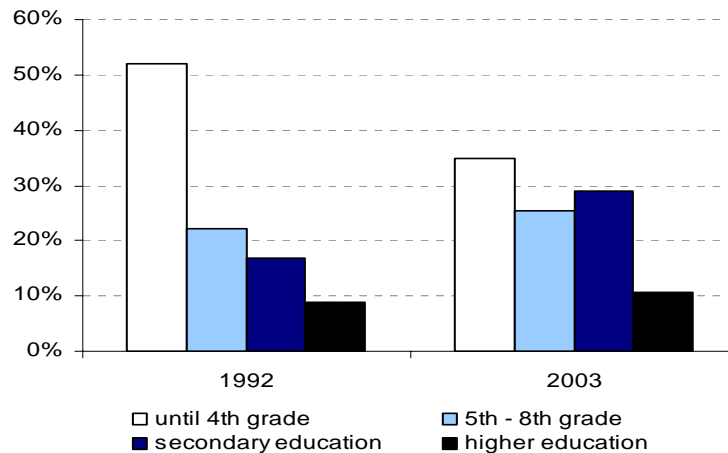
It may be said that a move towards innovation and a clearer preparation for future expansion in R & D activities within growing companies is beginning to be developed recently. There are, however, obstacles hindering this development from proceeding more rapidly. These obstacles are mainly due to organizational inflexibility, problems in the marketplace and the absence of systemic synergy. However, what is most noticeable in the two periods studied is that over 30% of companies complain of lack of qualified personnel. This shows that, even where there is clear difficulty in absorbing manpower, there are questions of quality that have to be overcome.

## 4. Higher Education and Human Resources Development

### 4.1. Education and the labour market

Brazilian labour force is much better educated than a decade ago. (see figure 18)

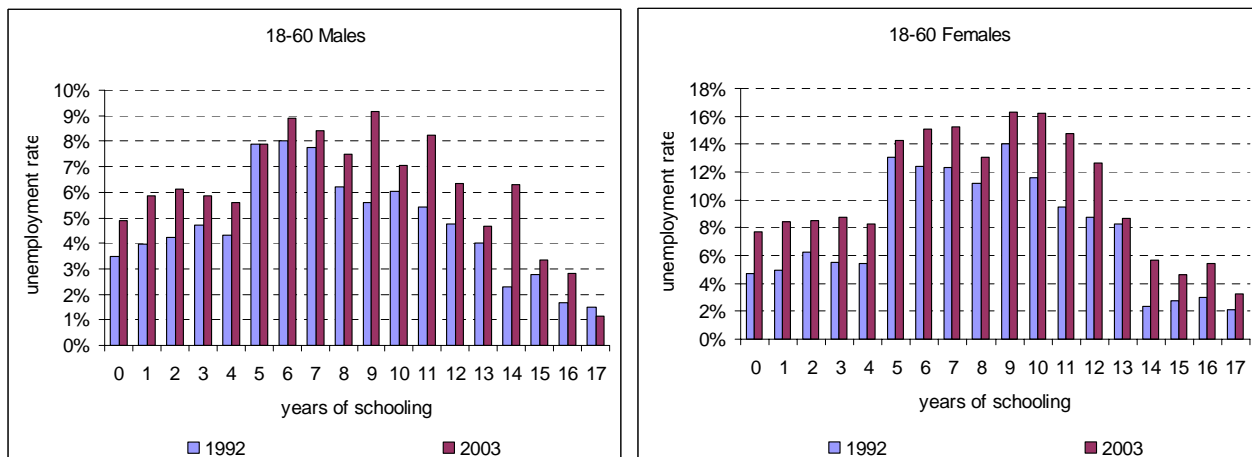
**Figure 18: Distribution of the labour force according to years of schooling in 1992 and 2003**



Source: PNAD.

Regarding the unemployment structure, Figure 19 shows the unemployment rate of the Brazilian adult labour force by years of schooling completed for the years 1992 and 2003 using data from the Brazilian Household Survey (PNAD). The figure presents two interesting features. First, the unemployment rate presents an inverted U-shaped curve. Unemployment is relatively lower in the tails and relative higher in the middle of the education distribution. That is, the unemployment rate is relatively higher for workers with six to ten years of schooling. This pattern persisted through the 1990s. Second, the unemployment rate increased for all education levels in the 1990s, but it increased more among the workers with an intermediate level of education.

**Figure 19: Unemployment rate by years of schooling**



## **4.2. The returns to Education in Brazil**

Brazil has the highest return on education among the 17 Latin American countries. Also, the marginal return on higher education in Brazil, estimated at 135% in 2003, is higher than that in countries such as Argentina (113.2% in 1998) Taiwan (84.8% in 1994) and the Ukraine (29.3% in 2000).

There is evidence that there has recently been a relative increase in demand for workers with higher education. One sign of this is that while the supply of jobs for workers with 12 or more years of education compared with those having 9 to 11 years, fell by 17% between 1992 and 2003 (from 0.53% to 0.36%), the earnings differential between the two groups rose dramatically by 43.6%, from 91.5% to 135%.

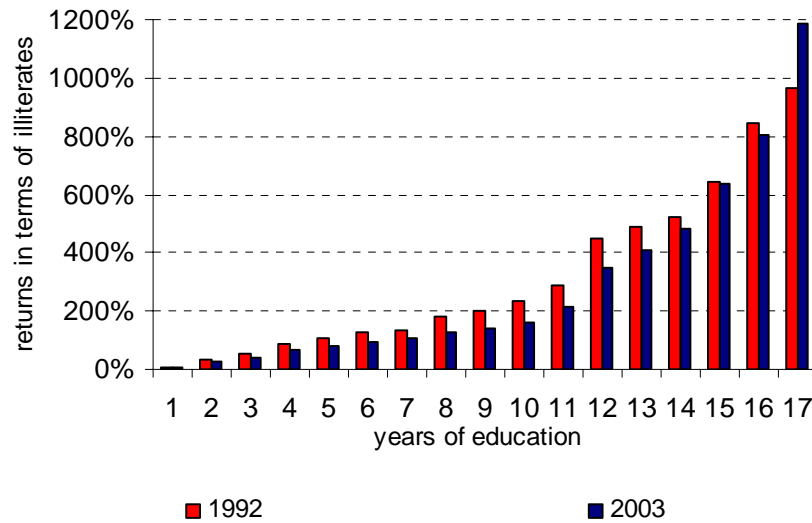
The demand for workers with higher levels of education increased noticeably in Brazil. Factors explaining this particular development are connected both to the country's greater commercial openness and to the technological developments that characterized the last 20 years of the 20<sup>th</sup> century. The labour market, with the new profile demanded by the introduction of new technologies, has come to value workers with higher education.

The rate of return on education in general continues to be quite high, which may be interpreted as an indication that Brazil still has a relative lack of workers with higher levels of education, especially workers with higher education, the area which presents the highest marginal return. Besides being high, marginal return on higher education has risen in a relatively marked way during the last decade of the 20<sup>th</sup> century which shows there was also a relative increase in the demand for workers with higher educational levels.

Besides the international comparisons, one result that is particularly evident is the high marginal return for one extra year of higher education in Brazil. (See figure 20) The average earnings for each additional year of schooling at the post secondary level of education in relation to complete secondary education in Brazil are quite considerable, a pattern that repeats itself in all the geographical regions. When analyzing earnings by area of specialization it is found that even in areas that show the lowest rate of returns such as teaching and social sciences, there are considerable rewards of 40% when compared with earnings associated with those having completed only secondary education. Another aspect is that unemployment among those with higher education was 2% below the average rate of unemployment for all workers in 1992 and 3.2% below average in 2003.

Those with higher education earn on average 6 to 8 times more than illiterate people, while there is a difference in earnings of 117% in favour of those who have completed higher education when compared with those who have completed secondary education. This is after eliminating the effects of other variables that affect earnings (age, gender, race, geographical region). Further, for individuals having seventeen years of study, i.e., have post-graduate degrees or who took graduation degrees with longer duration, such as medicine, the earnings return is 285% higher than for individuals with only secondary education.

**Figure 20: Return on education in Brazil in 1992 and 2003**



### 4.3. Higher Education and labour market by careers and area of specialization

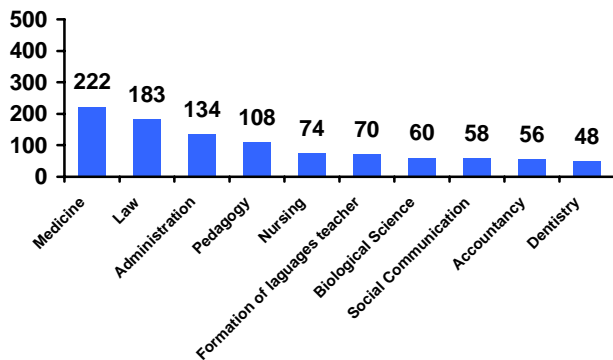
#### 4.3.1. Higher education: Fields of study

Enrolment and graduation in higher education in Brazil show a strong concentration in only three areas: Social Sciences, Business and Law; Humanities and Arts; and Education, all of them belonging to the so-called ‘soft sciences’. This situation creates distortions and may prove to be a factor in inhibiting opportunities for national development. Reversing this trend involves not only increasing investment but also giving new value to several of the specializations of the so-called ‘hard sciences’.

As is shown in Figures 21 to 24, the increased demand for higher education in Brazil is happening in few areas of education.

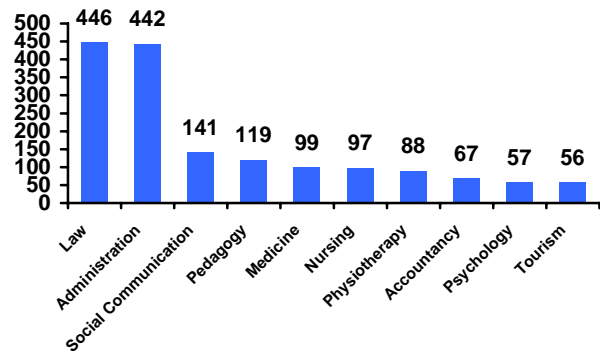
#### 10 most requested courses in Brazil in 2003 (numbers of candidates in thousands)

**Figure 21: Public courses**



Source: MEC/INEP

**Figure 22: Private courses**

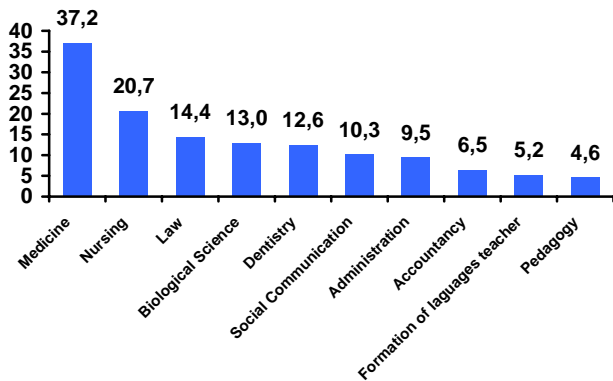


Source: MEC/INEP



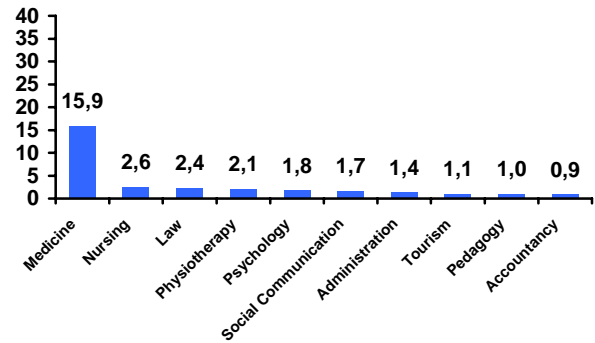
## Ratio of candidate/place in the ten most requested courses in Brazil in 2003

Figure 23: Public courses



Source: MEC/INEP

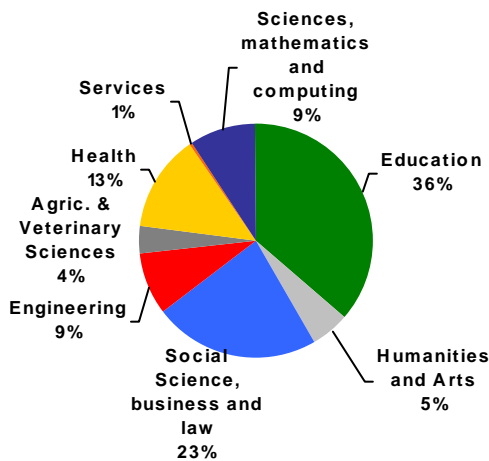
Figure 24: Private courses



Source: MEC/INEP

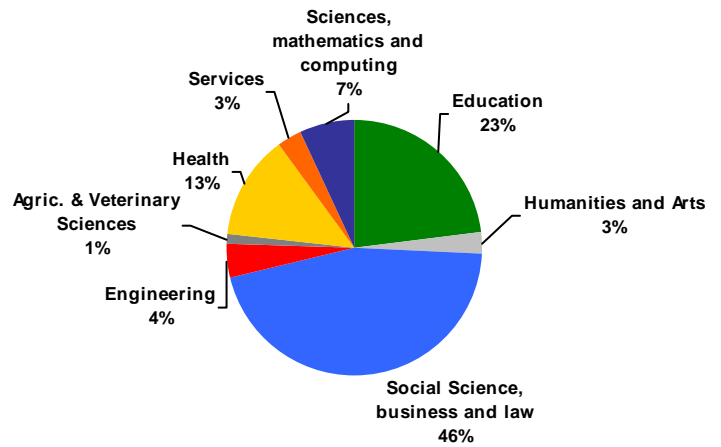
A similar pattern may be observed in the proportion of graduation according to the field of study (see figures 25 and 26) with some differences between the public and the private institutions. In the first case, the proportion of the hard sciences is bigger than in the last one.

Figure 25: Distribution of completions by field of study in 2003 – Public Sector



Source: MEC/INEP

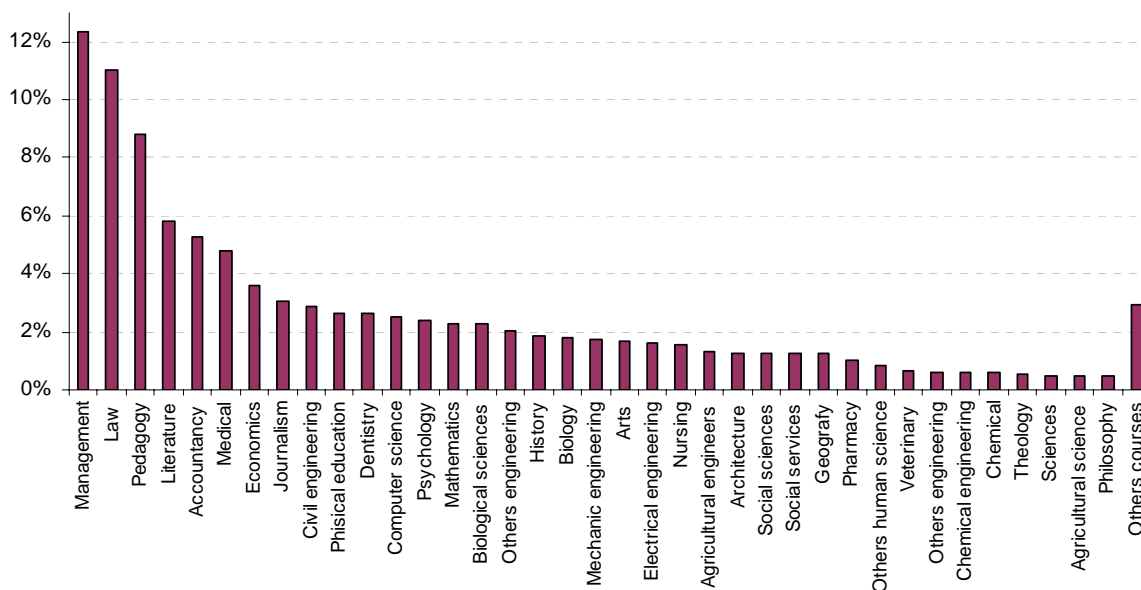
Figure 26: Distribution of completions by field of study in 2003 – Private Sector



Source: MEC/INEP

As a consequence, for the 45 fields of study reported in the database, 32.5% of the individuals were concentrated in only three areas, administration, law and pedagogy (see figure 27).

**Figure 27: Distribution of individuals with higher education by area of study (%) – Brazil**



Other courses: Advertising and promotions (0,4%); Library technicians (0,4%); Other literature and arts (0,3%); Physics (0,2%); Teacher training (0,1%); Geology (0,1%); Statistics (0,1%) and Other courses (1,4%). Source: Census 2000.

There are several explanations for the importance of that particular structure in the Brazilian Higher Education System. First from the supply point of view, those areas are much cheaper to be organized or expanded; they practically don't need expensive laboratories investments and maintenance. Second, also from the supply side, the recent period of expansion was characterized by the creation of new and small institutions by the private sector, typically out of the big cities and richer regions. In those circumstances it is probable that the money to be invested in creating new institutions or courses would not afford for investing in hard sciences courses. Third, from the point of view of the demand, in the last ten years Brazil grew at a slower rate than its historical pattern, which meant also a slower rate of demand for labour in the leading sectors of the economy as industry. Fourth, and specially for women, the demand from the public sector for new teachers was growing very fast because of both the expansion of public basic education and the requirements of the new LDB in relation to the teaching certificate at higher education level for incoming basic education teachers and a degree in education as a requirement for those working in educational administration, planning, inspection, supervision and guidance within schools. On the demand side, there may be two additional reasons: i) courses in the areas of administration, law and education offered by private institutions have lower monthly fees, which means that more people can pay for these courses than in other areas such as engineering and medicine; ii) in smaller towns, as the potential market for higher education is more restricted, the trend is for educational institutions to offer only those courses with more general interest or with the greatest demand.

Demand from the industrial sector favours training in various branches of engineering, computing and management subjects. Physicists, chemist, biologists and mathematicians are in demand but definitely to a lesser degree. However, the need for qualification and development in these basic areas is based on three elements: a) attending to the direct demand from industry and research and development; b) attending to the needs of the education system and academic research; c) attending to the need for qualification in the basic subjects of technology courses – engineering, applied courses and even those

of the technologists. The development of basic academic specialists has, therefore, a crucial indirect effect on technological areas.

It is very interesting to compare the Brazilian situation in that respect in relation to other countries. The structure of the Brazilian graduation is similar to the United States. But we have to consider that the area of Humanities in the US is big because of the different structure of the system in that country, where this area functions as a kind of opening door for further specialization afterwards which is not the case in Brazil. In all other developed countries the proportion in the so called soft sciences areas are significantly lower than the one observed in Brazil. It is worthy to stress the very high proportion of the area of Engineering in the case of Korea.

#### **4.3.2. Market driven courses in higher education**

In relation to the supplying the demand for preparation for the labour market in general, recent initiatives aimed at diversifying opportunities for post-secondary training – sequential courses, higher technological courses arising from initiatives laid down in the new LDB, are an important experiment and have helped to build an innovative atmosphere in the area of higher education. The legislation approved in 1996 has created the possibility of offering two types of short courses in higher education: technological and sequential courses. In both cases they are courses with a high practical content aimed at labour market requirements. The difference between them is in their status and qualification:

- Sequential courses are only offered by higher education institutions and may consist of the components of a complete course of four years. Course length maybe variable but the majority of those that provide vocational qualifications last for two years. Finishing a sequential course earns a certificate of study rather than a higher education degree.
- Technology training courses may be offered by higher education institutions or by institutions specializing in training technologists. Courses have a minimum duration of two and a half years. Successful conclusion of the course earns

Generally, institutions that have started to offer for example sequential and technological courses have shown a special sensitivity to trends in the labour market and managerial flexibility. These initiatives have come from private higher education institutions while public institutions have shown themselves reluctant to take up the new opportunities created by the legislation. Diversification in higher education must proceed and be consolidated. Only in this way can we imagine a broader and consistent process of generating larger numbers of students who are better prepared to enter the labour market. In more developed countries, a great proportion of enrolments in higher education are in short courses aimed at the needs of the labour market. In the United States, this proportion is 40% of total enrolments and in Spain 30%. a higher education degree allowing the student to continue to the postgraduate level.

In regional terms, the highest indicators of lack of professionally trained personnel are the following:

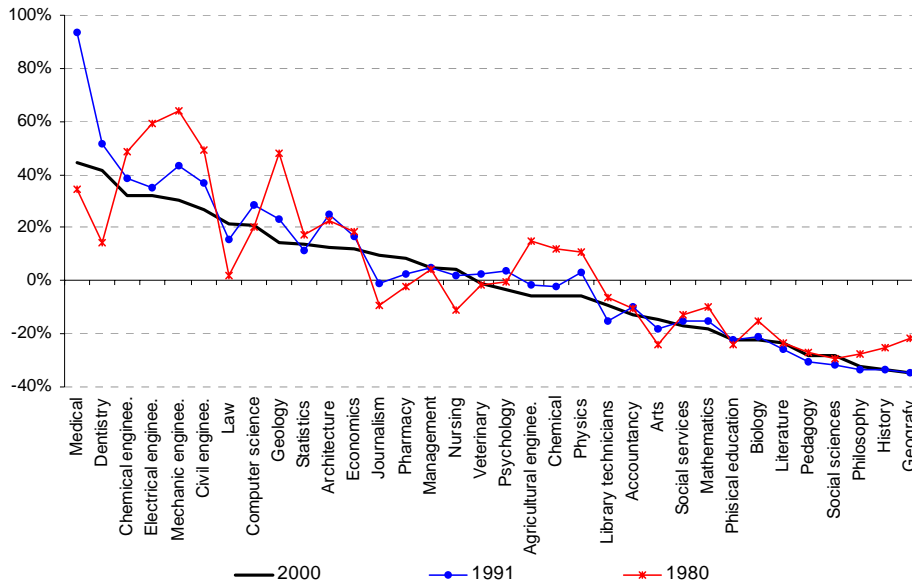
- In agricultural engineering, the regions with greatest earnings return are the North, Northeast and Centre West. However, the lowest rate of unemployment in this area is found in the Centre West, which supports the conclusion that, relative to other regions, there is a greater shortfall of agronomists in the Centre West.
- In medicine, the Northeast has the highest earnings return, followed by the North. However, unemployment in this area is quite high in the Northeast, in contrast to the North, which led to the conclusion that the relative scarcity of doctors is in the North.

- In chemical engineering there are clear signs that the greatest scarcity in this area is in the Northeast, given that this region gives the best return in earnings, as well as the lowest rate of unemployment, followed by the Northeast, compared to other regions.
- In the area of law, it may be said that the greatest scarcity occurs in the Northeast, followed by the North, bearing in mind that these regions have the highest earnings return and lowest rates of unemployment compared to other regions.
- For the remaining regions, criteria analogous to these were used to find the regions with greatest indicators of scarcity.

Brazil lacks studies that try to relate the performance in the labour market of workers with higher education to their area of specialization. The empirical results of this study indicate a significant imbalance between the supply of professionals at different levels and areas of qualification and the effective demand of the labour market for their respective occupations. This is shown by the great variability of performance in the labour market, not only among professionals with different levels of qualification, but also among professionals with different areas of training, in matters such as salary and unemployment rates. In terms of supply of education, these results can be explained by an imbalance in the offer of places for different types of qualification, mainly on the part of public educational institutions.

Nevertheless, the result of the empirical results suggests that there is not a great problem of matching between the supply of work by area of training in higher education and the demand for these professionals in Brazil as a whole. It is worth pointing out that there is no markedly negative relationship has been found between the earnings premium and the rate of unemployment, a result that might be expected if there were a large group of specialist areas with a high premium and low unemployment – showing the lack of professional people in these areas – together with a significant number of areas with a low premium and high unemployment – which in this case would give an indication of the surplus of professionals in these areas. (See figures 28, 29 and 30)

**Figure 28: Earnings differentials of workers by area of study**



**Figure 29: Unemployment rate by area of study**

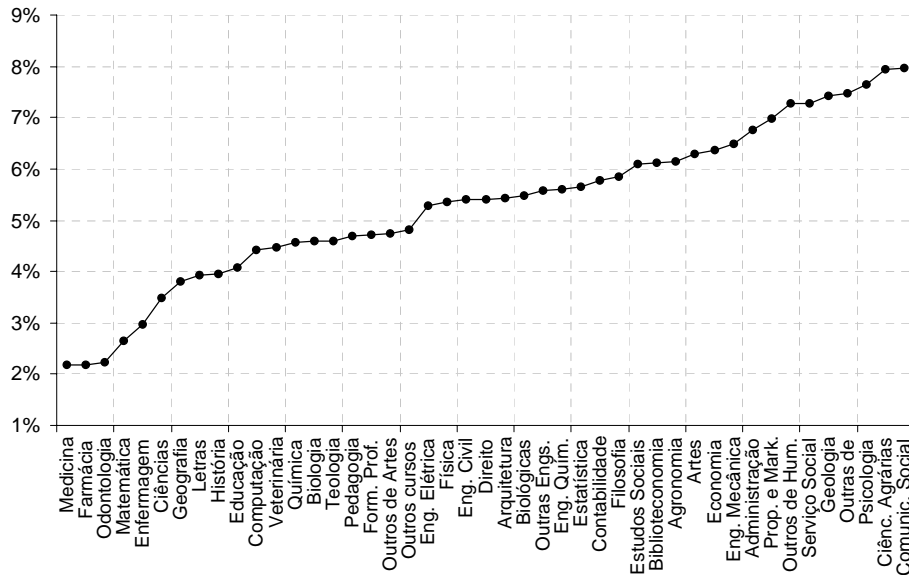
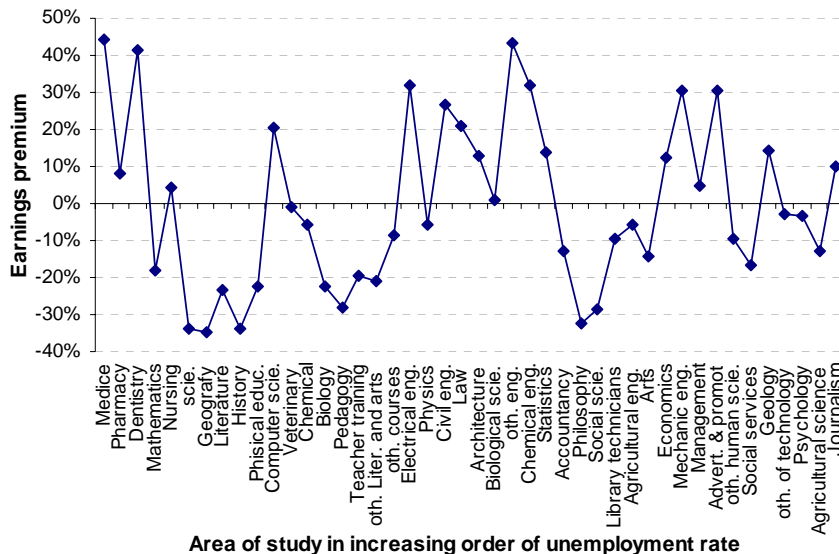


Figure 30 illustrates the fact of not identifying a statistically significant relationship between the two variables.

One implication of this result is that from the point of view of individuals who have already finished higher education, some subject areas clearly have a higher return than others. For example, medicine and dentistry have a high level of earnings and low risk of unemployment, while areas such as philosophy and social sciences have low earnings and a high level of unemployment. In terms of

supply of education, the results can be explained by an imbalance in the offer of places for different types of qualification, mainly on the part of public educational institutions.

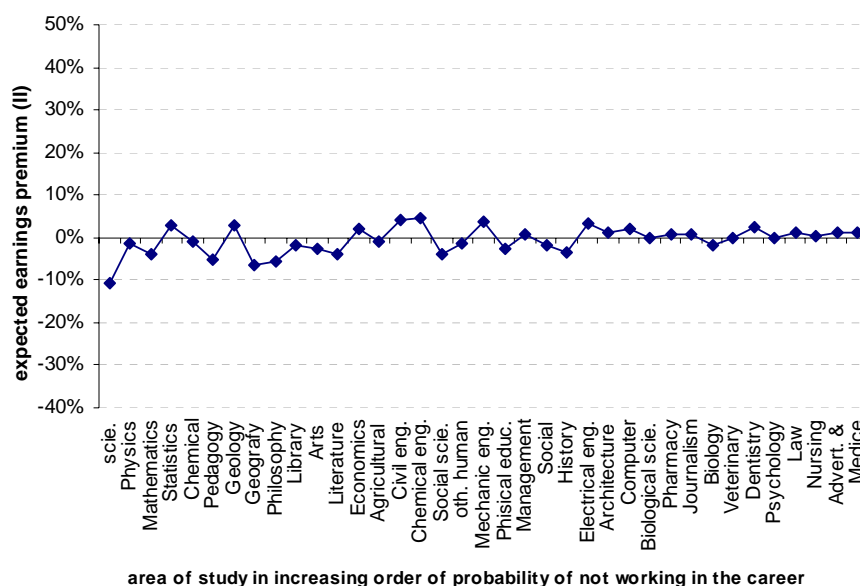
**Figure 30: Earnings premium in increasing order of unemployment rate – Brazil**



However, when we look at the return expected in the labour market between different subject areas from the point of view of those who are choosing what to study in higher education, the result changes substantially. Figure 31 shows the Expected earnings premium (II), defined as earnings premium multiplied by the employment probability and by entrance exam approval probability for the career (given by the inverse relation of candidate-place).

A conclusion that may be made is that from the point of view of the expected return, there are no obvious choices for the undergraduate candidate, since the expected earnings premium (II) does not register much variation between the areas of study.

**Figure 31: Expected earnings premium (II) by increasing order of risk – Brazil**



A second piece of statistical evidence showing the limitation caused by the influence of the return expected from the labour market on the choice of subject area comes from econometric tests, which indicate that the candidate/place ratio in entrance examinations does not correlate highly with earnings nor unemployment rates in these areas.. The earnings presented an elasticity of 0.5 in relation to the CVR (with a level of significance of 0.1%) while unemployment present an elasticity of only – 0.05 (with a level of significance of 11%).

The marked difference in performance in the labour market among professionals with different *levels* of training and among professionals in different *areas* of training, can also be explained by the problem of scarcity of information possessed by workers.<sup>5</sup>

The Brazilian postgraduate system is different from the undergraduate level in two ways: the majority of enrolments and courses are in public HEIs, and there is a more uniform distribution of courses in the major areas of knowledge. The increased demand for qualifications among teachers in HEIs and the increase in resources devoted to research necessarily has led to a notable re-definition and expansion of the country’s postgraduate system. Challenges also included raising the level of performance and training capacity of postgraduate programmes, which in turn led to the demand for new instruments and forms of support.

Between 1996 and 2003, the postgraduate system improved significantly. At the master’s level, the number of students increased from 43,968 to 65,099. About 10,500 master’s degrees were awarded each year during 1996 and 2003. At the Ph.D. level, the number of students rose from 20,464 in 1996 to 37,540

<sup>5</sup> Nevertheless, it was not possible to prove the hypothesis that the greater demand for certain specialists is associated with different premiums identified in the labour market. The empirical test does not identify a statistically significant relationship between the earnings premium and rate of unemployment among areas of training, while the hypothesis of consistency of choice of specialism presupposes the existence of a trade-off between the premium obtained in the job and the probability of getting a job, that is, the existence of a positive relationship between the variables of premium and unemployment. In addition, there are other determiners of the rewards obtained from different areas of study that have nothing to do with the question of relative scarcity of the subject area or the level of competition in the entrance examination, such as: (i) distance in relation to the place of residence; (iii) amount of monthly educational fees; (iv) time devoted to the course (full- or part-time); (v) time taken to obtain a job and to progress in the career after completion of the course or (v) the preferences and affinities different areas have for individuals.

students enrolled in 2003. In the same period, the number of Ph.D.s graduating each year increased from about 3,000 to 8,000. It is worth noting the considerable increase in postgraduate activities in the north and northeast regions, which improved the regional distribution of supply and helped to reduce inequalities in the training of human resources at the higher level.

#### **4.4. Implications for policy**

An explanation for the marked difference in performance in the labour market among professionals with different levels of training and especially among professionals in different areas of training is the problem of lack of information possessed by workers. It may be supposed that, as a rule, individuals have access to a limited amount of information in order to make choices concerning the best level of education to be sought, as well as careers that have most potential in terms of financial return. Naturally, the greater the availability of information about labour market conditions by type of occupation and qualification – such as unemployment rates, average earnings, length of working day and others – the better tends to be the decision of the individual concerning the acquisition of qualifications and choice of occupation.

It is worth pointing out that it is reasonable to suppose that the low level of sensitivity found in the candidate/place relationship in the *vestibulares* in terms of the earnings and unemployment variables, may be explained by a problem of providing information. In terms of public policies, one prediction that may be drawn out of the results is that greater public investment in generating information could help candidates to higher education make the best choice of academic specialism.

This is an area where the Ministry of Labour could develop policies aiming to increase the availability of information concerning conditions in the labour market of each occupation and professional career in order to improve the ability of the worker to make decisions about the choice of level of qualification, area of training and of work.

Another policy area is to encourage studies by the Ministry of Labour on projection of the potential demand for workers by occupation over different time scales. Even if we accept that the level of precision of this kind of projection may be quite limited, the potential advantage of a plan such as this to improve the suitability of the labour force to a demand that is constantly changing, may be considered significant for at least two reasons.

This is firstly because a specialized nucleus in such a plan may have a far higher potential to project future demand for jobs than that of each job provider in isolation. Indeed, rather than concentrating the task of projecting demand for jobs in a single organization, a more promising strategy for the Ministry of Labour would be to encourage the production of this kind of projection by different institutions, thus creating additional means for these institutions to compete with each other over time for the reputation of having the highest score for accuracy in their predictions.

The second reason that justifies such studies by the Ministry of Labour results from the fact that is socially desirable to re-allocate the labour force from occupations in decline to more promising occupations. And it should take place with the benefit of planning and be concentrated on younger workers. That is because re-allocation of labour force is expensive and takes a long time to develop. Then, as younger workers have a longer useful lifetime in the labour market, they can enjoy for a longer period of time the new offered qualification.

It is very important for institutions of vocational educational and higher education to incorporate the idea of entrepreneurship as a challenge in the course of changing the profile of their graduates. This



idea is in turn linked to business incubators connected to the institutions of higher education and technology centres as a way of creating more sophisticated links between the academic and research world and that of the business sector. This idea could be the motivation for an important cooperative financing project by international finance organizations that could have a great effect on the public higher education system and the Centres for Educational Technology.

The great majority of companies find difficulty in contracting labour, especially workers with vocational and higher education, for the operational area and at directorial levels. No significant dissatisfaction was found with the quality of manpower on the part of employers. In general, evaluations are positive, showing that the difficulties in hiring appear to be associated more with the personal attributes of workers than with the quality of their training. Two aspects of the curricular content were mentioned: (1) the need for more practical content delivered by teachers with practical experience; and (2) the need to develop behavioural competences such as leadership, adaptability, interactivity, teamwork and management. Those aspects have been indicated for vocational education as well as to the higher education, both at graduate and postgraduate level. When a specific subject area is quoted in which the highest degree of dissatisfaction is found, the one which appears most often is business administration, which is to a certain extent linked to the fact of this area requiring a high degree of behavioural competences.

The employers indicated workers with higher education and workers with vocational education as the types of personnel, who will be most probably needed by the company in the next 10 years. Besides the two main observations already mentioned, among the various suggestions given by companies to make the training of manpower more suited to their needs, those which appeared with greatest frequency and which have the most general applicability are:

- Increasing academic/business links at vocational and higher education levels. It was suggested the creation of courses that would be relevant to regional needs (such as mechanical engineering in Manaus, for example), another suggestion was to consult companies when course curricula are being developed, as well as increasing partnerships between the “*Sistema S*” and business;
- Updating technology in teaching establishments;
- Improving the quality of public teaching institutions;
- Offering more courses in computing.

Three forms of recruitment stand out concerning workers with vocational education: recommendation of friends and acquaintances, employment agencies and advertisements in newspapers and magazines. For workers coming through the “*Sistema S*”, companies mainly use recommendations of friends and acquaintances for hiring. A larger number of methods of contracting are used to acquire manpower with higher and postgraduate level education. To recruit workers with higher education, the use of employment agencies, the Internet, advertisements in universities, advertisements in newspapers and magazines, and recommendations by friends and acquaintances are the most common procedures. For hiring workers with postgraduate degrees, the main methods are head hunters, employment agencies and the recommendation of friends and acquaintances.

The great majority of companies have training programmes and various qualitative replies indicated in-house training of the workforce as an important factor in avoiding difficulties at the point of hire. The main policy of companies in terms of paying student scholarships or helping with the costs of courses for their workers is to pay part of these costs and thus share the investment in training with the

employee. Companies pay the whole of these costs, according to most of the responses, only at the level of director. By level of qualification, this type of investment, whether complete or partial, is almost always given to employees with vocational, higher or postgraduate levels of education.

This is a specific area in which it is possible to encourage greater participation from the private sector to improve the development of human resources in Brazil. High unemployment rates among young people, including those who have studied to secondary or higher levels are connected to their lack of work experience. The offer of better work-experience opportunities could be a decisive factor in reducing the problem.

## **5. Considerations for JBIC support**

Based on experiences of Brazil working with international agencies for education and human resources development, future assistance particularly by JBIC will have to take into account the following four elements:

1. The strong presence of the World Bank and the Inter American Development Bank in the areas of basic education and secondary vocational education. The World Bank is present from the beginning of the nineties in the area of fundamental education especially in the northeast, north and centre-west regions. The IDB is supporting secondary and vocational education - especially at the secondary level - from late nineties, acting in the country as a whole.
2. The problems that have arisen in the latest negotiations concerning the renewal of the PADCT financed by the World Bank (which has not been implemented) and which involved serious concern with technological innovation based on the research potential that has been established in the academic world.
3. The need to select some areas for action in higher education, both general and vocational. As has been demonstrated in the present study, a very well defined project in those areas could have an important impact both in terms of economic development in Brazil and in terms of enhancing equity in the Brazilian educational system
4. The convenience of considering also undergraduate education and the science and technology areas. Those are important areas for improving economic growth and development in Brazil, as has been shown in the present study. The Japanese experience of linking university to the proactive sector and research to technological development could be very important in transforming Brazilian R & D areas towards a more practical and less academic orientation.

The specific areas for JBIC support will be determined in the discussions with the JBIC and Brazilian authorities. Those discussions should also define a focus to that cooperation. Attention should also be paid to the results of the survey of business leaders, which emphasized the better preparation of the workers in vocational education and the general skills for the labour market. In some specific geographical areas (like Manaus for instance), a strong case was made for increasing the supply of engineers. From that perspective, the following list of areas could be envisaged as a first approach for future discussions that have high potential interest for JBIC support for Brazil:

### **a. to expand vocational higher education**

The quantity of short-term higher education courses oriented to the labour market is very restricted in Brazil, especially in public institutions. JBIC could support those institutions, especially the CEFETS,

to expand the offer of this kind of programs, financing curricular development, teacher training and laboratories and equipment.

**b. to improve higher education infrastructure especially for the ‘hard sciences’**

The improvement of higher education infrastructure for ‘hard science’ is very expensive. On the other hand, Japan has a long history of producing equipment for the laboratories needed for this purpose and JBIC could give the financial support to achieve this improvement.

Initiatives in this area should take into consideration the need for complementary links between investment strategies of the sector funds for science and technology. The investment made in the infrastructure of chemistry, physics, biology and mathematics at undergraduate and postgraduate levels should involve commitment on the part of the institutions of higher education to modernize teaching certificate courses in sciences and mathematics and to work towards the continuous improvement of schoolteachers. Financing the improvement should be linked to efforts to modernize the curriculum at undergraduate level and to a commitment to projects that make collective and multidisciplinary use of research infrastructure. One dimension of the infrastructure of scientific disciplines that is increasingly critical for institutions of higher education is access to library stocks, especially those with a focus on undergraduate courses.

**c. to expand the offer for the “hard sciences” and science and technology careers**

JBIC could support the Brazilian public higher education institutions to expand the offer of ‘hard sciences’ and science and technology subjects financing curricular development, teacher training and laboratories and equipment. In relation to private institutions, a specific loan through the BNDES could be considered as a global loan for specific purpose.

In particular, the JBIC might consider the suitability of designing a project focused on the North region. The main aim would be to provide a significant boost to the ability of the groups of institutions of higher education in the region, under the leadership of the public institutions of higher education, to offer training in chemistry, physics, biology and mathematics and in engineering courses. This reinforcement might include training human resources, improving infrastructure in general and creating two centres of excellence in engineering, one in Manaus and the other in Belém, with separate and complementary purposes: Manaus could prioritize excellence in engineering that is most relevant to the industrial complex of the free trade area; Belém could be a centre for excellence in transport, sanitation, agriculture, veterinary sciences, etc. The final decision on locating the areas to be supported and their institutional connections could be achieved by means of competitions between the institutions of higher education involved, taking into account the policy priorities of MEC and the MCT. Based on the Centres of Excellence, permanent support networks with the regions institutions of higher education could be set up.

**d. to support curriculum reform in order to achieve a closer relationship with the labour market and the development of science and technology**

JBIC could help the Brazilian public higher education institutions to introduce reforms in their curricula in order to fulfil the needs of the labour market and the development of science and technology. Activities for end should include financing curricular development, teacher training and laboratories and equipment. In relation to the private institutions, a specific loan through the BNDES could be considered as a global loan for specific purpose.

**e. to implement curriculum reform in the area of teacher education to accomplish the improvement of quality in basic education**

JBIC could help the Brazilian public higher education institutions to introduce reforms in their curricula in order to fulfil the needs of the public basic education systems in improving their quality and students' achievements. Activities to this end could include financing curricular development, teacher training and laboratories and equipment. In relation to the private institutions, a specific loan through the BNDES could be considered as a global loan for specific purpose.

**f. to improve administrative efficiency and managerial skills in public institutions**

JBIC could help the Brazilian public higher education institutions to enhance their efficiency and reduce their cost per students. Activities for that should include training programmes for university administrators and financing the investments that may be necessary for the expansion of enrolment, especially in evening courses.

**g. Supporting the setting up in the Federal HEIs of innovation cabinets**

Supporting the setting up in the Federal HEIs of innovation cabinets. The aim of these cabinets would be to seek, in the fields of education, management and relationships with society and the transfer of technology, the possibilities for innovative actions on the part of the institution and the diversification of sources of funding its target activities. Changes in teaching have been very slow because there are no mechanisms to stimulate, recognize or reward innovation in this area. The ability to absorb new information and communication technologies in the teaching process, involving a reconsideration of classroom time and the whole curriculum, has also been very slow in the Federal HEIs and occurs in few places. The absence of innovation nuclei makes the process more difficult since this depends of in the goodwill and disposition of groups of people who have traditionally been involved in routine activities.

The existence of a programme with sufficient resources to stimulate the Federal HEIs to set up, by means of projects and performance-based contracts, these nuclei or cabinets for innovation could mean a decisive break with conventional culture and inaction which, on the whole, characterizes our Federal HEIs.

**h. to improve administrative and financial autonomy of public institutions**

JBIC could help the Brazilian public higher education institutions to organize themselves in a fully autonomous status, enhancing their efficiency in the utilization of public funds. Activities to that end could include programmes to train MEC staff and university administrators.

## Appendix: Brazil, the country

Brazil is the biggest country in Latin America in term of geographical area and the fifth largest in the world, surpassed only by Russia, Canada, China and the United States. Its total area is 8.5 million km<sup>2</sup>, which is 47.3% of the South American land mass. The country is divided into 27 Federal units, 26 of which are states and one is the Federal district, and they are grouped into five regions: North, Northeast, Centre West, Southeast and South. This grouping gathers together states with similar physical, human, economic and social characteristics.

Brazil is the largest economy in South America and the thirteenth largest economy in the world in terms of GDP, according to International Monetary Fund (IMF) figures for 2001. In 2004, total GDP was US\$665 billion, with 9.7% coming from agriculture, 37.2% from industry and 53.21% from services. In 2004 Brazil's GDP per capita was US\$3,665. In the last ten years (1995-2004), the Brazilian economy has alternated periods of growth with periods of crisis, with average growth totalling 2.4% per annum. Development was driven by the agricultural sector, which grew on average 3.2% per annum while industry grew by 1.6% per annum and services 1.9%.

With the introduction in 1994 of the economic plan to stabilize the currency, the *Plano Real*, inflation was successfully controlled by means of de-indexing prices and salaries as well as using a fixed exchange rate. Since January, 1999 the government opted for a system of inflation targets. Adopting this policy emphasized the government's commitment to stability and increased the credibility of the Central Bank.

The population of Brazil in 2004 was about 179 million, making it the fifth most highly populated country in the world. Nevertheless, because of its large territorial area, its demographic density (20.2 inhabitants/ km<sup>2</sup>) is relatively low. Most of the population is concentrated in urban areas (81.2%), mainly in the large state capitals, a situation resulting from the marked process of urbanization the country experienced after the 1960s, when the urban population was only 44.7%. Today, of the 27 capitals of federal units in Brazil, twelve have more than a million inhabitants and São Paulo is among the ten largest cities in the world.

The Brazilian population is also showing a tendency towards aging. Between 1991 and 2000, the proportion of the population aged 40 and over grew from 23% to 27%, a result both of the drop in fertility as well as the increased life expectancy observed in recent years. Currently, life expectancy in Brazil is 71 years. The birth rate has dropped dramatically from 3.22% in 1980 to 2.42% in 1990. From that year, the rate began to drop slowly until it reached 2.06% in 2004. The mortality rate also dropped dramatically during the 1980s, from 0.86% per year in 1980 to 0.70% in 1990, after which it began to fall more slowly before stabilizing at 0.63% between 2000 and 2004.

The average income from the main economic activity of people working in Brazil as a whole rose by only 1.7% between 1992 and 2003, from R\$577 to R\$587 based on prices of the latter period. Even so, on evaluating development by region, the only regions which showed a positive result were the Southeast and Centre West. In all other regions a fall in average earnings was found between the years 1992 and 2003. Between 1992 and 2003, inequality of average income between the regions of Brazil increased.

In Brazil as a whole, 61.9% of the workforce in 2003 earned less than R\$400 per month, including the unemployed, and 26% earned between 400 and R\$1,000, while only 4.3% of those in employment earned more than R\$2,000. The region with the greatest concentration of people in the lowest wage

range the Northeast, where 83.6% of the total work force earned less than R\$400. In contrast, the Centre West and Southeast regions contained the highest proportions of employed persons earning more than R\$2,000, 5.8% and 5.9% of the total workforce respectively.

The social inequalities generated over a long period of time by the development process in Brazil are associated with decades of educational backwardness and the low average level of schooling among the population. Today, inequality in education explains about 45% of inequality in income among those from the first to the ninth income deciles. It is impossible to identify precisely the causality between inequality and the lower level of education of the Brazilian people, but the two problems are definitely closely associated in the relationship of circular causality that has made them reinforce each other over time. It is also true that until the end of the 20<sup>th</sup> century, Brazil had not defined clear and efficient policies to expand high-quality basic education in order to create universal access to this educational level for all young people. Problems of difference in access to, remaining in and success at school in Brazil are far more related to problems of inequality of income than to those of race.

Another aspect intimately related to educational levels is that of the marked regional disparities found in Brazil. It is no accident that the North and Northeast regions are those that have the lowest average income levels and the highest rates of poverty in the country. The levels of poverty are strongly related to the illiteracy rates, which in these areas are about double the rates of the South and Southeast regions.