Stop-out and drop-out: The behavior of the first year withdrawal of students of the Brazilian higher education receiving FIES funding

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ABSTRACT

This paper aims to analyze the first-year withdrawal of students that enrolled in college in 2011 and 2016 – the years that followed major changes on *Programa de Financiamento Estudantil* (Student Financing Fund - FIES) – and that received funding. Data from the 2011 and 2016 Higher Education Census and from the National Fund for Educational Development (FNDE) database of students are used. The Logit and Logit Multinomial methods are employed. Age has opposite effects in each of the years: while in 2011 older students withdrew less often, in 2016 they began to withdraw more often from their programs. In addition, when analyzing the result of the Logit, what is found is that students who entered college in 2016 both dropped out and stopped out of the programs more often. These changes may be a result of a crisis on higher education.

1. Introduction

The basic education offered by the public and private spheres presents significant differences between primary and secondary education in Brazil. The private school system presents, on average, the best results in assessments of basic education, as is the case of Prova Brasil[1]. Consequently, because of the significant differences in the education that those two groups of individuals – public schools' students and private schools' students – receive since childhood, the tendency is for these young people to perform differently in higher education.

In order to encourage the entry as well as the permanence of these students in higher education, the federal government took different measures intended for public and private institutions. In the first case, the REUNI[2] program was created, which aimed to increase the number of vacancies offered by universities, either through the creation of new

institutions or through the expansion of existing ones, or through the creation of student support programs, such as PNAES[3]. For private institutions, there was also an increase in the number of institutions, in addition to the creation of financial support programs to help students cover tuition fees. For private institutions, FIES[4] and The University for All Program[5] (ProUni) were created.

Created for promoting the access of students to private institutions, FIES has undergone several transformations since its creation. With the changes introduced in 2010, there was a significant expansion in the number of signed contracts, as well as in the amount of resources made available for the program. This expansion of FIES is made clear by the fact that in 2000 approximately 67,000 students were receiving it. In 2010 the program had 529,553 active contracts and 2,185,038 in 2015. As for the resources employed in the program, they went from R\$ 1.7 billion in 2010 to R\$ 17.8 billion in 2015 (TCU, 2001; TCU, 2011; TCU,

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[1] Prova Brasil was a large-scale test application that aims to evaluate the quality of the education offered by the Brazilian educational system, through standardized tests and socioeconomic questionnaires. The tests were applied to fourth and eighth grade students from the basic education. Students, teachers and principals filled the questionnaires. They cover topics as student profile, schools' infrastructure and teachers' job conditions (MEC, 2020a).

[2] REUNI (Programa de Apoio a Planos de Reestruturação e Expansão das Universidades Federais) was created in 2007 by the federal government. Its main objective was to increase the number of vacancies and consequently, the access to public higher education. (BRASIL, 2001, 2005; BRASIL, 2012).

[3] PNAES (Plano Nacional de Assistência Estudantil) is a financial aid program created to support low income students enrolled in presential undergraduate courses of public institutions, by giving them grants to pay for materials used in the courses, housing or transport expenses, and others (MEC, 2020b).

[4] The Student Financing Fund (FIES), implemented in 1999, is a loan that the student receives throughout undergraduate school and must be paid back in the years following its completion. (BRASIL, 2001, 2005; BRASIL, 2012).

[5] The University for All Program (ProUni), created in 2004, provides scholarships covering half of or the entire tuition fee for low income students that are enrolled in private institutions (MEC, 2020c).

2016). However, accompanied by this expressive expansion, some problems arose, which included the increase of loan default. Thus, the 2015 changes were a way of trying to make the program less defective, which made both the prerequisites for receiving the benefit and the conditions for paying it back after graduation more rigid.

Credit programs and scholarships have an important role in reducing the drop-out rates of students enrolled in undergraduate programs. According to Hoyt and Winn (2004), the reasons that lead to dropping out and stopping out are very different, and financial aid - through scholarships and funding programs - is more closely related to the decrease in stop-outs. Stratton et al. (2008) analyze individuals who had dropped out in the first year and others who had temporarily withdrawn over time. When it comes to financial aid, students who received a scholarship were less likely to dropout or had lower chances of stopping out. Chen and Hossler (2017) study the effects that different kinds of financial support have on the success of six-year college non-traditional students (i.e., part-time attendance, full-time employment, single parent status, and others). Their main conclusion is that financial aid seems effective for reducing the drop-out risks. In general, the literature shows that students who received loans or scholarships were less likely to dropout of university than students who did not receive any benefit (NORA, 1990; Desjardins et al., 1999; BETTINGER, 2004; GROSS et al., 2007).

Still within the context of higher education withdrawal and the impact of financial support programs on this phenomenon, studies has emerged that took into account a new issue: the different types of withdrawal. For the authors mentioned in the last paragraph, it is important to differentiate those students who have temporarily withdrawn from higher education – that is, those who interrupt their enrollment – from those students that withdraw permanently – those who leave the institution. Horn and Carroll (1998) use a sample from the Beginning Postsecondary Students database to examine first-year withdrawal in the US. One of their main findings is that the students who withdrew from the programs were more academically integrated in comparison to those who dropped out. In addition, they point out that the latter group of students has other occupations besides their education, such as work and family issues, which may conflict with school commitment.

Ishitani (2003) studies the case of students that are the first ones of their families to go to college. Applying the methodology of survival analysis, the author shows that these individuals have higher chances to dropout, comparing to the ones whose both parents have a higher education degree. Herzog (2005) analyzes factors that determine the temporary withdrawal, stop-outs and transfers in the second year with the use of logistic regression. In this work, one of the conclusions is that although one of the scholarships analyzed did not ensure the permanence of students, it allowed more students to be admitted in the program. Moreover, one of the main results of this work is that the highest permanence rate comes from the middle-class students who received financial support and who are heavily indebted.

Johnson (2006) analyzes the withdrawal of higher education students from a Midwestern American university, also using survival analysis. Among the results found by the author is the fact that being enrolled in a program that is not full-time and having low grades positively influences drop-out. Also for the United States, Choi (2018), using Propensity Score Matching (PSM) and stratification-multilevel analysis, seeks to study the effects that employment has on student persistence. Its main conclusion is that working on a more than 20 hours per week job has a negative effect on the chances of staying in the program, but the impact is less negative for the individuals that are more likely to have those jobs, who are traditionally people living in poorer socioeconomic conditions.

Stratton et al. (2008), when studying the US case, point out that a factor that strongly influences first-year withdrawal is the change of students' expectations based on the new information they obtain when entering the program, one of which is their grades. However, Kuh et al. (2008) point out that low grades or students' characteristics before they enter higher education are not the decisive factor for first-year withdrawal: according to these authors, it is the lack of engagement in the academic environment that determines whether or not students will drop out of college.

In the British case, Clark et al. (2005) analyze three factors that exert a great influence on the students' decision to stay in school after the post-compulsory education. The first one is individual ability. Students with better grades have a lower probability of dropping out. Second, the better the family background, the better the chances that the pupil will stay in college. Third, the country's economic context: when the economic context is not favorable, individuals tend to dropout less. Santelices et al. (2016) seek to analyze the effects that financial aid has on Chilean higher education. Using propensity score matching, the authors find that the non-subsidized state loan has the strongest correlation with persistence and the need-based grants destined to low income students have a high effect on the persistence among students enrolled in technical institutions.

In the Brazilian case, McCowan (2007) studies the effects that financial support programs have on the expansion of the higher education system in the country. His main conclusion is that they do not promote an equitable expansion, since students that come from a context with high socioeconomic vulnerability have higher chances to enroll in programs of lower quality or lower value on the employment market. Lima et al. (2002), using the survival analysis methodology, analyze the drop-out rates of physics' students in a university. Their main findings show that the students enrolled on *licenciatura*[6] programs persist longer, while women dropout less than men do. Guimarães et al. (2010), applying simultaneous equations, analyze some characteristics that affect the student's drop-out decision. They find that family income has a strong influence on students' performance and on their decision to leave the program. Age, gender and marital status also have an impact on the drop-out rates.

The purpose of this paper is to analyze first-year withdrawal among students who entered higher education in 2011 and 2016 – the years that followed the more significant changes in FIES that can be analyzed so far, due to the availability of data – and that received a FIES loan. The analysis will be carried out using a Logit and the Multinomial Logit method, and the results indicate that, even when receiving the FIES loan like other students, public school students are more likely to withdraw from college, both temporarily and permanently. In addition, when analyzing the results of the Logit, it can be observed that students who entered in 2016 both dropped out and stopped out of the programs more often. This work's contribution is to analyze the characteristics that influence different kinds of drop-outs – temporary and definitive – in different economic contexts and in different years of the funding program. Thus, one can think of policies to reduce the withdrawal of students receiving FIES, or to promote changes in the program.

Nowadays, Brazil has the largest higher education system in Latin America. It presented a significant growth in enrollment in the last two decades: while in 1999 it had 2,369,945 students, this number grew to 8,286,663 in 2017 (INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 1999, 2017). This expansion caused some major changes in the country's higher education. Salto (2018) points that the expansion of the higher education system has relied more on the private sector, especially on the for-profit institutions. The private sector can be divided into two categories. The first one are the nonprofit institutions, which consist mainly of religious institutions that are characterized by enjoying tax exemption but have some restrictions on how to use their revenue. The second one is the for-profit institutions, which have characteristics similar as any other business in the economy. Pereira et al. (2018) show that FIES was

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[6] In the Brazilian higher education system, there are two types of. The more frequent is the bachelor's degree. The second is *licenciatura*, when the student receives training to become a school teacher.

important for the growth of large business groups, since the for-profit colleges and universities had a great number of students that received FIES – for instance, the authors show that 77 % of the individuals enrolled in one institution received FIES. Their main conclusion is that although the expansion of FIES and of this kind of institution helped to increase the access to higher education, it also consolidates large business groups in the sector. Duarte and Mello (2014) study the impacts of FIES on the behavior of higher education institutions, especially on tuition costs. Using a differences-in-differences method – considering the 2010 changes in the program as a natural experiment –, they observe a 2.5 % increase in the tuition fee for the programs whose students could apply for FIES after the changes.

One of Salto's (2018) results shows that the county is really moving toward public funding for students in the private institutions in order to meet enrollment goals. While FIES had the positive effect of allowing people from different backgrounds to go to college, it also created another problem, similar to the one that is present in many other higher education systems: a high proportion of indebted students. In 2016, 46.5 % of the students who joined the program after 2010 were in debt with the government (TRIBUNAL DE CONTAS DA UNIÃO - TCU, 2017). Since this is a recent issue, there are no studies addressing it until this moment, but the first consequences are starting to arise, since the program reduced significantly the number of new contracts signed in the last three years.

Regarding the choice of the analysis periods – 2011 and 2016 –, these years were chosen because they followed significant changes in FIES. As for the decision to analyze only the first-year withdrawal, this choice was based on the fact that these periods have the highest withdrawal rates. Lobo E silva et al. (2007) show that first-year withdrawal in several countries is two to three times higher than in subsequent years. Coulon (2008) argues that the problem is no longer the admission to higher education, but the permanence of students in the chosen programs. The author mentions the case of France, where approximately 20 % of first-year students drop out of college. Among the reasons for this phenomenon, he points out the fact that although many students from lower social classes have access to higher education, they have obtained low-quality primary education.

This paper is divided into six sections. The first one consists of this introduction and a brief literature review. The second section presents data from the 2010 and 2015 editions of ENEM, a general profile of the high school students who took the exam in those years with the aim entering college in 2011 and 2016, respectively. In section three, the methodology is presented. On the fourth section, the descriptive statistics are discussed. In section five, the results are shown. At the end, the final considerations are presented.

2. Public and private high school and higher education in Brazil

The decision to separate students into the kind of schools where they finished high school - public and private education - is due to socioeconomic and academic differences, between these individuals. Public schools are free of charges and are administered by the government, while in private schools there are monthly payments and private owners manage them. Public schools are known to have less quality. Consequently, families with better financial conditions usually choose to enroll their children in private institutions. The literature, as is the case of the work of Barros and Mendonça (1995), highlights the great inequality among Brazilian students, in terms of both conditions and performance. The authors point out that the process of preparation for the educational trajectory relies on the student's innate skills, as well as public and private inputs.

When considering public resources, the differences in performance may be due to its poor distribution among different groups. In addition, the use of these inputs may also differ due to differences in their quality – even though they are equally distributed – since one group can be more efficient in their use. Finally, when considering the provision of private resources, which are related to the salaries of parents, their use in the preparation for entering higher education becomes another source of inequality (Barros and Mendonça, 1995). As the current selection processes – vestibular and the National High School Exam (ENEM) – allow the use of all those resources, the result reflects the different opportunities that those students had during the course of their lives.

According to Pedrosa et al. (2014), this creates barriers on the access to higher education for disadvantaged groups from an economic and social point of view. In order to present these differences between the two groups, data from the National High School Exam (ENEM) for the years 2010 and 2015 were used. Given that the sample of this work consists of students who entered higher education in 2011 and 2016, the previous editions of ENEM[7] consisted of students who, in general, were preparing to enter higher education the in the next year.

The socioeconomic characteristics and the students' academic trajectory are presented in Tables 1 and 2. In the first case, when analyzing their socioeconomic conditions, there are major differences between the students who finished high school in public schools and those who finished it in private schools. Regarding sex, women are the majority of the students who were taking ENEM in both years. As for age, students from public schools are, on average, older.

When analyzing race or ethnicity information – this information is available only in the 2015 ENEM – it can be seen that black students are the majority of high school graduates in public schools, while most of the students who have completed their secondary education in the private system are self-declared Caucasian. As for family income, there are again significant differences between the two groups of students. In the case of students from public schools, 83.46 % of them declared that their family income was up to three minimum wages in the 2010 ENEM and 69.12 % of the students who took the 2015 ENEM declared having a family income of up to two minimum wages. As for students who also work, what is observed for both years is that the percentage of students who worked was significantly higher among students who finished high school in public schools.

As for school-related data, the two groups also have different characteristics. In the first variable, the proportion of students who attended at least a part of high school in Youth and Adult Education (EJA) is higher among students who finished it in public schools. As for the time of day when the students went to school, public school students studied less often in the morning shift. Since the changes of 2015, it is necessary to score at least 450 points in the general grade of ENEM in order to be able to apply for FIES. Thus, even though most of the students who entered higher education come from the public school system, those who perform better are still the ones who come from private schools.

When analyzing the information presented above, it can be seen that students who finished high school in public schools come from a lower socioeconomic context. In addition, when analyzing the grades obtained in ENEM, their academic performance is inferior. Thus, when carrying out a study like this, it is important to take into account the type of school where the student graduated, since the individuals from public schools and those who completed their studies in the private system had different trajectories up to the time of entering the university.

In Brazil, it is possible to separate the higher education system into two main different types of institutions. They can be public or private. In the case of public institutions, the federal government is responsible for most institutions, although there are also state and city colleges. Students enrolled at public universities do not have to pay tuition. More recently, new policies were created to make the access to these universities more democratic. The quota system was implemented in 2012.

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[7] ENEM became valid as a form of admission to higher education in its 2009 edition.

Table 1
Socioeconomic information of students, separated by type of school where they finished high school.
Source: Prepared by the authors based on INEP (2010) and INEP (2015).

	2010		2015	
	Public school students	Private school students	Public school students	Private school students
Female	60.87 %	56.20 %	58.29 %	55.39 %
Average Age	23.787	20.021	23.40	19.94
Single	80.52 %	93.67 %	85.24 %	94.71 %
Married/Lives with the partner	9.48 %	6.43 %	12.75 %	4.44 %
Caucasian	–	–	33.03 %	57.01 %
Black	–	–	14.15 %	7.13 %
Multiracial	–	–	18.36 %	30.39 %
Indigenous	–	–	0.64 %	0.26 %
Father did not finish elementary school	58.73 %	54.86 %	51.43 %	22.92 %
Father finished high school	21.24 %	35.60 %	20.98 %	35.51 %
Father completed higher education	3.69 %	28.98 %	3.06 %	21.49 %
Mother did not finish elementary school	57.13 %	51.31 %	60.51 %	17.59 %
Mother finished high school	26.47 %	35.74 %	27.16 %	35.93 %
Mother completed higher education	5.95 %	32.18 %	3.11 %	24.26 %
Percentage of individuals who work or have worked	64.14 %	28.81 %	64.36 %	29.65 %
Percentage of students who work or have worked full-time	23.53 %	7.31 %	24.72 %	8.89 %
Student's Family Income				
Up to one minimum wage	29.12 %	5.27 %	27.36 %	5.36 %
One to two minimum wages	–	–	41.76 %	18.16 %
One to three minimum wages	54.34 %	27.80 %	–	–
Two to five minimum wages	–	–	23.59 %	30.59 %
Three to five minimum wages	12.29 %	26.83 %	–	–
Five to ten minimum wages	–	–	3.86 %	25.09 %
Nine to twelve minimum wages	0.52 %	9.49 %	–	–
Ten to twenty minimum wages	–	–	0.27 %	4.44 %
Twelve to fifteen minimum wages	0.15 %	4.80 %	–	–
More than fifteen minimum wages	0.18 %	11.14 %	–	–
More than twenty minimum wages	–	–	0.13 %	6.50 %

Table 2
Information about the student's academic trajectory during high school.
Source: Prepared by the authors based on INEP (2010) and INEP (2015).

	2010		2015	
	Public school students	Private school students	Public school students	Private school students
Attended high school at least partly through EJA	3.88 %	0.73 %	7.58 %	1.88 %
Attended high school exclusively in the morning shift	–	–	82.76 %	95.73 %
Average grade on the ENEM Science test	471.49	553.68	466.70	536.89
Average grade on the ENEM Humanities test	532.79	471.49	548.35	605.78
Average grade on the ENEM Languages test	496.59	572.33	494.61	555.79
Average grade on the ENEM Mathematics test	483.80	605.59	449.89	555.24
Average grade on the ENEM Writing test	381.80	545.52	362.78	540.82
Total average above 450 points	85.40 %	96.43 %	83.58 %	95.93 %

Also, low-income individuals can receive some form of support, such as housing, food or financial aid. Private universities are administered by different organizations, which can be either religious institutions or private companies. In both cases, students must pay tuition. Although their administration is not directly linked to the government, there are some programs such as FIES and ProUni that were created to help students finance their education.

The Student Financing Fund (FIES) was created through Provisional Measure No. 1.865-4 of August 26, 1999. Its purpose was to increase the access and permanence of young people in higher education. Its function is to fund undergraduate higher education students enrolled in programs of private institutions. Among some of its rules, it was possible to cover a maximum of 70 % of the undergraduate program, at an interest rate of 9% per year, capitalized monthly (BRASIL, 1999). However, it must be emphasized that this funding program has undergone several expressive changes until the present moment.

In 2010, there was the first significant change in the program, through the publication of a series of new laws throughout the year. The interest rate on the loan decreased to 3.4 % per year, with a

repayment period three times higher than the regular period of the undergraduate program, with 12 additional months. The funding percentage increased to up to 100 % and the applications began to be submitted continuously, which allowed students to apply for funding at any time of the year. In addition, students who were partially covered by ProUni were now able to use FIES to fund the part of the tuition not covered by the scholarship program (BRASIL, 2010a, b; BRASIL, 2010c, d; BRASIL, 2010e). In 2015, it was implemented some restrictive changes in the program. From that moment on, the interest rate became 6.5 % per year, with the argument that this increase aimed to contribute to the sustainability of the program, and a minimum score of 450 points in ENEM and family income per capita of up to 2.5 minimum wages were required – which was, in 2010, 20 minimum wages. (BRASIL, 2015).

Those three years – 2000, 2010 and 2015 – are marked by different contexts in the Brazilian economy and higher education system. In 2000, the year after the implementation of FIES, there were 2,694,245 students, 197,712 professors and 1180 public institutions around the country. The economy was growing, after years of economic instability.

In 2010, Brazil had the highest GDP since 1986, and many programs were created or expanded, the last one being FIES. At this moment, compared to 11 years earlier, the country's higher education had an expressive growth. There were now 6,739,689 students, 378,257 professors and 2365 public institutions. But in 2015 this scenario changed. The GDP growth was negative, and many public policies that had been created in the previous years had to be annulled or changed. Since then, the resources allocated to FIES reduced substantially, and the rules to receive it became stricter. Even at a time of economic crisis, at least at first these last numbers presented of the higher education did not decrease drastically. At this point, there were 6,554,283 students, 397,611 professors and 2407 institutions (INEP, 2000; INEP, 2011 and INEP, 2016).

3. Methodology

Based on the changes in FIES and on the work of Stratton et al. (2008), and as mentioned in the first section, the objective of this work is to analyze the first-year withdrawal among students who have entered higher education and received FIES in the years 2011 and 2016. The methods used were the Logit and Logit Multinomial.

There are two databases that are used in this paper. The first one is the Higher Education Census for the years 2011 and 2016, provided by the National Institute for Educational Studies and Research Anísio Teixeira (INEP). This dataset includes annual information about all the students, professors, programs and institutions that existed in those years. Some of the covariates from the database are age and gender of students and professors, the city and state where the program is offered. The second dataset consists of students who received FIES in each semester of the years 2011 and 2016 and is made available by the National Fund for Educational Development (FNDE). The data are updated semiannually, and include monthly information such as marital status, race and the value of the benefit for all students that received FIES in that period. The FNDE dataset is important because the information it provides is not available in the Higher Education Census. Data from the General Index of Programs (IGC) for each year, provided by INEP, were also included. The Higher Education Census and the microdata of FNDE do not have a common identifier. Thus, in order to find the same students in the two databases, some of their personal characteristics that were available in both – age, sex, course, institution and year of entry - were compared.

The methods used were the Logit and the Multinomial Logit Model. In this paper, the first method is used to estimate the model for two samples: the one when the students stopped out and the other for when they dropped out of college. Thus, the outcome variable assumes value 1 if the student dropped out and 0 if he stayed in college. A formal logit model allows estimation of probabilities and marginal effects, but at the cost of imposing the normal or logistic distribution on the data. Let z_i denote the covariates stop-out and drop-out and w_i denote the control covariates, the logit model is:

$$Prob\,[z_i = 1] = P(w_i, \gamma) = \frac{e^{w_i'\gamma}}{1 + e^{w_i'\gamma}} \tag{1}$$

In order to evaluate the personal characteristics that influence the probability of students continuing their studies, temporarily or permanently withdrawing from higher education, it is used an analysis based on the work of Stratton et al. (2008). They study the probability of the same event for a sample of students from the US higher education institutions in the early 1990s. In order to evaluate the probability of a given event occurring, OLS, logit or probit models are commonly used. However, these methods are valid only when the dependent variable is binary. In the case of this paper, the dependent covariate is the students' situation in the program, and it assumes the following values: 0, when the student is still enrolled at the end of the first year, 1 if he stopped out, and 2 if he dropped out. When the dependent variable is

nominal, discrete, and assumes more than two categories, and its set cannot be ordered in a significant way – as in the case of this study – the Multinomial Logit Model is used. According to Greene (2003), the Logit Multinomial Model can be represented by:

$$Prob\,(Y_i = j | x_i) = \frac{e^{\beta'_j x_i}}{1 + \sum_{k=1}^{J} e^{\beta'_j x_i}} \tag{2}$$

for j = 0, 1, 2..., J, $\beta_0 = 0$.

Its purpose is to explain the probability of choice of j, in which p_j is a function of the individuals' characteristics. The probability is defined by $p(Y = j \mid x)$, with $j = 1, 2, 3, …, n$.

4. Descriptive statistics

Data from the Higher Education Census were obtained for the student's personal information, situation in the program and participation in academic activities. The socioeconomic data of students were obtained from the database of FNDE. The variables used were sex, program, institution, year of admission, FIES, day, month and year of birth. After combining both databases some characteristics were selected for the proposed analysis, which are presented in the results section. The covariates used are presented in Table 3.

The descriptive statistics are presented below, in Tables 4 and 5. Except for stop-outs in 2011, most of the students who entered higher education in both years of the analysis were female. The average age of students at the time of the withdrawal increased in 2016, when compared to the first-year students of 2011. Regarding the students' race, Caucasians were most of the students that entered higher education in 2011, whereas in 2016 this position began to be occupied by black students. There was also a small increase in the admission of indigenous students to higher education.

Finally, most of the students who entered higher education in 2011 and 2016 attended public high schools. Only a small part – less than 10 %, in the main case – attended high school partly in a public school and partly in a private school. The proportion of students who attended public high schools and who entered higher education increased between these two periods: among students who were enrolled in the first year in 2011, 69.5 % were from public high schools, while it was 74.9 % in 2016.

Regarding program activities, the students who finished their first year of college and were still enrolled in their programs were the ones who proportionally participated more in academic activities, whether paid or not. As for using ENEM to enter the university, a higher proportion of students who were admitted through this system continued the programs beyond the first year, when compared to those who withdrew in some way. However, in 2016 this scenario was reversed: while 27.6 % of the students who remained enrolled in 2011 had taken ENEM, 13.7 % of the students who withdrew and 14.7 % of those who dropped out were admitted through the same system.

Other changes to FIES proposed in 2015 had to do with the programs. The first one refers to the priority of programs: from that moment on, the areas of engineering, health and teacher training – in the case of this study, the latter is in the *education* category – became a priority. However, in most cases education and engineering programs had a lower proportion of students in 2016 than in 2011. Nonetheless, in the health area there was a higher proportion of students who both enrolled and dropped out in 2016, when compared to 2011.

Another change refers to the programs' evaluation. Beginning in 2015, FIES was granted to students enrolled in programs with a 5 or 4 score in the National Higher Education Assessment System[8] (SINAES).

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[8] SINAES was created in 2004 and is formed by three main components: the evaluation of institutions, programs and students' performance. The results make it possible to assess the quality of programs and institutions in the country. The information is used to improve the efficiency of the system,

Table 3

Variables and their description.

Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

Variable	Description
female	1, if the individual is female.
age	Student's age, in years.
widower	1, if the student is a widower.
married_clm	1, if student is married or has a common-law marriage.
divorc_sep	1, if student is divorced or separated.
black	1, if student is black.
east asian	1, if student is east Asian.
indigenous	1, if student is indigenous.
public_school	1, if student has attended a public high school.
public_private	1, if student has attended part of high school in the public system and another part in the private system.
private_school	1, if student has attended a private high school.
paid	1, if student has participated in paid academic activities.
unpaid	1, if student has participated in unpaid academic activities.
enrollment_enem	1, if student's enrollment in the high school course was through the ENEM.
ln_semester	Logarithm of the semester fee (deflated) that was financed by the student.
prouni_50	1, if student has a ProUni scholarship that covers 50 % of the tuition.
funding	1, if student has any other funding besides FIES.
scholarship	1, if student has any other scholarship besides ProUni.
igc	Institution's average IGC.
education	1, if student is enrolled in the *Education* area, according to the OECD classification.
hum_arts	1, if student is enrolled in the *Humanities and Arts* area, according to the OECD classification.
sc_law_busi	1, if student is enrolled in a program in the *Social Sciences, Law and Business* area, according to the OECD classification.
math_sci	1, if student is enrolled in a program in the *Science, Mathematics and Computing* area, according to the OECD classification.
engi_con	1, if student is enrolled in a program in the *Engineering, Production and Construction* area, according to the OECD classification.
agri_vet	1, if student is enrolled in a program in the *Agriculture and Veterinary Medicine* area, according to the OECD classification.
health_welfare	1, if student is enrolled in a program in the *Health and Social Welfare* area, according to the OECD classification.
services	1, if student is enrolled in a program in the area of *Services*, according to the OECD classification.
year_2016	1, if student has entered higher education in the year 2016.

Table 4

Socioeconomic characteristics of students who entered in 2011.

Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

	Enrolled		Stop-outs		Drop-outs	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
female	0.581	0.493	0.493	0.5	0.547	0.497
age	23.546	6.440	23.002	5.908	22.655	5.606
widower	0.001	0.035	0.0008	0.028	0.001	0.037
married_clm	0.142	0.349	0.128	0.334	0.121	0.326
divorced_sep	0.027	0.161	0.024	0.154	0.019	0.138
single	0.831	0.375	0.846	0.36	0.857	0.349
black	0.445	0.497	0.426	0.494	0.43	0.495
east asian	0.024	0.154	0.019	0.138	0.02	0.141
indigenous	0.002	0.044	0.001	0.04	0.0009	0.03
caucasian	0.529	0.499	0.552	0.497	0.548	0.497
public school	0.695	0.460	0.746	0.435	0.68	0.466
public_private	0.077	0.266	0.069	0.254	0.09	0.287
private_school	0.228	0.420	0.183	0.387	0.228	0.419
Observations	68,534		1,223		2,189	

Table 5

Socioeconomic characteristics of the students who entered in 2016.

Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

	Enrolled		Stop-outs		Drop-outs	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
female	0.597	0.490	0.549	0.497	0.551	0.497
age	23.421	6.327	24.334	6.542	23.713	6.167
widower	0.001	0.029	0.001	0.036	0.0009	0.03
married_clm	0.113	0.316	0.133	0.339	0.121	0.326
divorced_sep	0.017	0.130	0.021	0.145	0.018	0.134
single	0.869	0.337	0.843	0.362	0.859	0.347
black	0.571	0.495	0.557	0.496	0.572	0.494
east asian	0.023	0.149	0.023	0.151	0.025	0.158
indigenous	0.002	0.047	0.003	0.055	0.002	0.053
caucasian	0.403	0.491	0.415	0.492	0.398	0.489
public school	0.749	0.434	0.765	0.423	0.787	0.408
public_private	0.066	0.249	0.069	0.254	0.067	0.25
private_school	0.185	0.389	0.165	0.371	0.144	0.351
Observations	191,538		9,198		17,526	

Among other indicators, the General Index of Programs (IGC) is based on this system; it consists of a measure used by INEP to evaluate higher education institutions. IGC is an indicator, with a score that range from 1 to 5 points. Thus, it is included the institutions' IGC for each year. By analyzing Tables 6 and 7, the average IGC for all categories of students was higher in 2016 than in 2011. Thus, there is an indication that programs with a higher score began to be funded.

It can also be noticed that between 2011 and 2016 there was a change in the relation between the amount of credit provided to the student and his withdrawal. While in 2011 students who remained

enrolled in the programs received higher average semester fee coverage compared to students who withdrew – whether temporarily or permanently –, this scenario changed in 2016.

As for the other financial benefits, there is a reduction between the two periods of students already receiving FIES and who also received the partial ProUni scholarship that covers 50 % of the program. In addition, there was also an effect with regard to the granting of other scholarships and funding: among the students who remained enrolled there was an increase in students that were granted credit and a drop in scholarships, while among the students who dropped out there was a decrease in funding and an increase in scholarships.

(footnote continued)

creation of public policies and it can also be used by the individuals in order to choose which institution is better for them.

Table 6

Characteristics of the students in relation to the programs they entered in 2011.

Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

	Enrolled		Stop-outs		Drop-outs	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
paid	0.029	0.168	0.021	0.144	0.004	0.064
unpaid	0.132	0.339	0.062	0.241	0.059	0.236
enrollment_enem	0.276	0.447	0.137	0.344	0.147	0.354
semester_fee	5,515.35	4,384.65	3,759.49	2,517.67	3,964.48	2,545.45
prouni_50	0.027	0.162	0.103	0.304	0.067	0.25
funding	0.01	0.1	0.009	0.098	0.01	0.099
scholarship	0.208	0.406	0.158	0.365	0.148	0.355
igc	2.355	0.577	2.491	0.457	2.457	0.519
education	0.076	0.265	0.062	0.242	0.070	0.256
hum_arts	0.005	0.067	0.008	0.090	0.003	0.056
sc_law_busi	0.348	0.476	0.337	0.473	0.349	0.477
math_sci	0.043	0.202	0.075	0.264	0.062	0.241
engi_con	0.223	0.416	0.306	0.461	0.290	0.454
agri_vet	0.027	0.161	0.034	0.182	0.016	0.124
health_welfare	0.277	0.447	0.176	0.381	0.208	0.406
services	0.002	0.046	0.002	0.040	0.002	0.043
Observations	68,534		1,223		2,189	

Table 7

Characteristics of the students in relation to the programs they entered in 2016.

Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

	Enrolled		Stop-outs		Drop-outs	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
paid	0.023	0.152	0.02	0.143	0.016	0.128
unpaid	0.102	0.303	0.057	0.232	0.054	0.226
enrollment_enem	0.135	0.341	0.238	0.426	0.262	0.44
semester_fee	3,930.88	3,125.02	3,823.77	2,560.79	3,947.95	2,521.45
prouni_50	0.008	0.092	0.015	0.121	0.015	0.124
funding	0.197	0.398	0.006	0.08	0.004	0.07
scholarship	0.023	0.152	0.284	0.451	0.234	0.423
igc	2.680	0.470	2.729	0.406	2.664	0.402
education	0.062	0.241	0.065	0.247	0.066	0.249
hum_arts	0.005	0.072	0.008	0.088	0.004	0.062
sc_law_busi	0.354	0.478	0.370	0.483	0.354	0.478
math_sci	0.041	0.199	0.047	0.213	0.043	0.203
engi_con	0.212	0.409	0.234	0.424	0.252	0.434
agri_vet	0.034	0.181	0.030	0.171	0.032	0.175
health_welfare	0.289	0.454	0.244	0.429	0.247	0.432
services	0.002	0.043	0.002	0.045	0.001	0.034
	191,538		9,198		17,526	

5. Results

In order to analyze the differences in withdrawal between the two groups of students – those entering higher education in 2011 and 2016, that can be analyzed so far –, estimates were made using two methods. The Logit Method seeks to make a simpler analysis. In order to do that, the whole sample is considered, without year distinction. This method is also used to analyze whether the year of entry has some impact on the withdrawal. In addition to the variables used later in the Multinomial Logit, the variable *year_2016* is added to the logit model, which indicates whether the student entered higher education in that year. The Multinomial Logit was chosen in order to analyze the characteristics between the students who stopped out or dropped out of the programs during the first year, when compared to the ones that remained enrolled until the end of the first year. The results achieved by both methods are shown in Tables 8 and 9. The two models were estimated with all covariates at once, but the results are separated into two tables to make the analysis of the coefficients and standard errors easier.

The two samples, stop-outs and drop-outs, estimated by the logit method, consist of the first-year students who withdrew from their programs in 2011 and 2016 and those who dropped out of the programs

in the same years. In general, the results obtained by applying the logit are similar to those obtained with the Multinomial Logit. Thus, this first analysis will be focused on the new variable: students who entered college in 2016 presented a temporary and permanent withdrawal greater than the 2011 first-year students.

This result may be related to some changes that occurred between 2011 and 2016. First, this increase in the number of students who are in the first year of higher education and who received FIES may be the result of changes in the credit program. As presented previously, in 2015 FIES underwent changes that made it stricter, in addition to making paying back more costly for students, as there was an increase in the interest rate and a reduction of the deadline for returning the resource. Thus, if the students have faced some discouragement in the first year of graduation – such as a lack of interest in the program or institution chosen at the time of entry, lack of perspective of receiving a salary that allows to pay back the funding after graduating with the conditions that were pre-agreed, or even factors such as current unemployment, decrease in family income – having committed to a high funding may be another factor to get them to give up the program.

In addition, the Brazilian economy changed during those years. While in 2011 the GDP grew 3.97 % compared to the previous year, in

Table 8
Results from the Logit for the whole sample and from the Multinomial Logit for the first-year students in 2011 and 2016 – personal characteristics.
Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

| | Logit | | Multinomial Logit | | | |
| | | | 2011 | | 2016 | |
	Stop-out	Drop-out	Stop-out	Drop-out	Stop-out	Drop-out
in_sex_student	−0.146***	−0.115***	−0.193***	−0.0263	−0.150***	−0.135***
	(0.0212)	(0.0157)	(0.0618)	(0.0466)	(0.0226)	(0.0168)
nu_age_student	0.0140***	−0.00130	−0.0123**	−0.0236***	0.0170***	0.00214
	(0.00172)	(0.00137)	(0.00594)	(0.00466)	(0.00181)	(0.00145)
widower	0.179	0.140	0.0378	0.693	0.230	0.103
	(0.288)	(0.241)	(1.015)	(0.597)	(0.303)	(0.265)
married_clm	0.0221	0.0197	−0.0227	0.00648	0.0358	0.0298
	(0.0335)	(0.0256)	(0.0982)	(0.0754)	(0.0358)	(0.0274)
divorced_sep	0.0431	0.0111	0.160	−0.0267	0.0472	0.0370
	(0.0723)	(0.0577)	(0.199)	(0.164)	(0.0780)	(0.0620)
black	−0.0835***	−0.0214	−0.00754	0.000871	−0.0956***	−0.0250
	(0.0209)	(0.0155)	(0.0607)	(0.0456)	(0.0223)	(0.0166)
east asian	−0.0444	0.0859*	−0.170	−0.171	−0.0183	0.120**
	(0.0679)	(0.0484)	(0.210)	(0.154)	(0.0721)	(0.0513)
indigenous	0.170	0.149	−0.159	−0.780	0.214	0.220
	(0.189)	(0.145)	(0.715)	(0.714)	(0.197)	(0.149)
public_school	0.144***	0.293***	0.249***	0.0130	0.151***	0.339***
	(0.0278)	(0.0212)	(0.0794)	(0.0562)	(0.0297)	(0.0231)
partial_public_private	0.104**	0.257***	0.102	0.218**	0.122**	0.269***
	(0.0455)	(0.0341)	(0.130)	(0.0868)	(0.0487)	(0.0371)
Observations	290,208		71,946		218,262	

Table 9
Results from the Logit for the whole sample and from the Multinomial Logit for the first-year students in 2011 and 2016 – academic characteristics.
Source: prepared by the authors using data from INEP (2011a), b; INEP (2016a), b; FNDE (2011a), FNDE (2011b), FNDE (2016a), b.

| | Logit | | Multinomial Logit | | | |
| | | | 2011 | | 2016 | |
	Stop-out	Drop-out	Stop-out	Drop-out	Stop-out	Drop-out
paid	−0.229***	−0.480***	−0.297	−1.953***	−0.251***	−0.384***
	(0.0702)	(0.0600)	(0.202)	(0.336)	(0.0750)	(0.0613)
unpaid	−0.841***	−0.874***	−0.646***	−0.647***	−0.919***	−0.929***
	(0.0428)	(0.0321)	(0.120)	(0.0922)	(0.0459)	(0.0343)
in_en_enem	−0.120***	−0.0162	−0.336***	−0.0271	−0.0958***	−0.0100
	(0.0251)	(0.0180)	(0.0941)	(0.0671)	(0.0262)	(0.0188)
ln_semester	−0.00819	0.171***	−0.211***	−0.0862*	0.0351	0.200***
	(0.0201)	(0.0151)	(0.0608)	(0.0445)	(0.0214)	(0.0161)
prouni_50	−0.145**	−0.281***	0.407***	−0.0955	−0.499***	−0.405***
	(0.0654)	(0.0519)	(0.110)	(0.0962)	(0.0886)	(0.0636)
other_funding	−0.319***	−0.567***	0.0596	0.0933	−0.422***	−0.708***
	(0.120)	(0.0984)	(0.294)	(0.219)	(0.132)	(0.110)
other_scholarship	0.267***	0.0697***	−0.253***	−0.336***	0.346***	0.145***
	(0.0237)	(0.0186)	(0.0804)	(0.0620)	(0.0251)	(0.0196)
igc	0.390***	0.0458***	0.539***	0.361***	0.356***	0.000995
	(0.0253)	(0.0163)	(0.0640)	(0.0455)	(0.0278)	(0.0175)
education	0.129***	0.271***	0.0252	0.199**	0.168***	0.286***
	(0.0462)	(0.0339)	(0.141)	(0.100)	(0.0491)	(0.0362)
hum_arts	0.576***	−0.171	0.743**	−0.269	0.543***	−0.134
	(0.116)	(0.120)	(0.331)	(0.386)	(0.125)	(0.127)
sc_law_busi	0.164***	0.180***	0.235***	0.225***	0.163***	0.175***
	(0.0270)	(0.0200)	(0.0887)	(0.0637)	(0.0284)	(0.0212)
math_sci	0.355***	0.263***	0.756***	0.562***	0.304***	0.230***
	(0.0499)	(0.0386)	(0.131)	(0.104)	(0.0545)	(0.0419)
engi_con	0.213***	0.283***	0.545***	0.441***	0.189***	0.265***
	(0.0303)	(0.0221)	(0.0921)	(0.0670)	(0.0324)	(0.0235)
agri_vet	0.130**	0.0102	0.565***	−0.322*	0.0725	0.0386
	(0.0616)	(0.0458)	(0.173)	(0.181)	(0.0661)	(0.0477)
services	0.175	−0.263	−0.0569	0.0656	0.175	−0.316
	(0.225)	(0.210)	(0.717)	(0.511)	(0.237)	(0.231)
year_2016	0.847***	1.023***				
	(0.0321)	(0.0240)				
constant	−5.370***	−5.182***	−3.589***	−3.162***	−4.767***	−4.338***
	(0.188)	(0.140)	(0.559)	(0.414)	(0.201)	(0.149)
Observations	290,208		71,946		218,262	

2016 it registered a decrease of 3.60 % compared to 2015 (WORLD BANK, 2018). Within this scenario, there was also an increase in unemployment: according to IBGE (2018), the unemployment rate in metropolitan areas was 6.3 % in February 2011, while in February 2016 it was 8.2 %. Consequently, the economic crisis may have made it more difficult for students to remain in higher education. Older students, who traditionally study and work, may have been affected by this new context. There is a possibility that in a crisis scenario students do not want to commit themselves to high debt repayment in the future, which may also have influenced the fact that the higher the funding, the greater the chances of them dropping out. This would be an opposite effect to ProUni: since the student does not have to pay back the money after graduating, in a scenario of economic difficulty, the individuals who received this benefit ended up showing less withdrawal.

In order to be able to analyze the impact of personal characteristics and the program on the different types of withdrawal, the Multinomial Logit method was used. When comparing the individual characteristics of students who stopped out and those who dropped out of the institution, there are similarities between some results. First, the fact that the student is female reduces the chance of both types of withdrawal occurring for both years. The result that women show greater persistence is already presented in the literature on withdrawal and permanence in higher education by Desjardins et al. (1999). As for age, there are different results for each year: while in 2011 the older the student, the lower the chances of stopping out or dropping out of the program, in 2016 this result is reversed, and now an older age has positive effect on the withdrawal – in the case of drop-out, the result did not present statistical significance.

In the analyzes of the student's marital status, *single* is the omitted variable. Widower, separated or divorced and married or in common-law marriage did not present statistical significance. One of the possible reasons for this result is the high proportion of unmarried students in the sample, which correspond, on average, to more than 85 % of the individuals in each sample. For the analysis of race and/or ethnicity, the selected omitted variable was *caucasian*. Thus, black students withdrew less often in 2016 than caucasian students – in this case, only this result presented statistical significance. This result is consistent with the conclusions of Kaltenbaugh et al. (1999). When analyzing the effects of funding for black and caucasian students, the authors conclude that this type of financial resource is positively correlated with the permanence of black students.

Considering that *private school* is the omitted variable, studying in a public school increases the chances of withdrawal for individuals that present this characteristic – in this case, three of the four results presented statistical significance. Thus, socioeconomic characteristics of public-school students presented previously may be influencing their permanence in higher education.

As far as paid and unpaid activities are concerned, they have a negative influence on withdrawal. This result is also in agreement with Desjardins et al. (1999), who show that students who participate in academic activities, end up having less incentive to give up their studies because they are more integrated into the university community. As for semester fee, there are different effects for the two years: in the case of 2011, a higher funding reduces the chances of the student withdrawing from the program. However, in 2016, the higher the value of the FIES resource allocated to the student, the greater the chance of leaving the program permanently. Finally, for the other funding – which do not consist of FIES –, one can assume that when the students receive them, the chances of dropping out and stopping out decrease. However, the opposite effect is true for other scholarships. In that case, they lowered the chances of withdrawal in 2011, but increased it in 2016.

As for the program which the students entered in, the omitted variable is *health welfare*. The conclusion that can be drawn from the analysis of the Multinomial Logit is that all programs presented higher chances of withdrawal when compared to those of the health area – the exception being the *Agriculture and Veterinary Medicine* area in 2011.

The influence of the program's quality was also evaluated, indicated by the *IGC* variable. The results show that the higher this indicator, the greater the chances of student withdrawal. This result is not valid for dropouts in the year 2016, when the value did not present statistical significance.

Thus, there have been some changes on the influence that the students' characteristics exert on the chances of them stopping out or dropping out of the programs between the two analyzed periods. Here, the emphasis will be the changes regarding the effects of the semi-annual funding amount, the student's age and the effect of the partial ProUni. The literature shows, in general, that the greater the amount of financial resources the student receives, the lower are the chances that he will withdraw (NORA, 1990; BETTINGER, 2004). This result can be seen in 2011, but not in 2016.

In the case of the partial ProUni, the estimation is that in the first year the students granted with this benefit were more likely to withdraw, while in 2016 the chances of withdrawal decrease. Because it consists of a scholarship that covers 50 % of the monthly tuition, the fact that there is no need to return the resource after graduation can be an incentive for the student to continue in the program at a difficult time. Regarding age, Desjardins et al. (1999) show that older students generally present higher withdrawal rates, since they already have other commitments besides the academic environment, such as family and work, which reduces the time they have to study.

6. Final considerations

Brazilian higher education has undergone several changes over the last two decades. In addition to the transformations that aimed at increasing the number of vacancies, there was also the creation of programs that sought to keep the students in college. When analyzing the data of students who took ENEM in 2010 and 2015, the ones who attended public high schools have more unfavorable socioeconomic conditions than those who studied in private schools. Given that in 2016 > 75 % of higher education students came from public high schools, programs designed to help students stay in the university are important.

Therefore, in a time of crisis, when an important program undergoes reforms that limit its access, it becomes important to analyze what may be impacting the withdrawal of students who have been given this benefit. Withdrawal is detrimental to various actors in the economy. It is so for the students themself, since they present both the financial and opportunity cost when entering higher education and from the moment they leave the program, they will not have the same opportunities as they would have if they had obtained the diploma. In addition, there is a loss of revenue for educational institutions. Finally, society has a lot to lose in the economic aspect, since public resources are destined for FIES, and when a student who received this investment does not graduate, it is not used as efficiently as possible.

It is important to point out the differences between the students that stop-out or drop-out when receiving some financial aid. When students that receive FIES dropout of college, they must pay back the money that was invested in them. When they receive ProUni, dropping out does not result in any penalty. For both FIES and ProUni, if the student stops out of the program it will not cause the loss of the benefit, but within a limited period – depending on the benefit and the moment the student applied for it.

Since FIES and ProUni have a limited number of vacancies that are offered for each period of time, when a student is selected to receive the benefit and later stops out for longer than allowed or when he drops out, that means that another student that might have completed the program was not selected. One of the main objectives of expanding the Brazilian higher education system was to increase the number of young people in the county with a college degree, a number that is lower than other countries in Latin America. In addition, there is a loss in terms of the positive externalities that a person with more education would

provide for society.

Personal and academic characteristics of the students represented a change in the influence that they exert in the different types of withdrawal between the two analyzed periods, some hypotheses that could explain the results were put to discussion. However, this is a limitation of this study. Through the available data and the applied methods, it can be concluded that there was this change in variables and a greater withdrawal among students who entered higher education in 2016 than among those who entered in 2011, but it is not possible to determine one or more causes for this phenomenon through the methods used. Thus, studies using other tools or in other areas of study may further contribute to an explanation for these results.

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CRediT authorship contribution statement

Alice Saccaro: Conceptualization, Methodology, Software, Formal analysis, Investigation, Writing - original draft, Writing - review & editing, Visualization. **Marco Túlio Aniceto França:** Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing, Visualization, Supervision, Funding acquisition.

References

Barros, RicardoPaesde, Mendonça, RosaneSilva Pintode, 1995. Os Determinantes da Desigualdade no Brasil. Texto para Discussão nº 377 do IPEA. IPEA, Rio de Janeiro Available at: < http://www.ipea.gov.br/portal/images/stories/PDFs/TDs/td_0377.pdf > . Visited on: May, 26th, 2018.

Bettinger, Eric., 2004. How Financial Aid Affects Persistence. National Bureau of Economic Research, Working Paper 10242. January, JEL No. I2.

BRASIL, 1999. Medida Provisória nº 1.865-4, de 26 de agosto de 1999. Dispõe sobre o Fundo de Financiamento ao Estudante do Ensino Superior e dá outras providências. Available at: < http://www2.camara.leg.br/legin/fed/medpro/1999/medidaprovisoria-1865-4-26-agosto-1999-358953-publicacaooriginal-1-pe.html > . Visited on: April, 1st, 2018.

BRASIL, 2001. Lei no 10.260, de 12 de julho de 2001. Dispõe sobre o Fundo de Financiamento ao estudante do Ensino Superior e dá outras providências. Available at: < http://www.planalto.gov.br/ccivil_03/leis/LEIS_2001/L10260.htm > . Visited on: May 1st, 2018.

BRASIL, 2005. Lei no 11.096, de 13 de janeiro de 2005. Institui o Programa Universidade para Todos – PROUNI e dá outras providências. Available at: < http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2005/lei/L11096.htm > . Visited on: May 1st, 2018.. .

BRASIL, 2010a. Resolução nº 3.842, De 10 De Março De 2010. Fixa a taxa efetiva de juros do Fundo de Financiamento ao Estudante do Ensino Superior (FIES). Available at: < http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=4037-resolucao-3842-10-03-2010&category_slug=marco-2010-pdf&Itemid=30192 > . Visited on: May 1st, 2018.

BRASIL, 2010b. Portaria Normativa nº 10, de 30 de abril de 2010. Dispõe sobre procedimentos para inscrição e contratação de financiamento estudantil a ser concedido pelo Fundo de Financiamento ao Estudante do Ensino Superior (FIES). Available at: < http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=17231-port-normativa-n10-30042010&category_slug=marco-2015-pdf&Itemid=30192 > . Visited on: May 1st, 2018.

BRASIL, 2010c. Resolução nº 3, de 20 de outubro de 2010. Dispõe sobre o alongamento de prazo para amortização das operações de crédito realizadas com recursos do Fundo de Financiamento ao Estudante do Ensino Superior (FIES). Available at: < http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=6890-resolucao-3-20-outubro-2010&category_slug=outubro-2010-pdf&Itemid=30192 > . Visited on: May 1st, 2018.

BRASIL, 2010d. Decreto nº 7.337, de 20 de outubro de 2010. Dispõe sobre as condições de amortização dos contratos de financiamento celebrados no âmbito do Fundo de Financiamento ao Estudante do Ensino Superior - FIES. Available at: < http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=7370-decreto7337-20-outubro2010&category_slug=janeiro-2011-pdf&Itemid=30192 > . Visited on: May 1st, 2018.

BRASIL, 2012. Análise sobre a Expansão das Universidades Federais 2003 a 2012. MEC, Brasília Available at: < http://portal.mec.gov.br/index.php?option=com_docman&

task=doc_download&gid=12386&Itemid= > .Visited on: May 1st, 2018.

BRASIL, 2015. Portaria Normativa nº 8, de 2 de julho de 2015. Dispõe sobre o processo seletivo do Fundo de Financiamento Estudantil - Fies referente ao segundo semestre de 2015 e dá outras providências. Available at: < http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=17718-port-norm-8-fies-3julho&category_slug=julho-2015-pdf&Itemid=30192 > . Visited on: May 1st, 2018.

Chen, Jin, Hossler, Don, 2017. The effects of financial aid on college success of two-year beginning nontraditional students. Res. High. Educ. 58, 40–76 Available at: < https://link.springer.com/content/pdf/10.1007%2Fs11162-016-9416-0.pdf > . Visited on: February 1st, 2019.

Choi, Yool, 2018. Student employment and persistence: evidence of effect heterogeneity of student employment on college drop-out. Res. High. Educ. 59, 88–107 Available at: < https://link.springer.com/content/pdf/10.1007%2Fs11162-017-9458-y.pdf > . Visited on: January 22nd, 2019.

Clark, Damon, Conlon, Gavan, Galindo-Rueda, Fernando, 2005. Post compulsory education and qualification attainment. In: Machin, Stephen, Vignoles, Anna (Eds.), What's the Good of Education? The Economics of Education in the UK. Princeton University Press, New Jersey.

Coulon, Alain, 2008. O Ofício de Estudante: a entrada na vida universitária. EDUFBA, Salvador Available at: < http://www.scielo.br/pdf/ep/v43n4/1517-9702-ep-43-4-1239.pdf > . Visited on: January 28th, 2019.

Desjardins, Stephen, Ahlburg, D., Mccall, B., 1999. An event history model of student departure. Econ. Educ. Rev. 18, 375–390.

Duarte, Isabela Ferreira, Mello, JoãoManoelPinhode, 2014. Student Loans Impacts on Tuition Costs - Consequences of FIES. Rio de Janeiro. 51 p. Masters' Dissertation. Department of Economics, Pontifícia Universidade Católica do Rio de Janeiro. Available at: < http://www.dbd.puc-rio.br/pergamum/tesesabertas/1212329_2014_pretextual.pdf > . Visited on: February 5th, 2020.

FUNDO NACIONAL DE DESENVOLVIMENTO DA EDUCAÇÃO – FNDE, 2011a. Microdados do FIES: Financiamentos Concedidos em 1.2011. Available at: < http://www.fnde.gov.br/dadosabertos/dataset/fundo-de-financiamento-estudantil-fies > . Visited on: April 30th, 2018.

FUNDO NACIONAL DE DESENVOLVIMENTO DA EDUCAÇÃO – FNDE, 2016a. Microdados do FIES: Financiamentos Concedidos em 1.2016. Available at: < http://www.fnde.gov.br/dadosabertos/dataset/fundo-de-financiamento-estudantil-fies > . Visited on: April 30th, 2018.

FUNDO NACIONAL DE DESENVOLVIMENTO DA EDUCAÇÃO – FNDE, 2016b. Microdados do FIES: Financiamentos Concedidos em 2.2016. Available at: < http://www.fnde.gov.br/dadosabertos/dataset/fundo-de-financiamento-estudantil-fies > . Visited on: April 30th, 2018.

GREENE, William, 2003. Econometric Analysis, 5th edition. Prentice Hall, New Jersey.

GROSS, Jacob, HOSSLER, Done, ZISKIN, Mary, 2007. Institutional Aid and Student Persistence: An Analysis is of the Effects of Institutional Financial Aid at Public Four-Year Institutions. NASFAA J. Student Financial Aid 37 (1).

GUIMARÃES, Juliana, SAMPAIO, Breno, SAMPAIO, Yony, 2010. What is behind university drop-out decision in Brazil? A bivariate probability model. Empirical Econ. Lett. 9 (6) Available at: < http://www.econ.cam.ac.uk/people-files/cto/jgc29/pubs/10_100212-EEL-Sampaio&Caalcanti_USA_Published%20Paper.pdf > . Visited on: January 30th, 2019.

HERZOG, Serge, 2005. Measuring determinants of student return vs. Drop-out/Stop-out vs. transfer: a first-to-Second year analysis of new freshmen. Res. High. Educ. 46 (8) Available at: < http://www.studentclearinghouse.org/colleges/files/ST_UNRretention.pdf > . Visited on: July 1st, 2018.

HORN, Laura, CARROLL, C.Dennis, 1998. Stop-outs or Stayouts? Undergraduates Who Leave College in Their First Year. U.S. Department of Education Office of Educational Research and Improvement: Statistical Analysis Report. Available at: < https://nces.ed.gov/pubs99/1999087.pdf > . Visited on: July 1st, 2018.

HOYT, Jeff, WINN, Bradley, 2004. Understanding Retention and College Student Bodies: Differences Between Drop-Outs, Stop-Outs, Opt-Outs and Transfer-Outs. NASPA J. 41 (3).

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE, 2018. Taxa de desemprego mensal nas regiões metropolitanas, estimada a partir da PME. Available at: < https://ww2.ibge.gov.br/home/estatistica/indicadores/trabalhoerendimento/pme_nova/default_encerramento.shtm > . Visited on: April 12th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 1999. Sinopse Estatística do Censo da Educação Superior – 1999. Disponível em: < http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-superior > . Acesso em: January 31st, 2019.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2010. Microdados do Exame Nacional do Ensino Médio. Available at: < http://portal.inep.gov.br/microdados > . Visited on: April 30th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2011a. Microdados do Censo da Educação Superior - 2011. Available at: < http://portal.inep.gov.br/microdados > . Visited on: April 30th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2011b. Índice Geral de Cursos de 2011. Available at: < http://portal.inep.gov.br/basicalevantamentos-acessar > . Visited on: April 30th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2015. Microdados do Exame Nacional do Ensino Médio. Available at: < http://portal.inep.gov.br/microdados > . Visited on: April 30th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2016a. Microdados do Censo da Educação Superior 2016. Available at: < http://portal.inep.gov.br/microdados > . Visited on: April 30th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2016b. Índice Geral de Cursos de 2016. Available at: < http://

portal.inep.gov.br/basicalevantamentos-acessar > . Visited on: April 27th, 2018.

INSTITUTO NACIONAL DE ESTUDOS E PESQUISAS EDUCACIONAIS ANÍSIO TEIXEIRA - INEP, 2017. Sinopse Estatística do Censo da Educação Superior – 2017. Disponível em: < http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-superior > . Acesso em: January 31st, 2019.

Ishitani, Terry, 2003. A longitudinal approach to assessing attrition behavior among first-generation students: time-varying effects of pre-college characteristics. Res. High. Educ. 44 (4) Available at: < https://www.iwu.edu/first-generation/Ishitani.pdf > . Visited on: January 31st, 2019.

Johnson, Iryna, 2006. Analysis of stop-out behavior at a public research university: the multi-spell discrete-time approach. Res. High. Educ. 47 (8), 905–934 Available at: < https://link.springer.com/article/10.1007%2Fs11162-006-9020-9 > . Visited on: July 1st, 2018.

Kaltenbaugh, Louise S., JOHN, S.T., Edward, P., STARKEY Johnny, B., 1999. What difference does tuition make? An analysis of ethnic differences in persistence. J. Student Financial Aid 29 (2) Article 2. Available at: < https://publications.nasfaa.org/cgi/viewcontent.cgi?article=1091&context=jsfa > . Visited on: May 1st, 2018.

Kuh, George, Cruce, Ty, Shoup, Rick, Kinzie, Jillian, Gonyea, Robert, 2008. Unmasking the effects of student engagement on first-year college grades and persistence. J. Higher Educ. 79 (5) September/October 2008, pp. 540-563. Available at: < http://www.yorku.ca/retentn/rdata/Unmaskingtheeffects.pdf > . Visited on: May 1st, 2018.

Lima Jr., Paulo, SILVEIRA, Fernando Langda, OSTERMANN, Fernanda, 2002. Análise de Sobrevivência aplicada ao estudo do fluxo escolar nos cursos e graduação em física: um exemplo de uma universidade brasileira. Revista Brasileira de Ensino em Física 34 (1), 1403 Available at: < http://www.scielo.br/scielo.php?pid=S1806-11172012bra000100014&script=sci_abstract&tlng=pt > . Visited on: January 22nd, 2019.

LOBO E SILVA, F.I.L.H.O., Leal, Roberto, MOTEJUNAS, Paulo Roberto, HIPÓLITO, Oscar, LOBO, Maria Beatriz DeCarvalhoMelo, 2007. A Evasão no Ensino Superior Brasileiro. Cadernos de Pesquisa 37 (132) set./dez. Available at: < http://www.scielo.br/pdf/cp/v37n132/a0737132 > . Visited on: 17 mai. 2018.

McCOWAN, Tristan, 2007. Expansion without equity: an analysis of current policy on access to higher education in Brazil. High. Educ. 53, 579–598 Available at: < https://link.springer.com/content/pdf/10.1007%2Fs10734-005-0097-4.pdf > . Visited on: January 30th, 2019.

MINISTÉRIO DA EDUCAÇÃO, 2020a. Prova Brasil. Available at: < http://

portal.mec.gov.br/prova-brasil > . Visited on: January 24th, 2020.

MINISTÉRIO DA EDUCAÇÃO, 2020b. PNAES. Available at: < http://portal.mec.gov.br/pnaes > . Visited on: March 31st, 2020.

MINISTÉRIO DA EDUCAÇÃO, 2020c. ProUni. Available at: < http://siteprouni.mec.gov.br/ > . Visited on: March 31st, 2020.

NORA, Amaury., 1990. Campus-based Aid Programs as Determinants of Retention among HispanicCommunity College Students. J. Higher Educ. 61 (3).

PEDROSA, Renato, SIMÕES, Tania, CARNEIRO, Ana, ANDRADE, Cibele, SAMPAIO, Helena, KNOBEL, Marcelo, 2014. Access to higher education in Brazil. Widening Particip. Lifelong Learn. 16 (1,1), 5–33 Available at: < http://www.ingentaconnect.com/content/openu/jwpll/2014/00000016/00000001/art00002 > . Visited on: May 1st, 2018.

Pereira, TarcísioLuiz, DE, B.R.I.T.O., Andrade, Silvia Helena, 2018. A expansão da educação superior privada no Brasil por meio do FIES. EccoS Revista Científica (47), 337–354 Avaiable at:https://search.proquest.com/openview/75c7457ac7e5c251b4-f5e3c4c85c2568/1?cbl=2030580&pq-origsite=gscholar. Visited on: January 31st, 2019.

SALTO, Dante, 2018. To profit or not to profit: the private higher education sector in Brazil. High. Educ. 75, 809–825 Available at: < https://link.springer.com/content/pdf/10.1007%2Fs10734-017-0171-8.pdf > . Visited on: January 31st, 2019.

SANTELICES, MaríaVerónica, et al., 2016. Determinants of persistence and the role of financial aid:lessons from Chile. High. Educ. 71 (3), 323–342 Available at: < http://link.springer.com/article/10.1007%2Fs10734-015-9906-6 > . Visited on: January 30th, 2019.

STRATTON, Leslie, O'TOOLE, Dennis, WETZEL, James, 2008. A multinomial logit model of college stop-out and drop-out behavior. Econ. Educ. Rev. 27 (3), 319–331 Available at: < https://econpapers.repec.org/article/eeeecoedu/v_3a27_3ay_3a2008_3ai_3a3_3ap_3a319-331.htm > . May 24th, 2018.

TRIBUNAL DE CONTAS DA UNIÃO - TCU, 2017. Ministério da Educação. Prestação de Contas Ordinárias Anual: Relatório de Gestão do Exercício de 2016. Available at: < http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=66631-relatoriogestao-fies-exercicio-2016-pdf&category_slug=junho-2017-pdf&Itemid=30192 > .Visited on: May 13th, 2018.

WORLD BANK, 2018. GDP Growth (annual %): Brazil. Available at: < https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=BR > . Visited on: April 1st. .