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Gaps in Persistence Under Open-Access and Tuition-Free Public Higher Education Policies

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Abstract: The massification of Argentine higher education intensified in the context of open-access and tuition free public university policies. Although Argentina stands out in relation to enrollment in higher education, it faces serious problems in terms of retention and graduation. To study the factors associated with dropout in the higher education system, we use the Permanent Household Survey, or EPH, to measure these phenomena. The EPH is a quarterly national survey that systematically and permanently collects data on the population's demographic, educational, labor and socioeconomic characteristics. Based on the EPH, we calculated the global dropout and graduation rates by socioeconomic status and gender and used logistic regression models to estimate the effect of some demographic, socioeconomic, institutional and financial factors on dropout probability. Among the main findings, we observed that the socioeconomic status and being a first-generation student matter. We detected that being a first-generation student, even after controlling for the socioeconomic status of the student's household, gender, the

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type of institution (tertiary non-university or university) and having a scholarship, implies a higher probability of dropout. We conclude that these results are most germane to public policy design and possible replications of this methodology in other Latin American countries.
Keywords: Higher education public policies; Dropout; Graduation; Higher education; Argentina

Brechas en la persistencia bajo políticas de acceso sin restricciones y de gratuidad en la educación superior
Resumen: La masificación de la educación superior se intensificó en el contexto de las políticas públicas de acceso irrestricto y gratuidad en el sector público. Si bien Argentina se destaca por su alta escolarización en el nivel superior, enfrenta graves problemas en la retención y graduación. Para estudiar los factores asociados con la deserción en el sistema de educación superior, abordamos la medición a través de la Encuesta Permanente de Hogares o EPH. La EPH es una encuesta nacional trimestral que recopila de manera sistemática y permanente datos de las características demográficas, educativas, laborales y socioeconómicas de la población. En base a la EPH, calculamos las tasas de abandono y graduación globales por nivel socioeconómico y género y estimamos el efecto de algunos factores sobre la probabilidad de abandono usando modelos de regresión logística. Entre los hallazgos observamos que el nivel socioeconómico y ser estudiante de primera generación, incluso después de controlar por el nivel socioeconómico del hogar, el género, el tipo de institución (terciaria no universitaria o universitaria) y tener una beca, implican una mayor probabilidad de abandonar. Concluimos señalando la utilidad de estos resultados en el diseño de políticas públicas y la posibilidad de replicar esta metodología en otros países latinoamericanos.
Palabras-clave: Políticas públicas de educación superior; abandono universitario; graduación; educación superior; Argentina

Brechas na persistência bajo políticas de acesso aberto e matrícula gratuita em educação superior
Resumo: A formação da educação superior se intensifica no contexto das políticas públicas de acesso irrestrito e gratuito no setor público. Si bien Argentina se destaca pela alta escolarización no nivel superior, enfrenta graves problemas na retención y graduación. Para estudar os fatores associados ao abandono no sistema de ensino superior, abordamos a medição por meio da EPH. A EPH é uma pesquisa nacional trimestral que coleta de forma sistemática e permanente dados sobre as características demográficas, educacionais, trabalhistas e socioeconômicas da população. Com base na EPH, calculamos as taxas de abandono e graduação globais por nível socioeconômico e gênero e estimamos o efeito de alguns fatores na probabilidade de abandono por meio de modelos de regressão logística. Entre os resultados, nós observamos que o status socioeconômico e sendo um aluno de primeira geração, mesmo depois de controlar o nível socioeconômico da família, sexo, tipo de instituição (não universitário ou terciário universitário) e ter uma bolsa de estudos, implicam uma maior probabilidade de deixar. Concluímos ressaltando a utilidade desses resultados na formulação de políticas públicas e a possibilidade de replicar essa metodologia em outros países latino-americanos.
Palavras-chave: Políticas públicas de educação superior; abandono universitario; graduação; educação superior; Argentina

Introduction

Argentina, like most Latin American countries, has a very unequal social structure, characterized by high socioeconomic and educational inequality (Gasparini et al., 2005). The skewed distribution of income and the disadvantages among low-income households in terms of the level of education attained by their adults, affect the chances children from these poor households have to attend good quality primary and secondary education (Binstock & Cerruti, 2005; Krüger, 2012). In turn, low-income students have fewer opportunities to attend higher education institutions. Due to these gaps in terms of socioeconomic and educational background that the households of these students present, both the Argentine government and university authorities support open access and cost-free undergraduate program policies at public universities. This paper shows that the absence of academic and economic barriers to admit students to undergraduate studies at public higher education institutions did not guarantee equity in terms of persistence and graduation.

Based on information from the national Argentine Permanent Household Survey (Encuesta Permanente de Hogares- EPH) for the years 2003-2015, this study investigates what the major demographic and socioeconomic factors are that affect the probability of degree attainment and dropout in Argentine higher education.

We begin by analyzing the Argentine higher education system in the context of the massification and institutional differentiation. Next, we present a summary of the principal theoretical background in the study of factors affecting university dropout, mainly focusing on changes in the literature in the last decade. In particular, we describe different approaches depending on whether the level of analysis refers to dropout from a higher education institution or, what interests us, from the tertiary sector as a whole. We present the design and methodology used in this research and the results achieved. Then, we discuss the main results obtained regarding the factors that affect dropout in the higher education system. We conclude with a discussion of the main findings and some implications in order to design public policies that can contribute to raising graduation rates and improving college retention.

Massification and Institutional Differentiation in Argentine Higher Education

The increasing demand for higher education in Argentina is the product of the middle-classes' pursuit of upward social mobility. Between the early 20th century and the end of World War I, the average annual growth rate of university enrollment reached an unprecedented 13.2% and sustained an annual average of 7.4% until 1955 (García de Fanelli, 2005).

In the past three decades, the massification of higher education intensified due to the growth of high-school graduates in the context of a higher education system with non-selective admission mechanisms for most institutions and cost free undergraduate studies in the public sector. In 2014, Argentina's gross enrollment ratio in higher education achieved 83% of the 20-24 age-group, like Denmark (82%), slightly below the United States (87%) and higher, for example, than developed countries such as France, Germany, Italy, Japan, and the United Kingdom (UIS, 2017).

To respond to the social demand for higher education slots, the structure of the higher education institutions was also transformed through a process of horizontal and vertical differentiation. Horizontal differentiation in Latin American countries occurred mainly through the expansion of the private sector. Vertical differentiation meant new undergraduate and graduate programs and short-cycle degrees, both in the university and in the tertiary non-university sectors. As a result of this institutional and program differentiation, the Argentine higher education system is

now a complex structure of 65 public and 66 private universities and university institutes[1] and 2,213 public and private tertiary non-university institutions (García de Fanelli, 2017a).

Totaling almost 1.5 million students, the public university tier or "national university sector" is by far the most important in terms of student enrollment, academic staff, political visibility, social prestige, and functions. Within the national university sector, we find a widely differentiated university system, ranging from a few research-intensive schools (mostly in the basic sciences) at some traditional national universities to primarily teaching institutions at schools or universities devoted mainly to professional training. The non-university tertiary tier embraces such institutions as teacher-training institutes and technical and semi-professional schools, including those training para-medical personnel, social workers, artists, and technicians (García de Fanelli, 2017a).

The undergraduate programs, especially at national universities, have an average duration of between five and six years. Students, a significant proportion of whom are older than 25 and work while they study, tend to live at home as there are no student residences on university campuses.

Even though Argentina stands out in relation to enrollment in higher education, it faces serious problems in terms of retention and graduation. Regarding graduation in the higher education system, we consider the indicator constructed by the OECD called "first-time graduation rates by tertiary level."[2] According to the calculation of this indicator, 38% of young people in the OECD will obtain their first bachelor's degree, while only 12% will do so in Argentina. This percentage is also significantly lower than in Chile (36%) and Mexico (24%). The same is true when comparing the proportion of young people who will access a master's or doctoral degree (see Table A1 in Annex 1).

In brief, these indicators show, on the one hand, the great potential Argentina has with regard to young people seeking a college or tertiary level degree and, on the other, the difficulties to achieve this goal. Behind this low level of graduation lies the problem of dropout, usually associated with extracurricular variables related to the socioeconomic and cultural environment of households.

Theoretical Framework

Factors affecting graduation and higher education dropout are numerous, reflecting the complexity of these issues. Vincent Tinto (1975), in his classic work on university dropout, noted that to study the magnitude and causes of this phenomenon, it would be necessary to distinguish between dropping out of the higher education system and of an institution or a specific field of studies. His interactionist model focuses on the latter, paying attention to the integration of students with the academic and social environment of the university. Tinto's model emphasized the adaptation of individuals to the culture and the academic environment of the higher education institutions (Cabrera et al., 2014). Individuals enter the institution with a series of given attributes (gender, race/ethnicity and ability), educational experiences (average grades in secondary school, academic and social achievements) and family profiles (attributes of social status, climate values, and expectations). These factors directly or indirectly influence the student's achievements in higher education and her dedication to the institution and to the goal of achieving a degree.

[1] Since the 1995 Higher Education Act was ratified, a new type of university institution has developed: the "University Institute." These institutions specialize in only one field of study, for example, health care, engineering, or law.

[2] First-time graduates from tertiary education are defined as students who receive a tertiary degree for the first time in their life in a given country. The number of graduates in 2015 of which the age is unknown is divided by the population at the typical graduation age (OECD, 2017, p. 70).

Tinto's theory is especially useful when analyzing the graduation and the dropout that takes place within a university (Kuna et al. 2011). From the time Tinto developed his first dropout model for American universities in 1975, to the latest developments within this line of research, new theoretical perspectives have contributed to enriching the study of this issue.[3]

Other research approaches have studied degree attainment and dropout that take place in the higher education system. These types of studies shed light on the academic, cultural and economic factors prior to the students' admission and selection of a higher education institution, further enriching the analysis by incorporating different types of institutions (in the United States, four-year colleges and two-year community colleges) and students (traditional and non-traditional).[4] This is the case of the 11-year study by Cabrera & La Nasa (2000), who analyzed a cohort of students at the upper-middle level from 1982 using a college-choice model. Within this cohort and up to 1993, 35% of the senior high-school students attained a bachelor's degree. From the analysis of the socioeconomic profile of the students, they drew interesting conclusions. Students with a low socioeconomic status were only 13% likely to graduate within 11 years compared to 57% of students with the highest socioeconomic status. However, this 44% gap that separates the probability of graduating of the lowest to the highest socioeconomic level was reduced to 25% when other factors were considered. In that sense, obtaining a degree depended not only on the socioeconomic level of high-school students, but also on the academic resources, the aspirations to obtain the degree, the type of higher education institution which the students had attended, the fact of having taken courses in mathematics and science at the secondary level and having had children while studying in higher education (Cabrera & La Nasa, 2000).

Another factor affecting both academic achievement and the probability of persisting and obtaining a degree is that of being a first-generation student (FGS), i.e., one whose parents do not have a college education. FGSs usually come from families with lower incomes and show lower levels of engagement in high school (Pike & Kuh, 2005; Terenzini et al., 1996). FGSs also display reduced levels of persistence and graduation, even controlling for demographic, socioeconomic, and sociocultural factors. For those FGSs who succeed in completing higher education, their short-term chances in the labor market are similar, but the likelihood of continuing postgraduate studies differs; in this case it is lower than that of students whose parents hold a higher education degree (Choy, 2001; Ishitani, 2006; Pascarella et al., 2004). Accordingly, Choy (2001, p. 8) points out that: "Multivariate analysis confirms that, among those who intended to earn a degree or certificate, first-generation students were less likely to reach their goals even after controlling for other factors also related to persistence and attainment, including socioeconomic status, age, enrollment status, sex, race/ethnicity, type of institution, and academic and social integration. In other words, first-generation status appears to be a disadvantage throughout postsecondary education that is independent of other background and enrollment factors." These findings highlight the impact that the cultural capital that parents with higher education have while influencing the different stages of access, persistence and the subsequent graduation of their children (Reay et al., 2005).

These two levels of analysis complement each other, particularly when designing public and institutional policies to improve retention and persistence. One focuses on the explanation of retention and graduation problems within higher education institutions or on an academic program,

[3] For a detailed analysis of the most important conceptual changes in the literature on university dropout in the last 40 years in the United States, see Cabrera et al. (2014).

[4] Non-traditional students tend not to meet the following requirements: ages 18 to 24, single marital status, no children, entering immediately after high school, studying full time, financially dependent on parents and living on university campuses (Cabrera et al., 2014). In general, non-traditional students have a higher risk of dropping out (Gilardi & Guglielmetti, 2011).

given certain personal, academic, family and socioeconomic attributes of the students. The other centers precisely on the system level, studying all these demographic, educational and socioeconomic conditions that precede young people's access to higher education. Our study focuses on the data of the higher education system and on the demographic, socioeconomic, type of institution (tertiary non-university and university), and the financial and FGS factors that affect the likelihood of graduation in higher education.

Data and Methodology

In Argentina and in most Latin American countries, longitudinal surveys to study dropout and graduation at universities are not available. Therefore, an option to study the factors associated with persistence and graduation at a systemic level of higher education is to approach the measurement of these phenomena through the Permanent Household Survey (EPH). The EPH is a quarterly national survey that represents the country's urban population.[5] It systematically and permanently relays the demographic, educational, labor and socioeconomic characteristics of the people. Regarding higher education, it surveys whether the student attends or attended a higher education institution, whether the person no longer attends, and whether he or she concluded the level.

The following section first presents the indicators used to measure global graduation and dropout rates in higher education and the main characteristics of the students who comprise the universe of our analysis. We then describe the models used to estimate the probability of global dropout in higher education in Argentina.

Population Studied and Indicators

The sample in our study is comprised of young people (18-30 years old) with some higher education studies living with their parents.[6] Given that the survey does not include a question regarding the educational level of a student's parents, we have restricted the sample to include only those students living at their parents' home in order to garner information on the socioeconomic status of their households, as well as on their parents' level of education.

Using a pool of data corresponding to the grouping of the years 2003 to 2015 of the EPH,[7] we have calculated the global graduation rate for higher education (GGRH) and the global dropout rate for higher education (GDRH) [8] by the socioeconomic level of the students and the gender.

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[5] The 2010 Argentine urban population represented 91% of the total population (INDEC, 2010).

[6] In Argentina almost 80% of the students between 18 and 25 years of age live with their parents, no matter their social origin. For those between 25 and 30 years old, the proportion that still lives with their parents is around 44%. In this latter group, those most likely to live on their own are those from the lower class (60%) and upper class (63%), in contrast to the middle class (52%).

[7] We have constructed an original database by combining the surveys corresponding to the third trimester of each year from 2003 to 2015, except for the years 2007 and 2015 in which the II trimester was used since the III trimester was not available. We call it a pool of data since it corresponds to consecutive years, but it is studied as a cross section in which we introduce a control for each year. Among the studies that also used a pool of data, we can mention Paz & Cid (2012) and García de Fanelli & Adrogué (2015).

[8] Note that "the global graduation rate" for higher education differs from the OECD "first-time graduation rate" indicator defined in Footnote 2. The OECD indicator related the number of first time graduates in a certain year to the population at the typical graduation age. This type of information is not available in the EPH. Moreover, our study considers the population between 18 and 30 years old because we are also interested in analyzing dropout that takes place during the first years of study.

$$GGRH = \frac{\sum GH}{\sum NAH} \quad (1)$$

$$GDRH = \frac{\sum DH}{\sum NAH} \quad (2)$$

Where GH are those who graduated from higher education, DH are those who dropped out and NAH are the sum of those who attended higher education but no longer attend (GH+DH).

Figure 1 presents the higher education enrollment, graduation and dropout rates according to the per capita income of the student's family. Following Groisman's (2016) classification[9] we refer to those who belong to the first quintile of per capita income as the lower class; to those in the second, third and fourth quintile of per capita income as the middle class; and to those who belong to the fifth quintile of per capita income as the upper class. The figure shows that those students who belong to the lower class have a higher global dropout rate (55%) than those in the middle class (40%) or in the upper class (21%). The other side of the coin is that global graduation rates are less than 50% for the first group, and almost 80% for the latter. Since a high number of young people between 18 and 30 years old were still studying, these indicators may vary. Some may drop out later on, and others may return to their studies and complete them. In sum, these indicators are an approximation of the dimension of graduation and dropout from higher education in Argentina, which would only be more accurate if these indicators were calculated from a cohort study.

In addition to the dropout and graduation rates, there are considerable differences in enrollment rates. Note that the upper class not only has the highest graduation rate, but also the highest net enrollment rate (72%). The enrollment rates for the middle class is slightly above the average, 40%, while the lower class presents the highest levels of dropout together with the lowest levels of enrollment (55% and 17%, respectively).[10] In terms of gender differences, women have higher graduation and enrollment rates and lower dropout rates than men.

[9] In his book, Groisman (2016) analyzed different measures of the concept of social class to identify changes in social stratification: income quintiles, income intervals with respect to the median, the educational level of the head of household and the occupational insertion of the head of household. He found a great correspondence among the different approaches used. In our work, we chose to measure social classes according to the income quintiles methodology because it is one of the most common criteria employed in higher education studies in Latin America.

[10] One of the factors that explained the lower enrollment among young people in the lower-class sector is that almost half of them failed to complete the high school level (García de Fanelli, 2017b).

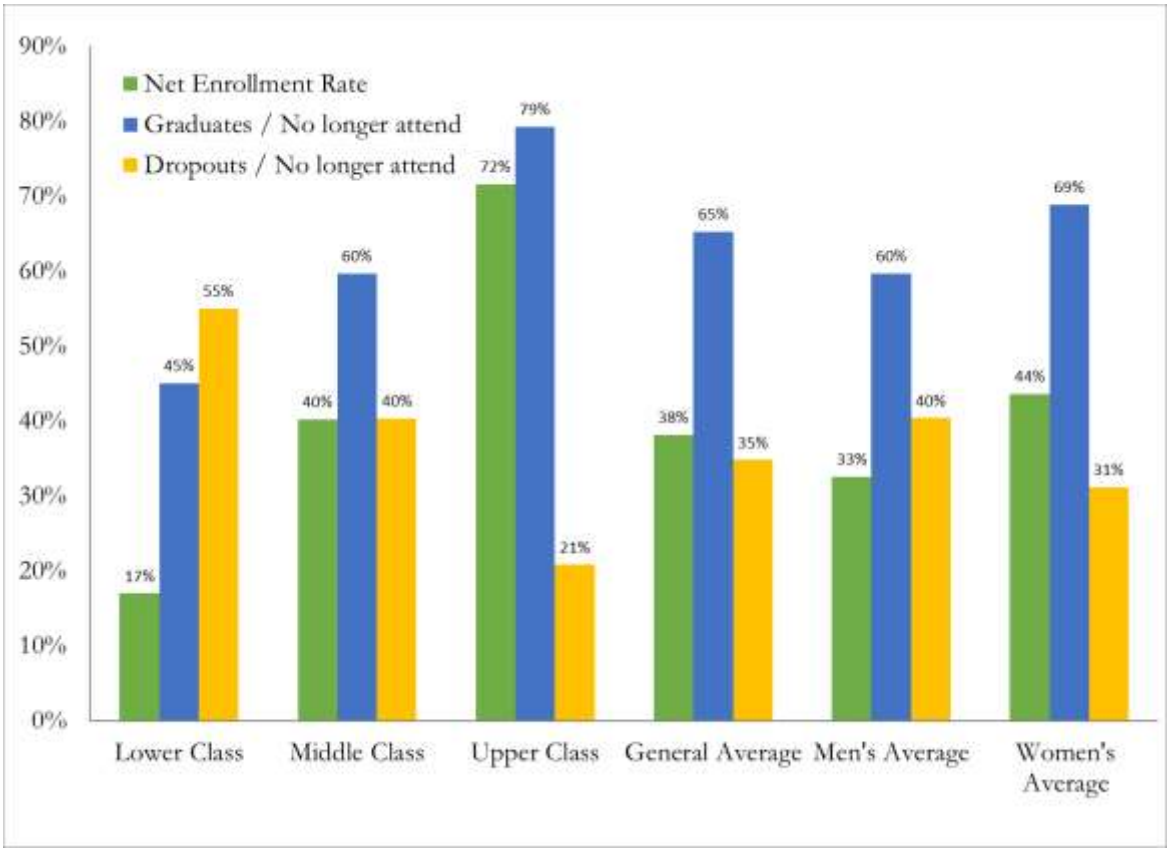

Figure 1: Higher education Net Enrollment rate, proportion of graduates and dropouts among youths who no longer attend according to their per capita family income
Source: Own estimation based on information from the EPH for 2003 to 2015. People between 18 and 30 years of age.

As we saw in the literature, both socioeconomic status and gender have a great incidence on enrollment, graduation and dropout; being an FGS is also a relevant factor to bear in mind. In this sense, this study intends to highlight the incidence of being a first-generation higher education student on dropout since the database shows that approximately 61% of the sample presents this condition – neither the head of household nor the spouse is a higher education graduate. Finally, another element that may be relevant in explaining the probability of dropping out is whether the person under study is a traditional student, i.e., a person under 25 years of age and living with her parents. In our sample, those under 25 years old represent 68%.

Logistic Regression Models

To study the factors associated with the overall dropout rate of the Argentine higher education sector, we used a logistic regression[11] model that makes it possible to determine which factors influence the probability of dropping out of higher education studies (Cabrera, 1994). To this end, we estimate the parameters of the following model:

$$\Pr ob(dropout = 1) = F(X\beta) \qquad (3)$$

[11] Other Argentine studies have used this econometric technique for similar analyses; among them are Gasparini (2002), Paz & Cid (2012) and the author in a previous work (García de Fanelli & Adrogué, 2015).

Where the probability that individual *i* dropped out is a dichotomous variable, which has a value equal to one if individual *i* dropped out of higher education studies and zero if the person did not. β is the vector of coefficients and *X* represents those observable variables corresponding to the characteristics of the individual that affect the probability of dropping out.

In this case, based on the variables that are relevant in the international literature that was discussed in the previous section and in the Argentine case in particular (García de Fanelli, 2014) and the availability of information provided by the EPH, we have estimated two models. As was pointed out in the previous section, this estimation was made using only the information about students living with their parents so that we can correctly capture their parents' education, their family's socioeconomic background and the incidence that these have on dropping out of higher education studies. The explanatory or independent variables (*Xi*) that we have considered for the estimation of the model can be classified as background, higher education and other characteristics and are the following:

Background characteristics.

- Gender: 1 if it is a boy, 0 if it is a girl.
- Adjusted household per capita income: It is the household's per capita income adjusted by the average household per capita income of that year in order to mitigate the effect of inflation.
- Lower class: It is a variable indicating the economic situation of the person's household. It has value 1 if the person belongs to the first quintile of household per capita income and 0 otherwise.
- Middle class: Like the previous variable, it reflects the economic situation of the person's household. It has value 1 if the person belongs to the second, third or fourth quintile of the household per capita income, and 0 otherwise.
- First generation: First generation of students. The value is equal to 1 for those whose head of household (father/mother/mother-in-law/father-in-law/grandfather/grandmother) and spouse have no higher education

Higher education characteristics.

- College student: It is a variable with value 1 if the student is a university student and 0 if the person is a tertiary non-university student.[12]
- Dropout in the first year: It has value 1 if the person only reached the first year of studies, and 0 for those who reached more years.
- Scholarship: It is a variable with value 1 if the person has a scholarship as income and 0 otherwise.

Other characteristics.

- Region: This variable was used to control for differences between the regions in the country. One dummy variable was created for each region (City of Buenos Aires, Buenos Aires

[12] Tertiary institutions train primary and high school teachers, as well as offer short vocational and technical programs. On the other hand, due to the great number of missing values in the variable which refers to the sector – less than 35% of the observations respond to this question – it is not possible to introduce the public-private sector difference as an explanatory variable.

suburbs, Patagonia, Pampas, Northeast, Northwest and Cuyo) with value 1 if the person resides there and 0 otherwise.

- Year: We have introduced a dummy for each year (2003-2015) in order to control for possible political or socioeconomic situations that could have influenced the decision to drop out. However, no particular trend was found in the variables analyzed during the period under study, no clear improvement or decline.

Table 1
Descriptive statistics

Variable	Number of Observations	Mean	Standard Deviation
Dropout	16,262,522	0.092	0.290
Gender	16,262,522	0.437	0.496
Adjusted household per capita income	16,262,522	1.207	1.015
Lower Class	16,262,522	0.138	0.345
Middle Class	16,262,522	0.643	0.479
First generation	16,262,522	0.608	0.488
Younger than 25 years old	16,262,522	0.676	0.468
First year student	16,262,522	0.270	0.444
Scholarship	16,262,522	0.012	0.110
College student	16,262,522	0.712	0.453
Year 2003	16,262,522	0.077	0.266
Year 2004	16,262,522	0.075	0.263
Year 2005	16,262,522	0.076	0.266
Year 2006	16,262,522	0.078	0.268
Year 2007	16,262,522	0.079	0.270
Year 2008	16,262,522	0.076	0.265
Year 2009	16,262,522	0.076	0.265
Year 2010	16,262,522	0.079	0.270
Year 2011	16,262,522	0.075	0.263
Year 2012	16,262,522	0.072	0.258
Year 2013	16,262,522	0.074	0.262
Year 2014	16,262,522	0.082	0.274
Year 2015	16,262,522	0.081	0.274
City of Buenos Aires	16,262,522	0.145	0.352
Buenos Aires Suburbs	16,262,522	0.347	0.476
Pampas	16,262,522	0.237	0.425
Patagonia	16,262,522	0.023	0.149
Cuyo	16,262,522	0.072	0.259
Northeastern	16,262,522	0.054	0.226
Northwestern	16,262,522	0.122	0.327

Source: Own estimation based on information provided by the Permanent Household Survey (EPH) corresponding to the years 2003 to 2015 (III Trimester, except in 2007 and 2015, in which II Trimester was used since III trimester was not available).

The differences between the two models lie in the variables chosen to see the impact of a given condition. The first model includes the adjusted household per capita income instead of the lower-, middle- or upper-class variable; the second model incorporates the income levels.[13]

Results

Table 2 presents the results obtained for each of the two estimated models that examine the importance of the different determinants or factors related to the student's dropout probability, which is around 35% for the group under analysis – students between 18 and 30 years old living with their parents (see Figure 1). As can be seen, the estimates remain almost unchanged when applying both models. To ease interpretation, results reported in Table 2 are presented as odds-ratios (whereby a ratio of less than 1 reflects a decreased likelihood of graduation) (Cox et al., 2016).

Table 2
Factors associated with the probability of dropout from higher education. Estimation through a logistic regression model

	Odds Ratio	**Standard Deviation**	**Z Statistic**		**Odds Ratio**	**Standard Deviation**	**Z Statistic**	
		(1)				(2)		
Gender	1.42	0.003	198.51	***	1.41	0.003	195.65	***
Adjusted household per capita income	0.84	0.001	-138.38	***				
Lower Class					1.41	0.005	98.72	***
Middle Class					1.38	0.004	122.45	***
First Generation	2.55	0.006	410.82	***	2.63	0.006	428.98	***
Younger than 25 years old	0.36	0.001	-543.36	***	0.36	0.001	-538.4	***
Dropout in the first year	1.30	0.003	123.67	***	1.31	0.003	127.98	***
Scholarship	0.05	0.002	-94.75	***	0.05	0.002	-94.37	***
College student	1.04	0.002	21.22	***	1.04	0.002	18.31	***
Dummies per year			yes				yes	
Dummies per region			yes				yes	
Number of Observations			16,262,522				16,262,522	
LR chi2			718,704				713,977	
Prob > chi2			0				0	
Pseudo R2			0.072				0.071	

Source: Own estimation based on information provided by the Permanent Household Survey (EPH) corresponding to the years 2003 to 2015 (III Trimester, except in 2007 and 2015, in which II Trimester was used since III Trimester was not available). * $p<0.05$; ** $p<0.01$; *** $p<0.001$

[13] The high level of significance of the coefficients estimated was no surprise given the great amount of data provided by the EPH (see number of observations in *Table 1).*

From the above table, we can conclude that the likelihood of men leaving higher education studies is 1.42 times that of women. Students with a higher per capita income have less probability of dropping out. Students from the lower class drop out 1.41 times more often than upper-class students. While those who belong to the middle class drop out 1.38 times for every time an upper class student does. Those students whose parents did not graduate from higher education have around 2.6 more probability of dropping out than those whose mother and/or father is a graduate, even after controlling for other factors, such as socioeconomic status. Younger students have less than half the probability of dropping out compared to those between ages 25 and 30.

The probability of dropping out is 1.3 times higher for the students in their first year than for those who have progressed. Students with a scholarship have a lower probability of dropping out, and college students have a slightly higher probability of dropping out than tertiary students. The difference in dropout according to the type of institution (tertiary non-university or university) may be related to the greater difficulty and duration of university studies.

These factors constitute some of the demographic, socioeconomic and higher education variables that condition the academic and social experience of young people in their access to and persistence in higher education. In general, these results are consistent with the national and international literature that analyzed the factors that affect the possibility of dropping out of higher education (Cabrera & La Nasa, 2000; Choy, 2001; Goldenhersh et al., 2011; Ishitani, 2006; Pascarella et al., 2004).

Robustness Check

Following Angrist & Pischke (2008), who state that estimations from linear probability models are similar to those from probit and logit models with the added benefit of straightforward interpretation, we have also estimated the linear regression model as a robustness check. The results confirmed the findings obtained through the logistic regressions since the coefficients showed a similar influence for each factor presented (see Table A2 in Annex 1).

Limitations

As can be seen, both models are statistically significant and all variables analyzed present significant coefficients with a confidence of 99%. However, this methodological approach using the EPH source has its limitations. In fact, an appropriate analysis of the factors affecting either dropping out of higher education or of obtaining a bachelor's degree should ideally be performed using a longitudinal survey that is specially designed to study these and other issues concerning dropout and graduation, such as student achievement. Some studies for other countries are based on this type of information source, such as Cabrera & La Nasa (2000). Cohort studies make it possible to analyze the factors associated with graduation and global dropout, and to measure the effect of academic resources on the aspirations young people have regarding higher studies, the choice of institution, and the probabilities of achieving a degree. In particular, the main limitation of our analysis is the lack of information regarding the academic resources, which were highly relevant, for example, in the studies on the academic performance of Argentine university students using data from some study programs and institutions (Giovagnoli, 2002; Giuliodori et al., 2010; Porto, 2007; Porto et al., 2007; Sosa Escudero et al., 2009). The important effect we found in our estimates regarding the impact of being a FGS may be indirectly associated with these resources. According to the international literature, FGSs are also those having the greatest deficits in learning at the intermediate level – lower aspirations for higher education studies; they receive scant advice from parents about which institution or career to choose and are less academically prepared for higher studies (Choy, 2001).

Conclusion and Implications

Even though Argentina stands out in relation to enrollment in higher education, which shows the great potential it has with regard to young people seeking a college or tertiary level degree, it faces serious problems in terms of retention and graduation. Behind this low level of graduation lies the problem of dropout, usually associated with extracurricular variables related to the socioeconomic and cultural environment of households. As happened in other high participation systems of higher education, "the principal intrinsic limit to social equality of opportunity is the persistence of irreducible differences between families in economic, social and cultural resources" (Marginson, 2016, p. 9).

Factors affecting graduation and higher education dropout are numerous, reflecting the complexity of these issues. Our study focuses on the higher education system and on demographic, socioeconomic, FGS and other higher education factors that affect the likelihood of dropping out. In general, all the findings obtained are in line with the international literature on this issue.

We observed that the possibility of men leaving higher education studies is 1.42 times that of women. Students with a higher per capita income have less probability of dropping out, as well as those who have a scholarship. The probability of dropping out is 1.3 times higher for the students in their first year than in the subsequent years. College students show a slightly higher probability of dropping out than tertiary students and younger students are less than half as likely to drop out as those between ages 25 and 30. Also, we found that being a FGS, even after controlling for the socioeconomic status of the student's household, the gender, the occupational status, the type of studies, the dropout in the first year and the fact of having a scholarship, implies a higher expected chance of dropping out from higher education. This is quite interesting bearing in mind that public higher education in Argentina is open access and tuition-free.

Based on these results and other studies carried out by García de Fanelli & Adrogué (2015) and García de Fanelli (2017b), we can indicate some policies that could help improve observed graduation rates and reduce dropout, especially during the first year. Two central issues in this sense are the production of reliable information to design public and institutional policies and the study of the main instruments governments and institutions can implement to improve retention and graduation levels.

To design evidence–based public and institutional policies, Argentina needs to incorporate data collection tools regarding the educational and work paths of young people, gathering information on aspirations, academic performance, sociodemographic, economic, and cultural variables of the students' households from the last years of secondary school to the completion of higher education studies. Given the absence of longitudinal surveys, the estimation made in this work is based on micro data from the EPH, which facilitates a first approximation to some of the factors associated with university dropout in an age group (18-30 years old in our study). Moreover, as all Latin American countries have similar household surveys, this study could be extended to the region, allowing further studies in this line of research.

At the institutional level, universities should produce data on graduation rates of freshmen cohorts and freshmen persistence rates by type of degree. This data could contribute both to monitoring the impact of different institutional initiatives universities have been carrying out during the last decade to facilitate access and to reducing dropout. Such programs include vocational orientation, tutoring, teacher training, all of which are in line with what Engle and O'Brien (2007), and Tinto (2012) recommended.

At the same time, following the international experience, the government can use these data in their quality assurance and funding policy instruments to encourage institutions to improve

retention and graduation rates, while also guaranteeing the level of quality. These public policies could promote institutional actions to monitor and to boost the academic performance, retention and graduation of higher education students, especially those at risk of dropout.

The institutional analysis of the factors that explain the prevailing freshmen retention rates and graduation rates among low income and FGSs, on the one hand, and the promotion of institutional policies via quality assurance and funding public policies, on the other, could promote the implementation of institutional policies to enhance the social and academic integration of students, particularly those from households with lower cultural and economic capital.

Finally, regarding the student financial aid policy, we found that scholarships were effective at increasing retention. Nonetheless, better information is needed in order to make an appropriate evaluation of the impact of financial aid on performance and graduation rates and take into account different responses according to the amount of the scholarship grant. In our study it was clear that the association of dropout with the socioeconomic status of students is important. So, to be effective, these scholarships must be able to cover not only the direct costs, which in a free-tuition system are not that high, but mainly the opportunity costs of not working while studying.

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Annex 1

Table A1
First-time graduation rates, by tertiary level in some high-income and middle-income countries, 2015

Countries	**Bachelor's or equivalent**	**Master's or equivalent**	**Doctoral or equivalent**
Argentina[1]	*12*	2	0.3
OECD average	*38*	17	1.6
Australia	60	20	2.5
Austria	25	20	1.9
Belgium	43	12	0.6
Canada	40	11	1.5
Chile	36	9	0.2
Denmark	53	28	3.2
Finland	50	24	2.6
Germany	32	17	2.9
Israel	42	19	1.5
Italy	28	20	1.5
Japan	45	8	1.2
Mexico	24	4	0.3
Netherlands	44	19	2.3
New Zealand	57	9	2.2
Norway	39	17	2.0
Portugal	35	16	1.6
Spain	31	18	1.7
Sweden	26	20	2.4
Switzerland	48	18	3.3
United Kingdom	44	22	3.0
United States	39	20	1.6

Source: Based on data in OECD (2017).
Notes: 1. Corresponds to year 2014.

Table A2

Factors associated with the probability of dropout from higher education. Estimation with an OLS regression model.

	Coefficient	**Standard Deviation**	**t Statistic**		**Coefficient**	**Standard Deviation**	**t Statistic**	
	(1)				(2)			
Gender	0.028	0.0001	198.62	***	0.028	0.0001	197.74	***
Adjusted household per capita income	-0.010	0.0001	-126.53	***				
Lower Class					0.023	0.0003	86.02	***
Middle Class					0.023	0.0002	124.61	***
First Generation	0.068	0.0002	433.07	***	0.069	0.0002	441.09	***
Younger than 25 years old	-0.089	0.0002	-564.07	***	-0.089	0.0002	-562.57	***
Dropout in the first year	0.019	0.0002	116.1	***	0.020	0.0002	118.54	***
Scholarship	-0.086	0.0006	-132.86	***	-0.085	0.0006	-132.43	***
College student	0.004	0.0002	23.32	***	0.003	0.0002	21.51	***
Constant	0.065	0.0004	170.15	***	0.034	0.0004	95.59	***
Dummies per year			yes				yes	
Dummies per region			yes				yes	
Number of Observations			16,262,522				16,262,522	
F			28,656				2,751	
Prob > F			0				0	
Adjusted R-squared			0.042				0.042	

Source: Own estimation based on information provided by the Permanent Household Survey (EPH) corresponding to the years 2003 to 2015 (III Trimester, except in 2007 and 2015, in which II Trimester was used since III Trimester was not available). * p<0.05; ** p<0.01; *** p<0.001

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