



# Elasticity - Income from Private Sector Demand for Presential Higher Education in Brazil

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## Abstract

Brazilian higher education registered a remarkable growth from the 90's, explained by the changes that occurred in the Law of Directives and Bases of Education (Lei de Diretrizes e Bases da Educação- LDB) of 1996. These changes enabled the expansion of the private sector, by more than 500%, from the 80's until the year 2018. This article analyzed the income elasticity of demand based on data from the Higher Education Census and the Average Income of the Brazilian population in the period from 1984 to 2018. The aim is to demonstrate how family income substantially influences the number of students enrolled in private higher education in the country. The calculation showed an elasticity of approximately 2.96, that is, for each unit increased in the income of the Brazilian population, the demand for higher education will be increased by approximately 2.96 units. The results obtained, based on the growth of the country's income, help in the projection of future enrollments, in the revenue forecast and in the preparation of the sector's business planning.

**Keywords:** Higher education; Presential education; Income; Private university

## Introduction

Teaching as a means of improving income distribution and quality of life has been the target of several studies throughout Brazilian history, such as those developed by Barros et al. [1] and Langoni [2] that the inequality installed in Brazil is a direct reflection of the slow expansion of the educational system. Therefore, a greater investment in education will contribute to the gradual decrease of inequality and consequently to economic growth.

Inequality in income distribution is real. As much as the average income showed a significant improvement within the

period analyzed, financial resources, as well as the others, are finite and scarce, making entering higher education an important decision and involving numerous trade-offs. Even in the face of this paradigm, the study published by the National Forum of Catholic Higher Education Institutions (2018), considered the data obtained from the main institutions in Brazil, points to a projection of growth in the student base by 2020. Being driven mainly by distance learning, both because of its low cost and its ease of adapting to the student's routine.

Therefore, the central objective of this article is to estimate and analyze the impact of the income elasticity of private sector demand and attendance. The first part is the contextualization of higher education. The second analyzes the behavior of enrollment and average income of the population in the 1984-2018 period. The third part presents the models used and discusses the results obtained. Including this Introduction and a chapter dedicated to the final conclusions.

## Contextualization of the Private and Presential Brazilian Higher Education Sector

### A brief history of private higher education in Brazil

When discussing higher education, it is necessary to approach its history in Brazil, to obtain a holistic view of the whole process from its past conception to the present day.

Saviani [3], mentions the precursory beginning, but still incipient that the Jesuits, in the colonial period, took the first steps towards the contribution of higher education in Brazil, with the courses of philosophy and theology, but it cannot be confirmed.

According to Sampaio [4], the higher education courses in Brazil, as registered, emerged from 1808, the year of arrival of the royal family in our land, in view of the need to serve the young elite of the time. Even with higher level courses in Brazil,

the right to knowledge was considered elitist. Napoleon restricted the right to study in Europe, so only the children of the colonial aristocracy had access to. This part of society retained knowledge, while most of the people were enslaved, or subdued by their colonizers.

In 1920, the first University in Brazil - the University of Rio de Janeiro - was created by decree number 14,343 of September 7, 1920, which brought together the Polytechnic School of Rio de Janeiro, the School of Medicine of Rio de Janeiro and the School of Law of Rio de Janeiro, which was a milestone in Brazil.

According to Sampaio [5], the autonomy of the University was finally discussed and should be organized as follows:

a) Integrated into a single system, but under autonomous direction, the professional faculties (medicine, engineering, law), specialized technical institutes (pharmacy, dentistry), and institutions of high studies (faculties of philosophy and letters, mathematical sciences, natural physics, economic and social sciences, education, etc.);

b) And in a manner that, without losing its character of universality, can develop as an organic and living institution, put by its scientific spirit, by the level of its studies, by the nature and effectiveness of its action, at the service of the formation and development of the national culture" [6].

Private Higher Education began in the Republican period. With the constitution of the Republic in 1891, that allowed the opening of higher education to the private sector but walking slowly until 1920. Martins [7] points out that from 1930 to 1945 there was an intense dispute between the secular and Catholic elite for the control of education, especially in the private sector. In 1931, during the Vargas era, a reform in education was promoted, which, among other things, was in line with the Constitution of the Republic, keeping the higher education system open to private initiative.

In the following period until 1968, the struggle was with teachers and student movements. They demanded the absorption of the private sector by public institutions, but with the publication of the first LDB in 1961, the victory of the private sector was characterized [8].

In 1964, with the military dictatorship, student movements were repressed, and public universities were kept under close surveillance. The control made by the State displaces the demand to the private sector that started to attend about 75% of the 1,400,000 students enrolled in 1980.

After the military regime (1985 to 1995) the number of registrations was relatively stable and a decrease in the participation of private institutions in the sector was registered. From 1995 onwards the growth of private institutions is noticeable, mainly characterized by the new LDB (Lei de Diretrizes e Bases da Educação- Education Guidelines and Basics Law) of 1996.

Higher education in Brazil constituted a late event: [...] the first universities in Latin America were created in the 16th and 17th centuries, when there were already several universities in

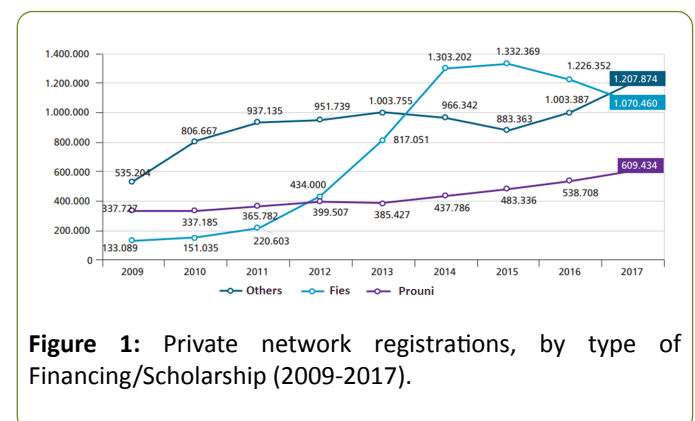
Europe. Unlike the Spanish colonization, in Latin America the Portuguese were hostile to the creation of higher schools and universities in their Brazilian colony. The first institutions of higher education (IES) in Brazil were created only at the beginning of the 19th century, with the transfer of the Portuguese court in 1808 to the colony. They were only intended to provide professional staff to perform different occupational functions at court [9].

### Private higher education access programs

In 1999, the Higher Education Financing Fund (Fundo de Financiamentos Estudantil-FIES) was established. A program to finance the study of those regularly enrolled in higher education courses. Although it started in 1999, it was structured only in 2001, through Law No. 10,260. Since its creation, the program has undergone several normative changes.

In 2004, Prouni - University for All Program (Programa Universidade para Todos) was created, with the objective of granting full and partial scholarships in undergraduate and sequential courses of specific training. The private institutions of higher education registered, in the first year, 112,275 scholarships, being 71,950 full and 40,370 partials, closing the year 2018 with approximately 417,276 scholarships granted, of which 182,474 full and 234,629 partial. The program, since its creation until 2018, has already attended about 2.47 million students, with 69% of full scholarships.

After the creation of Prouni, the government endeavored to create a rapprochement between the two programs. With the Normative Ordinance No. 30 of 2007, the Prouni partial scholar could finance up to 50% of the amount not covered, **Figure 1** shows the evolution of the two programs and the result of this approximation. Then, in 2010, the percentage that could be financed would reach its totality. This normative modification made the programs complementary, favoring the permanence of the student in higher education, and in 2015 it underwent adjustments to curb the growing pace of expansion of the program.

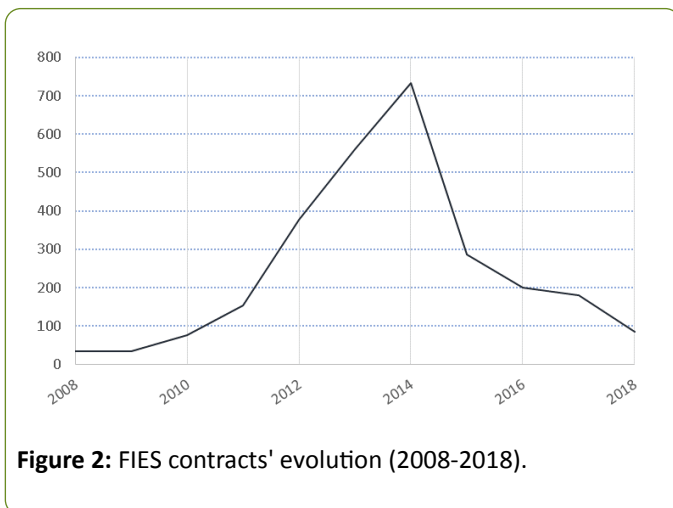


**Figure 1:** Private network registrations, by type of Financing/Scholarship (2009-2017).

According to the Ministry of Education-MEC, the "New Fies instituted by Law 13.530/2017, adopted new parameters for the entry of students allowing zero interest to those most in need and a scale of funding that varies according to the applicant's family income. The new Fies brings improvements

in the management of the fund, giving financial sustainability to the program to ensure the sustainability of the program and enable wider access to higher education." With this, there will be the upper limit corresponding to 2 minimum wages and a half of family income per capita. The offer in courses in the North, Northeast and Center-West regions will be prioritized, aiming at correcting regional inequalities existing in the country. For comparison, currently 60% of the financing contracts are in the South and Southeast regions and the Federal District, among other changes.

Based on the report released by the Brazilian Association of Higher Education Maintainers (Associação Brasileira de Mantenedoras de Ensino Superior- ABMES), **Figure 2** shows that FIES closed 2018 with less than 85 thousand contracts, being the worst performance since 2010.



**Figure 2:** FIES contracts' evolution (2008-2018).

However, the creation of the FIES can be justified by the country's own history. According to Jardim [10]:

"In Brazil, the access to the University for students from the lower classes, Afro-descendants, among others who have historically been on the fringes of higher education, is a relatively recent fact. The implementation of social inclusion policies - via affirmative action-has been materializing preponderantly in the field of higher education and in the labor market" [10].

According to Diniz and Goergen [11], Brazilian higher education is currently structured in close relationship with globalization. Where complex combinations can be observed such as the private offer of higher education by international groups of companies.

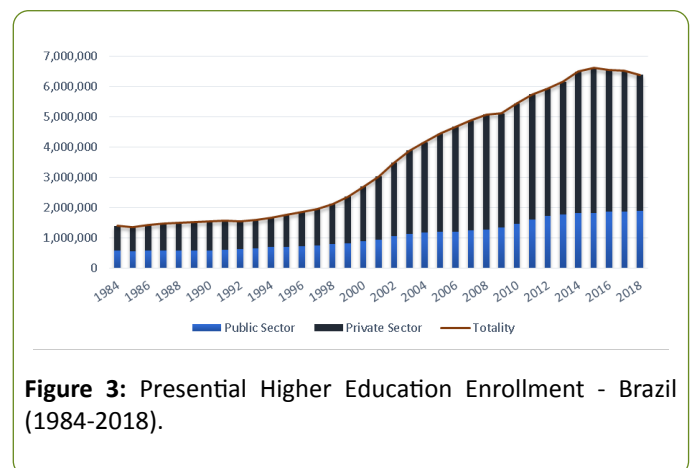
**Table 1:** Evolution of School Enrollment in Presential Higher Education - Brazil (1984-2018).

Year	Public Sector	Private Sector	Totality	%Public	%Private
1984	571,879	827,660	1,399,539	40.86	59.14
1994	690,450	970,584	1,661,034	41.57	58.43
2004	1,178,328	2,985,405	4,163,733	28.30	71.70
2014	1,821,629	4,675,696	6,497,325	28.04	71.96

## Behavior of Enrollment and Average Income of the Population

### Development of higher education enrolment

Private higher education in Brazil has undergone great changes. For Tachibana et al. [12], the expansion of higher education in Brazil in the last two decades was mostly conducted by the private sector. According to the authors: Durham [14] and Souza the participation of the public sector in the classroom graduation enrollment was greater than that of the private sector until the late 1960s. From 1970s onwards, the situation began to reverse, and in the following decade the private sector assumed a major role in the number of registrations. This share, from 64.3% in 1980, rises to 67.1% in 2000, and reaches an even higher level in later years, reaching 71.1% in 2013 [12,13] as shown in **Figure 3**. From the tabulation and analysis of the data it is possible to affirm that the system is heading towards an inversion from the elite to a massification system, especially during the period in which the workers' party was ruling Brazil.



**Figure 3:** Presential Higher Education Enrollment - Brazil (1984-2018).

In **Table 1**, it is possible to verify that this massification occurred mainly through the private sector, which only in the analyzed period had an average growth above 500%, while the public presented approximately 333%. Increasing the number of vacancies, facilitating access, and improving education are needs for a better qualified labor force and help to create technological leaps that benefit the entire production chain of a country.

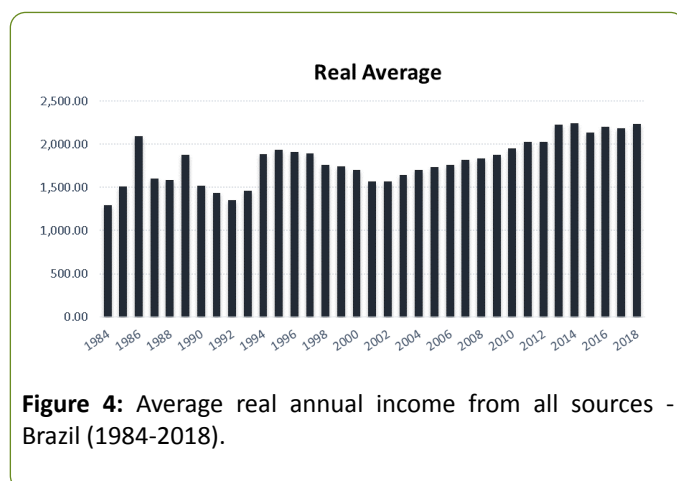
2018	1,904,554	4,489,690	6,394,244	29.79	70.21
%Medium growth	333.03	542.46	456.88	-	-

According to Martins [14], the robust growth in enrollments was due to favorable environments and situations and to the large allocation of budgets to the PROUNI programs and especially FIES. Still according to the author, Brazil's accession to the General Agreements on Trade and Services (AGCS) of the World Trade Organization (WTO) was fundamental. Higher education begins to be a commercial service in the country and becomes 75% of higher education enrollment.

### Evolution of the average income for the Brazilian population

For the present work the real average income from all sources was used, which is measured by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatísticas- IBGE), through the National Monthly Continuous Household Sample Survey (Pesquisa Nacional por amostra de domicílios Contínua Mensal- PNAD). Income information is collected by work, as well as through other sources: rents, pensions, retirements and other income. It is understood that the monthly tuition may come from any source of income available to the student.

**Figure 4**, shown below, was produced based on the information from the IBGE historical collection and was deflated by the National Consumer Price Index (Índice Nacional de Preços ao Consumidor- INPC) of September 2018. This index is used to adjust to present value the purchasing power of the wage of the population with lower incomes (1 to 5 Minimum Wages).



**Figure 4:** Average real annual income from all sources - Brazil (1984-2018).

In relation to the earnings of all sources, according to the results, it can be noted that they reflect the reality of economic, social and political changes experienced by Brazil in each period. From 2004 to 2014 Brazil moved towards reducing social inequality and increasing average yield. In 2015 there was a setback when this income reached R\$ 2.137,13 (Brazilian currency) with a reduction of approximately 5%

compared to the previous period (2014). Between 1984 and 2018 the indicator showed a growth of 42%.

## Models used and Results Obtained

### Linear regression

Simple linear regression consists in establishing a linear mathematical function that relates two variables. These analyses allow us to measure in values how much one variable influences the behavior of the other. In cases where the dependent variable and the independent variable are transformed into log variables, the interpretation is a combination of linear-log and log-linear cases [15]. In other words, the interpretation is given as an expected percentage change in Y when X increases by a few percentages. Such relationships, where Y and X are logged, are commonly referred to as elasticity in econometrics.

### Demand elasticity-income

One of the factors that influences consumption is income. The income elasticity of demand, in accordance with Vasconcellos [16], measures the percentage change in demand given a change in consumer income. This means that the calculation of the income elasticity of demand indicates how much more the consumer is willing to consume, or stop consuming if their income varies, positively or negatively. It is calculated using Formula 1:

$$\text{Demand elasticity-income} = \frac{\text{Percentage Variation in the quantity demanded}}{\text{Percentage Change in income}} = \frac{\Delta \%Q_D}{\Delta \%R} \quad (1)$$

The target result can be classified between:

- Necessary goods:  $0 < \epsilon_R < 1$
- Luxury Goods:  $\epsilon_R > 1$

In other words, an asset will be considered luxury whenever the increase in the amount demanded is greater than the increase in income. Therefore, when the income increases, its consumption will increase more and when the income is reduced, the demand for this good will tend to fall drastically. Being this the first item to be cut from the consumption basket if there is a retraction in consumer income. The goods needed are those that when income increases, their consumption increases no more than proportionally.

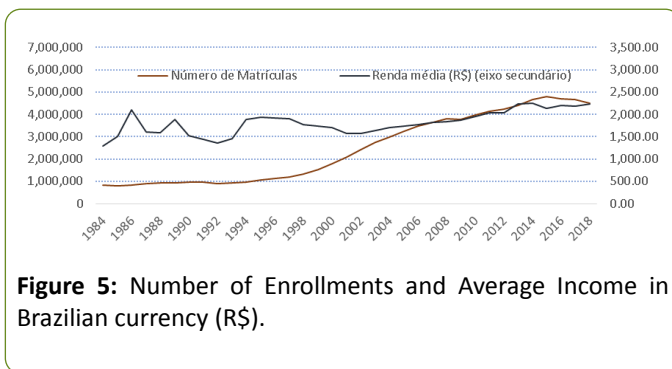
As the present study used linear regression as an econometric model to measure the results, in this case, for Gujarati (2008), the log-linear model is the one indicated to measure the elasticity and its results are obtained through Formula 2.

$$\log Y_i = \alpha + \beta \log X_i + \epsilon_i \quad (2)$$

Also according to Gujarati [17], an attractive aspect of the log-linear model, which made it very widespread in applied works, is that the beta 2 angular coefficient measures the elasticity of good  $y$  in relation to variable  $x$  (price of good ( $y$ ), price of the related good ( $z$ ) or income, for example). That is the percentage change of  $Y$  corresponding to a given (small) percentage change of good  $X$ .

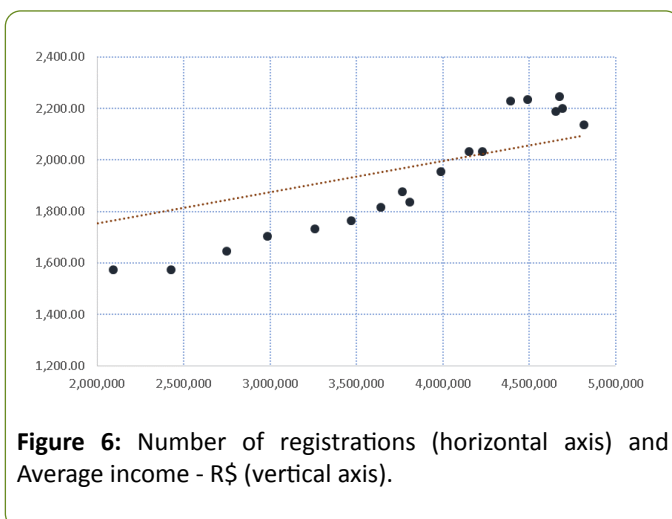
## Results

This study used, as a basis for measuring results, the calculation of the linear regression demanded of private and presential higher education in Brazil, the time cut analyzed comprises the years 1984 to 2018.



**Figure 5:** Number of Enrollments and Average Income in Brazilian currency (R\$).

**Figure 5** presents the temporal evolution of the selected variables from 1984 to 2018. As shown, the number of enrollments in the private sector of higher education presented a sharp growth from 2000 onward. While the average income of the population presented a less sharp growth in the analyzed period and a smaller variability in the last 18 years.



**Figure 6:** Number of registrations (horizontal axis) and Average income - R\$ (vertical axis).

**Figure 6** presents the dispersion graph of the selected variables from 1984 to 2018. The positive relationship between them can be observed graphically. The data present strong and positive correlation (0.7) in the analyzed period. Giving us indications of dependence between the variables.

The linear regression aims to estimate the change in enrollment (dependent variable) from the change in the

average income of the population (independent variable). The result is presented in **Table 2**.

**Table 2:** Results of linear regression.

Regression Statistics	
R Multiple	0.7
R - Square	0.6
R-Adjusted Square	0.5

The  $R^2$  is the coefficient of determination or coefficient of explanation and measures the percentage of variation of  $Y$  that is explained by the variable  $X$ . The analysis of this result suggests that 60% of the variation in enrollment is explained by the variation in average income, the other 40% being explained by other factors such as the desires and needs of the individual, as well as their perspective of life among others.

The calculation of the elasticity-income of demand is measured by linear regression as exposed in Formula 2, being a function that relates the independent variable, the income ( $x$ ) with the dependent variable, the number of registrations ( $y$ ). That is, it measures the increase that the number of enrollments will undergo if there is an accrual in the income of the student, or the student's sponsor. The calculation showed an elasticity of approximately 2.96, that is, for each unit increased in income, the demand for higher education will be added of approximately 2.96 units.

It is worth mentioning that the relationship coefficients of the model showed positive results and that the model is well adjusted, presenting results of Test F and P-value lower than the level if significant, in this case 5%, indicating that in fact there is a linear correlation between  $X$  and  $Y$ , that is, the higher the income the higher the number of enrollments.

This means that the entrance to higher education in person can be considered as an elastic good, classified as a higher (luxury) good and that its variation depends mainly on the individual's income. It is also influenced by other factors, such as the entrance to higher education at a lower cost or the choice to enter a technical or professional course, or the degree of ambition or the future perspective of the individual.

From the business point of view, the results obtained help in the projection of future enrollments, in the forecast of future revenue and in the elaboration of the business planning of the sector, based on the growth of the country's income. It allows executives to better plan and evaluate investments in new projects, aiming at the continuity of the operation.

## Final Considerations

Brazilian higher education is mostly formed by private institutions that aim at profit, even to the detriment of the quality of education, while the focus should be on the formation and technical-scientific, economic and cultural promotion of students.

The Brazilian educational system, in the period analyzed, presented an inversion from elitism to a massification system. According to surveys, it is possible to verify that this massification occurred mainly through the private sector, which only in the period between 1984 and 2018 had an average growth of over 500%, while the public showed approximately 333%.

The elasticity found in the analyzed period was approximately 2.96. This indicates that for each unit increased in income, the demand for higher education will be increased by approximately 2.96 units. Therefore, based on the results obtained it is possible to conclude that income is an impact factor on the access of low-income students to higher education.

Even with the existing student financing programs in the country, it is important that the Brazilian Government pays increasing attention to expand and improve these forms of student access. Only through education and qualification of the population it will be possible to improve income distribution and reduce social inequality.

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