Article

STUDENT DROPOUT AT UFMG: ANALYSIS OF THE INFLUENCE OF STUDENTS' SOCIOECONOMIC PROFILES AND COURSE CHARACTERISTICS

Evasão discente na UFMG: análise da influência dos perfis socioeconômicos dos estudantes e das características dos cursos

Deserción estudiantil en la UFMG: análisis de la influencia de los perfiles socioeconómicos de los estudiantes y las características de las carreras

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Abstract: This article discusses student dropout in higher education based on data from the Federal University of Minas Gerais (UFMG). Focusing on the 2012 cohort, we investigated, using descriptive statistics and logistic regression models, the extent to which course dropout at the institution is associated with the socioeconomic profile of students and the characteristics of the undergraduate programs they attend. We examined two hypotheses: (1) dropout is associated with students from lower social and academic origin; (2) there is an association between dropout and the type of program, defined in terms of academic degree and level of selectivity. The results

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indicated that, in the analyzed context, dropout is not as clearly and directly associated with students' socioeconomic characteristics. However, they highlighted that the academic degree and selectivity of the programs in which students are enrolled are important factors in explaining differences in dropout rates.

Keywords: higher education; student dropout; academic program.

Resumo: O artigo discute a evasão discente no ensino superior a partir de dados da UFMG. Focalizando a coorte de 2012, investigamos, por meio de estatísticas descritivas e de modelos de regressão logística, em que medida a evasão de curso na instituição está associada ao perfil socioeconômico dos estudantes e às características das graduações que frequentam. Averiguamos duas hipóteses: 1ª) a evasão estaria associada a estudantes com perfis social e escolar mais baixos; 2ª) haveria uma associação entre evasão e o tipo de curso, definida em termos de grau acadêmico e nível de seletividade. Os resultados mostraram que no contexto analisado a evasão não se associa de forma tão clara e direta às características socioeconômicas dos estudantes. Evidenciaram, por outro lado, que o grau acadêmico e a seletividade dos cursos aos quais os estudantes estão vinculados são fatores importantes para explicar diferenças nas taxas de evasão.

Palavras-chave: educação superior; evasão discente; grau acadêmico.

Resumen: El artículo discute la deserción estudiantil en la educación superior a partir de datos de la UFMG. Centrándonos en la cohorte de 2012, investigamos mediante estadísticas descriptivas y modelos de regresión logística en qué medida la deserción de curso en la institución está asociada al perfil socioeconómico de los estudiantes y a las características de las graduaciones que frecuentan. Comprobamos dos hipótesis: la deserción estaría asociada a estudiantes con perfil social y escolar más bajo; habría una asociación entre la deserción y el tipo de curso, definido en términos de grado académico y nivel de selectividad. Los resultados mostraron que la deserción está poco asociada con las características socioeconómicas de los estudiantes. Por otro lado, evidenciaron que el grado académico y la selectividad de los cursos a los que los estudiantes están vinculados son factores importantes para explicar diferencias en las tasas de deserción.

Palabras clave: educación superior; deserción estudiantil; grado académico.

1 INTRODUCTION

Understanding student dropout in higher education from a sociological perspective is no easy task. Is it more closely related to students' social and academic origin or to the characteristics of the programs they attend? Does it arise directly from the social and academic challenges some students face in continuing their studies, or is it the result of strategic decisions made by those dissatisfied with their programs, seeking other degrees and/or institutions better aligned with their expectations? The expansion of access to Brazilian higher education over the past two decades (Barbosa, 2021), along with changes in admission processes, such as those brought about by the creation and implementation of the Unified Selection System (Nogueira *et al.*, 2017), further complicate these questions.

The first hypothesis suggests that dropout is related to the social and academic profiles of students, occurring more frequently among those who are less privileged. Within the scope of this hypothesis, variations in dropout rates among programs or institutions could be explained by the social and academic origin of the students who attend them. Higher dropout rates in teaching degree programs offered by federal institutions, for example, could be attributed to the fact that these programs typically attract older students, with less favorable economic conditions, from families with lower educational attainment, who attended public schools and performed less favorably in the National High School Exam (Enem) (Ariovaldo, 2023; Gatti *et al.*, 2019; Locatelli; Diniz-Pereira, 2019; Tartuce; Nunes; Almeida, 2010). It is expected that students' socioeconomic characteristics influence their chances of persisting in their programs, whether due to practical reasons (financial difficulties; the need to balance study and work; or, additionally, domestic work, motherhood, and studies) or strictly academic reasons (difficulty understanding academic structures and timelines; and lack of preparation to keep up with certain courses).

The second hypothesis posits that students are more likely to abandon programs associated with low expectations regarding material and symbolic returns in the labor market. It is important to acknowledge that academic programs prepare students for professions that offer highly unequal remuneration and status. Moreover, students do not always enroll in the programs and institutions they truly desire (Nogueira, 2018; Nonato, 2018). In admission processes, the selection of a possible program – one that combines a realistic chance of acceptance with feasible location and class schedule – has become increasingly common, rather than choosing the most desired program and institution. In such cases, attrition, followed by reintegration into another program perceived as more satisfactory, remains a persistent possibility.

In common sense, we tend to directly associate dropout with failure. From this perspective, the validity of the first hypothesis might seem almost self-evident. Students with lower social profiles would be more likely to drop out because they face greater challenges in staying in their programs. However, research on higher education dropout urges us to approach this conclusion with greater caution, as they do not always identify a significant association between socioeconomic vulnerabilities and higher dropout rates (Braga; Peixoto; Bogutchi, 2003; Durso; Cunha, 2018; Paula, 2021; Lima Júnior; Ostermann; Rezende, 2012). Moreover, studies on the topic also reveal that, generally, students do not drop out solely due to failure but also because they are dissatisfied with their programs and/or with the professional future they believe awaits them (Nogueira; Paula; Ariovaldo, 2021; Ristoff, 1999; Tinto, 1982, 2012; Mercuri; Polydoro, 2004). Before reaching conclusions about the reasons for dropout across different programs, further investigation is needed.

In this article, we analyze student dropout in the programs offered by the Federal University of Minas Gerais (UFMG)[5], based on data from students who enrolled in 2012. These data, provided by the institution, include information regarding students' social and academic profiles, program characteristics (academic degree, class schedule, and minimum admission score), and academic status (enrolled, graduated, or dropped out). The choice of this cohort was guided by the possibility of observing the investigated phenomenon over an extended period.

The first objective of the research was to analyze how academic status varied according to the social and academic profiles of UFMG entrants. This objective was defined based on the first hypothesis mentioned above, which seeks to explain dropout as a result of the challenges faced by less privileged students. To achieve this, we examined the status of students who enrolled in 2012, as of 2019, the most recent year for which data were available.

The second objective, aligned with the second hypothesis considered here, aimed to analyze the extent to which dropout was associated with the level of satisfaction regarding the economic and symbolic returns expected by students from their programs. In the absence of data directly reflecting students' perceptions, we used the minimum admission score as a proxy for the prestige and expected returns associated with the programs. The most selective programs are not necessarily those with the highest number of applicants per spot but those that attract candidates with higher social and academic profiles. By attracting this profile of candidates, these programs tend to have higher cutoff scores. Sociologically, it is well known that the

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[5] At the time, UFMG offered 93 undergraduate programs, including 14 exclusively teaching degree programs, 14 dual-degree programs – where students could choose between a teaching degree, a bachelor's degree, or pursue both sequentially – 64 bachelor's degree programs, and one technologist program.

preference for these programs is not random. The programs chosen are precisely the most traditional, prestigious, and those that prepare students for the most lucrative professions (Vargas, 2010; Martins; Machado, 2018; Nogueira, 2018; Rodrigues, 2023). Therefore, we considered selectivity a reliable indicator of the social value of the programs and sought to determine the extent to which it was associated with dropout.

In addition to this introduction, the article is organized into five additional sections. The second section discusses the phenomenon of student dropout in higher education and the challenges of understanding it sociologically. The third section presents the methodological strategies employed. In the following section, we examine the profile of UFMG students, according to their academic status, whether they dropped out or not, and the academic degree of the programs they entered in 2012. The fifth section analyzes, through descriptive data and regression models, the potential effects of student profiles and program characteristics on dropout probabilities. Finally, in the concluding remarks, we summarize the main findings of the research, assess its limitations, and reflect on some challenges faced by studies on student dropout in higher education.

2 THE PHENOMENON OF DROPOUT IN HIGHER EDUCATION

Over the past two decades, the Brazilian higher education system has undergone significant expansion (Senkevics, 2021), accompanied by democratization policies aimed at providing access to this level of education for students from historically excluded groups. While progress has been made toward democratizing access to higher education, this process does not eliminate the persistence of a series of inequalities related to the types of educational opportunities effectively available to different groups within the system. Thus, various studies have highlighted the existence of horizontal hierarchies in higher education (Gerber; Cheung, 2008; Prates; Collares, 2014; Brito, 2017; Carvalhaes; Ribeiro, 2019). In this context, we may be experiencing a segregated democratization (Dubet, 2015) or an unequal massification (Merle, 2011), in which expansion occurs alongside internal segmentations. Programs whose degrees yield higher profitability and social prestige tend to predominantly attract students from economically and socially privileged origin; conversely, programs preparing students for less valued and less lucrative professions are more likely to attract students from less advantaged origin.

In addition to differences in access to programs and institutions based on students' social profiles, it is essential to understand the underlying social dynamics of student retention or dropout. Why do a considerable number of students entering higher education fail to remain in their programs or complete them? Data from the Higher Education Census indicate an annual dropout rate of approximately 25% to 28% in on-campus programs between 2013 and 2022, and between 33% and 36% in

distance learning programs (SEMESP, 2020, 2022). Considering this phenomenon by cohorts, around 45% to 50% of students in Brazilian higher education drop out of the program they originally enrolled in, based on data from 2010 to 2014 (Marques, 2020; Paula; Nogueira, 2020).

Student dropout in higher education is a complex phenomenon. At first glance, it is common to associate this issue directly with failure. It is as if dropout always resulted from academic and/or socioeconomic difficulties (family problems, the need to prioritize work, the inability to afford the direct or indirect costs associated with attending higher education, among other reasons). However, several authors have argued that dropout in higher education cannot be attributed solely to students' academic or social challenges (Ristoff, 1999; Ristoff, 2016; Tinto, 2012). Without dismissing the fact that these challenges may explain many cases, analyses point to significant movement between programs and institutions (Marques, 2020), where the motivation for leaving does not stem from difficulties but from dissatisfaction or changes in students' professional and academic preferences (Paula, 2021; Ariovaldo, 2023).

In this sense, another important obstacle to the investigation of dropout must also be considered: the variation according to its type (Vitelli; Fritsch, 2016). It is necessary to objectively distinguish between dropout from the program, from the institution, and from the system. A student who drops out of a given program may not permanently leave higher education and, in fact, may move within the system, re-enrolling in another program and/or institution. Moreover, this change can be experienced as something positive by the student. In many cases, it means abandoning a program that does not meet the student's interests or individual goals, ultimately leading to redirection to a program and/or institution considered more satisfactory.

In this sense, Tinto (2012), proposes the distinction between involuntary and voluntary (departures). The former would result from academic failure, while the latter would occur despite maintaining sufficient performance by the student. This distinction is important as it makes it clear that, from the student's perspective, not all dropout is negative. However, it brings with it some problems. Under the label of voluntary, Tinto (2012, p. 4) groups two types of dropout that seem quite distinct: a) dropout related to the incongruence between the individual purposes/goals and what is offered by the institution; b) dropout related to difficulties in interacting and establishing strong academic and social ties with the institution. These difficulties tend to be more pronounced among low-income students, students with parental education, workers, or those with other disadvantages, who face greater challenges in experiencing their studies and integrating into university life. It can be seen that the second type of dropout is not as voluntary as it may seem. The difficulties in integrating into the academic world can be closely related to the socio-economic characteristics of the students. Even in relation to the first type, it must be remembered that individual

purposes and goals are not fixed. They are redefined based on the concrete experiences of the individuals.

Although it is difficult to precisely distinguish between voluntary and involuntary dropout, we can agree with Tinto that dropout does not always signify the failure of students in the face of the demands of higher education. In many cases, students drop out because they are dissatisfied with the course or institution they are enrolled in, and as a result, many may opt for programs they consider more promising.

An example of this reality refers to the teacher education programs. Research points to the social devaluation of these courses and the teaching profession, as well as the lower social and educational profile of those who choose them (Louzano *et al.*, 2010; Gatti, 2014; Waltenberg *et al.*, 2016). In Brazil, this situation is linked to the fact that the teaching profession in basic education has low prestige and economic return compared to similar professions, which limits its appeal among young people, especially those from privileged social classes and with good academic performance. The low value placed on the profession affects not only the initial demand for teacher education programs but also the likelihood of students' persistence. This is not limited to teacher education programs but can also impact other higher education courses that are similarly less selective and competitive.

To understand the differences in dropout rates between students from different courses, it seems necessary to evaluate the two hypotheses mentioned in the introduction. The first is that dropout rates on less prestigious courses are associated with students' lower social and educational profiles and their difficulties in staying in the higher education system. This would, therefore, be an involuntary dropout. The second hypothesis, on the other hand, is that the abandonment of these degree programs would largely result from a mismatch between the career prospects offered by these programs and the students' aspirations. Thus, the unpromising career prospects would stimulate voluntary dropout, which would be based on the search for courses with higher prestige and economic return.

It is important to consider that the way students enter higher education can influence their likelihood of persistence (Nogueira; Paula; Ariovaldo, 2021; Almeida *et al.*, 2016; Tinto, 1982). If a student chooses a course they genuinely desire and have the objective conditions to complete, their likelihood of persistence increases significantly. Conversely, if they enroll in a course based merely on availability, without adequately considering their preferences and objective conditions, the chances of dropping out increase. In Brazil, this is even more evident in the case of federal institutions with the Unified Selection System (USS). Although designed to promote democratization of access, USS has had the unintended effect of encouraging candidates to make more strategic choices based on their Enem scores rather than their original preferences and career interests. Thus, several studies suggest that USS has contributed to increasing

dropout rates, especially in less prestigious and less selective programs (Nogueira *et al.*, 2017; Nonato, 2018; Ariovaldo; Nogueira, 2018).

3 DATA AND METHODS

Our analysis encompasses information on 5,336 undergraduate entrants at UFMG (Federal University of Minas Gerais) across the Belo Horizonte campuses, based on data provided by the institution's Undergraduate Dean's Office. Using the students' unique registration codes, we matched two data sources: responses from UFMG socioeconomic questionnaire, completed by students upon enrollment, and updated information regarding their academic status. This provides us with a database that allows us to examine the association between variables related to the social characteristics of undergraduates (age, gender, race, income, and education level), their mode of admission (whether through affirmative action or not), the course in which they were accepted (academic degree, schedule, minimum entry grade), and their academic status, defined in terms of dropout or retention at the institution.

From this consolidated database, we tracked the cohort of undergraduates who entered UFMG in 2012, mapping their academic status up to 2019. The fact that, by the final year of the cohort, only a few students remained enrolled since 90% had either completed or abandoned their programs, lent greater reliability to our analyses.

In the academic records database, students can exhibit the following statuses: regular, completed, on leave, and excluded. We considered cases where undergraduates were recorded as "excluded" in any of the years covered by our analysis as instances of dropout, regardless of whether the student later returned to higher education, either in the same or a different program, at the same or a different institution. Therefore, our analysis is specifically focused on course dropout.

To analyze our second working hypothesis, that dropout rates would vary according to the attractiveness of degree programs, we constructed a selectivity variable based on the quintiles of the programs' cutoff scores[6]. We classified the degree programs into five selectivity groups: low, medium-low, medium, medium-high, and high.

Our analytical strategy is based on the use of multilevel logistic regression models, allowing us to examine the relationship between the variables of interest and the probabilities of dropout at UFMG[7]. Such models are appropriate both for

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[6] It is important to note that the minimum admission score refers to the cutoff score in the entrance exam, as UFMG had not yet adopted the USS system.

[7] To estimate the models, we used the R software, version 4.1.2, with the lme4 package. The original coefficients of the full model were transformed into marginal effects using the marginaleffects package. We also used the margins package, which has a similar function, to compare the results, which were identical. For the calculation of average predicted probabilities, we used the ggeffects package.

estimating the binary response variable (dropout or not) and for including an intercept that varies across programs, thus better fitting the hierarchical structure of the analyzed data (Agresti, 2019). This model design is essential for our purposes, as students within the same program share a common academic context, which may influence their likelihood of remaining in the program.

In addition to estimating a model with all the program variables, with the aim of more thoroughly investigating the possible effect of the entry program on the probabilities of dropout, we estimated additional models that include interaction terms, in order to analyze whether there would be heterogeneous associations between some of the socioeconomic variables and the academic degree, or between such variables and the selectivity of the program.

4 STUDENT PROFILE, COURSE CHARACTERISTICS, AND DROPOUT PROBABILITIES

Table 1 presents the percentage variation in the academic situation of 2012 entrants, according to demographic, social, and educational characteristics. It also includes the percentage variation based on the characteristics of the courses students enter, considering the academic degree (bachelor's; teaching degree; double degree), the shift (day; night), and the level of selectivity, as a way to capture the prestige and attractiveness level of the course.

Table 1 – Sociodemographic profile of UFMG students from the 2012 cohort, according to course status

| Variables | Categories | Academic status | | Total |
		Graduated or enrolled N = 3.811[1]	Dropout N = 1.525[1]	N =
Age range	Up to 20 years	2.720 (76%)	870 (24%)	3590
	From 21 to 24 years	654 (68%)	304 (32%)	958
	Over 25 years	437 (55%)	351 (45%)	788
Gender	Female	2.214 (77%)	669 (23%)	2883
	Male	1.597 (65%)	856 (35%)	2453
Race	White	1.925 (72%)	731 (28%)	2656
	Black	1.886 (70%)	794 (30%)	2680
School origin	Private school	2.026 (75%)	688 (25%)	2714
	Federal public school	397 (75%)	129 (25%)	526
	State or municipal public school	1.388 (66%)	708 (34%)	2096
Family income	Over 10 minimum wages	1.158 (76%)	374 (24%)	1532
	Over 5 to 10 minimum wages	924 (71%)	369 (29%)	1293
	Over 2 to 5 minimum wages	1.254 (69%)	572 (31%)	1826
	Up to 2 minimum wages	475 (69%)	210 (31%)	685
Parental education	Higher education	2.064 (74%)	734 (26%)	2798
	High School	1.136 (70%)	481 (30%)	1617
	Elementary school	611 (66%)	310 (34%)	921
Admission type	No bonus received	2.472 (72%)	974 (28%)	3446
	Received bonus in the exam	1.339 (71%)	551 (29%)	1890
Work	Does not work	2.998 (75%)	984 (25%)	3982
	Up to 20 hours per week	226 (68%)	106 (32%)	332
	Over 20 hours per week	587 (57%)	435 (43%)	1022
Academic degree	Bachelor's degree	2.959 (75%)	961 (25%)	3920
	Dual Degree	514 (59%)	357 (41%)	871
	Teaching degree	338 (62%)	207 (38%)	545
Shift	Daytime	2.649 (75%)	891 (25%)	3540
	Nighttime	1.162 (65%)	634 (35%)	1796
Course selectivity	High selectivity	1.288 (86%)	210 (14%)	1498
	High-medium selectivity	729 (73%)	263 (27%)	992
	Medium selectivity	657 (70%)	278 (30%)	935
	Low-medium selectivity	422 (55%)	347 (45%)	769
	Low selectivity	715 (63%)	427 (37%)	1142

[1] Frequency (%)

Source: Prepared by the authors based on data from Prograd/UFMG (2023).

With regard to sociodemographic characteristics, we observed an association between dropout rates and factors linked to greater social vulnerabilities. In this context, the proportions of dropouts were higher among students from state or municipal public schools, those with household incomes of up to two minimum wages or between two and five minimum wages, those whose parents had a maximum education level of elementary school, and working students. We also noted that

students in older age groups and male students showed higher dropout rates, which may be associated with labor market participation – these groups displayed a higher proportion of working students in the analyzed data.

We also observed a significant variation in dropout rates according to course characteristic. Students admitted to teaching degree programs or programs offering dual modalities i.e., a combined offer of a teaching degree and a bachelor's degree had higher dropout rates, particularly in the latter case, as did those enrolled in evening courses. From the perspective of selectivity, higher dropout rates were observed among students admitted to programs classified as having low or medium-low selectivity – thus, among those who entered less attractive programs that presumably prepare for professional careers with lower economic and symbolic returns. This result underscores the importance of this factor in the variation of dropout rates, corroborating previous studies on this phenomenon (Adachi, 2017; Silva Filho *et al*., 2007).

The descriptive analysis of the proportion of dropouts thus indicates an association between dropout rates and certain factors related to the less privileged socioeconomic and educational profiles of students, as well as an association with evening classes, teaching degrees or dual modality programs, and the lower selectivity of the programs they enter. However, it is important to assess how much these factors effectively contribute to differences in dropout probabilities when controlling for other variables. For instance, a specific factor, such as students' employment status, might seem decisive for their academic situation when considered in isolation, but it could be strongly associated with other factors, such as family income and parental education levels. Furthermore, there may be heterogeneous associations between students' socioeconomic characteristics and the features of the programs they enroll in.

To properly investigate our hypotheses, we estimated a multilevel logistic regression model to examine the relationship between the variables of interest and the probabilities of dropout at UFMG. Table 2 presents the results of the estimated model, expressed in average marginal effects, along with their respective confidence intervals and p-values in bold for statistically significant coefficients. Positive marginal effects indicate an increase in the average probability of dropout, whereas negative effects suggest a reduction in this probability (i.e., a higher likelihood of retention or course completion).

Before discussing the results of the fixed effects, it is worth noting that when comparing the null model, that is, without variables related to student characteristics, with the full model, we observe a reduction in the standard deviation of the random intercepts from 0.83 to 0.54 – as indicated at the end of the table. This suggests that part of the variability in dropout rates initially attributed to the courses can be explained by the individual and contextual characteristics of the students included in the full model.

Table 2 – Results of the multilevel logistic model

Variables	Contrasts	Marginal effects	95% IC[1]	p
Age range (Up to 20 years)	21 to 24 years	0.037	0.005, 0.07	**0.026**
	Over 25 years	0.113	0.069, 0.158	**0.000**
Gender (Female)	Male	0.108	0.081, 0.134	0.2
Race (White)	Black	-0.010	-0.035, 0.015	0.448
School origin (Private school)	State or municipal public school	0.040	0.000, 0.080	**0.051**
	Federal public school	0.016	-0.031, 0.062	0.515
Family income (More than 10 minimum wages)	Up to 2 minimum wages	-0.027	-0.073, 0.019	0.247
	More than 2 to 5 minimum wages	-0.006	-0.042, 0.030	0.754
	More than 5 to 10 minimum wages	-0.007	-0.041, 0.028	0.699
Parental education (Higher education)	Elementary education	-0.047	-0.084, -0.010	**0.014**
	High school education	-0.020	-0.051, 0.010	0.185
Admission type (Did not receive bonus)	Received bonus	-0.047	-0.082, -0.012	**0.009**
Work (Does not work)	Up to 20 hours per week	0.001	-0.046, 0.047	0.971
	Over 20 hours per week	0.040	0.003, 0.076	**0.033**
Academic degree (Bachelor's degree)	Degree	-0.012	-0.097, 0.072	0.774
	Dual modality	0.051	-0.030, 0.132	0.217
Shift (Daytime)	Evening	0.024	-0.031, 0.079	0.397
Course selectivity (High)	Low	0.194	0.108, 0.280	**0.000**
	Medium-low	0.285	0.200, 0.370	**0.000**
	Medium	0.154	0.081, 0.227	**0.000**
	Medium-high	0.109	0.040, 0.177	**0.002**

Standard deviation of random intercepts in the null model (without fixed effects): 0.83
Standard deviation of random intercepts in the full model (with fixed effects): 0.54
[1] Confidence interval

Source: Prepared by the authors based on data from Prograd/UFMG (2023).

The model results indicated that the variables age, gender, parental education level, school origin, form of admission to UFMG, work and course selectivity level were significant in determining dropout probabilities at the institution. Students in the two older age groups, 21 to 24 years old and above 25 years old, had a 3 percentage points (p.p.) and 11 p.p. higher probability of dropping out, respectively, compared to their peers who entered UFMG at age 20 or younger. Regarding gender, men had a 10 p.p. higher probability of dropping out compared to women.

The variables characterizing the students' social and educational profiles exhibited contradictory associations with dropout rates, suggesting that inequalities alone cannot fully explain the dropout processes within the institution. For example, students whose parents' highest level of education was elementary school showed a 4.7 percentage points (p.p.) lower probability of dropping out. Similarly, students admitted through affirmative action, who received score bonuses, also had a 4.7 p.p. lower probability of dropping out. However, when considering the students' school

origin and employment status, we observed associations more aligned with the hypothesis linking dropout rates to social disadvantage. Graduates from state or municipal schools had a 4 p.p. higher probability of dropping out compared to those from private schools. Among working students, those working more than 20 hours per week had a 4 p.p. higher probability of dropping out than their peers.

Regarding the course related variables, no significant associations were observed for academic degree or shift, but selectivity showed a notable effect. Students enrolled in groups classified as lower selectivity, compared to those in higher selectivity groups, exhibited substantially higher probabilities of dropping out. Those in low and medium-low selectivity courses had, respectively, a 19 percentage points (p.p.) and 28 p.p. higher probability of dropping out compared to students in higher selectivity courses. These findings support the second hypothesis, which suggests that dropout is associated with the abandonment of courses that are less socially valued and potentially reflects students' efforts to seek re-enrollment in programs perceived as offering greater material and symbolic returns.

The model results suggest that it is inadequate to explain the dropout phenomenon by considering only the variables related to students' socioeconomic and educational profiles or those related to the courses in isolation. The significant challenge may lie precisely in understanding how these dimensions interact. To better investigate this issue, we present the results of models with interaction terms between three important socioeconomic variables school origin, parental education, and family income and the variables of academic degree and course selectivity. Interaction terms allow regression models to examine whether the association between two variables changes across different values or categories. For example, how does income interact with course selectivity? Are students from low-income families more vulnerable to leaving UFMG if they enroll in more selective courses?

To facilitate the interpretation of the results, they are presented through graphs, with the coefficients expressed as average predicted probabilities, in Figures 1 and 2. The points on the graphs represent the coefficients observed in the models, while the lines indicate the confidence intervals of the estimates. The higher the coefficient, the greater the probability of the event (dropout) occurring. Points and intervals that are very close or similar suggest that there are no statistically significant differences between the estimates.

Figure 1 – Predicted probabilities of UFMG dropout by academic degree of the program
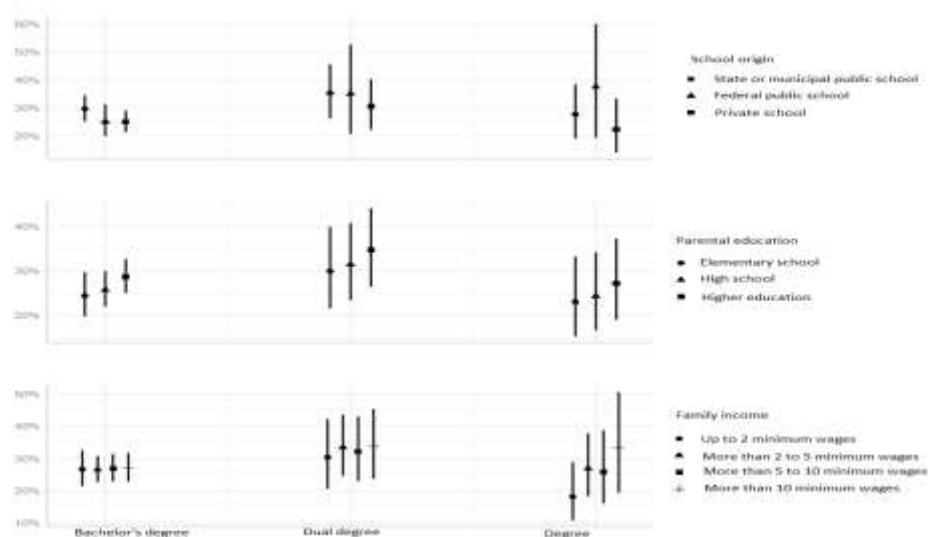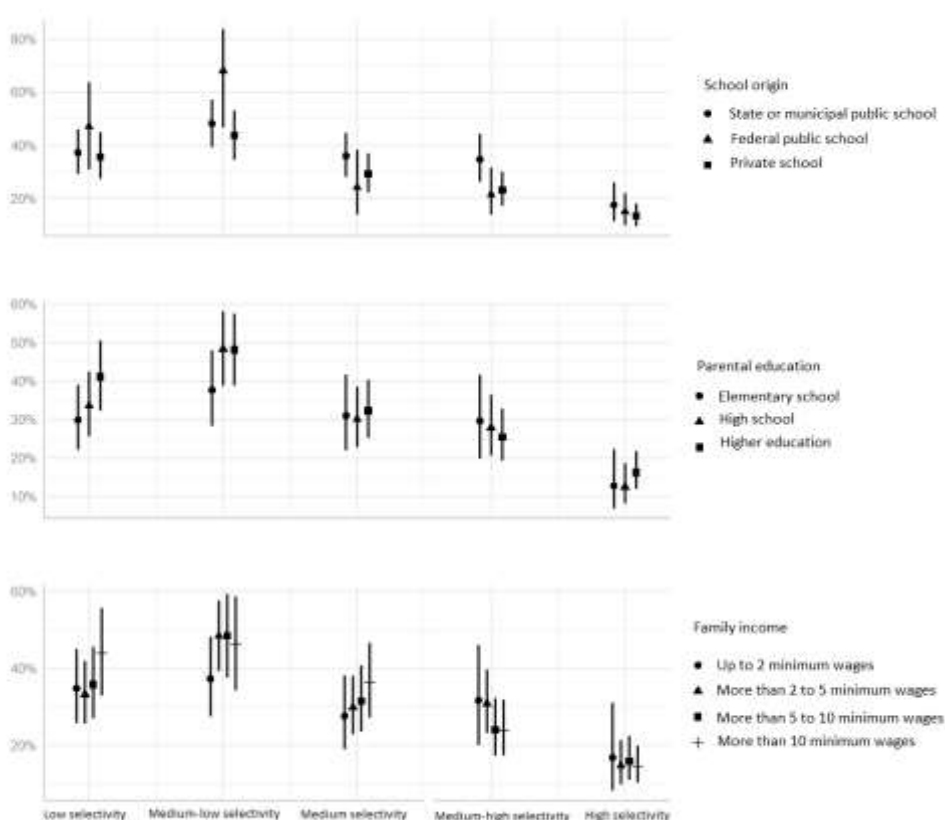

Source: Prepared by the authors based on data from Prograd/UFMG (2023).

The academic degree graphs follow the result obtained from the initial model, as we did not observe significant differences in the dropout probabilities for any of the three interaction pairs. This reinforces the idea that there are no strong associations between socioeconomic variables and the probability of dropout at UFMG (at least for the 2012 cohort). Despite the patterns in the directions of dropout probabilities, it cannot be stated that there are significant differences between them, considering that the confidence intervals of the coefficients are wide and do not significantly differ across categories. Nonetheless, two estimates stand out: for school origin, we observe that students who graduated from federal schools have a higher probability of dropping out of degree courses, on average 38% – or 10 percentage points (p.p.) – higher than students from state and municipal schools; and 16 p.p. higher than those who completed high school at private schools. Regarding family income, the results show that students from families earning more than 10 minimum wages have a 33% average probability of dropping out of degree programs – or 15% p.p. – higher than students from families earning up to 2 minimum wages.

The results suggest that, despite there being no significant differences in dropout probabilities across academic degrees, in degree programs, students with better economic conditions and from a more distinguished educational origin (federal schools) are more likely to drop out compared to other students. One possible explanation is that these students are more inclined to leave these courses, as they live in a social environment where there is pressure to pursue courses with higher economic and symbolic returns. Furthermore, they have the financial and academic resources

necessary to invest in changing their course of study. On the other hand, low-income students from state and municipal public schools might feel more satisfied with degree programs or lack the necessary conditions to make a change (Alves *et al.*, 2016; Maciente *et al.*, 2015).

Figure 2 – Predicted probabilities of UFMG dropout by program selectivity

Source: Prepared by the authors based on data from Prograd/UFMG (2023).

The estimates regarding course selectivity confirmed the pattern identified in the initial model: the more selective the course, the lower the dropout probabilities for all responses related to variables such as school origin, parental education, and family income. The exception occurs in the medium-low selectivity group, where there is an increase in the coefficients compared to those classified as low selectivity, as observed in the first model. On the other hand, it is important to highlight that, as mentioned in the previous results, the confidence intervals of the estimates partially overlap, and therefore, it is not possible to establish that these differences are statistically significant.

As highlighted in the results for academic degree, some estimates stand out. Regarding school origin, the difference was again significant for students from federal

schools, who exhibit higher average probabilities of dropping out of low and medium-low selectivity courses – 47% and 68%, respectively. Students with higher parental education also have a higher average probability of dropping out of lower selectivity courses. For those whose parents completed higher education, the probability of dropping out of a low-selectivity course is 11 percentage points higher than for students whose parents completed only elementary school. As for family income, students in the higher income range, above 10 minimum wages, have a higher probability of dropping out of low-selectivity courses, with a 44% probability, which is 8 percentage points higher than those students in the lowest income range.

5 FINAL CONSIDERATIONS

This study aimed to investigate the factors associated with student dropout at UFMG. To this end, we analyzed data from the cohort of students who enrolled at the institution in 2012, investigating whether and how the sociodemographic and academic profiles of individuals, as well as the characteristics of the programs they attended, primarily the academic degree and the selectivity level of the program, influence the likelihood of dropout at the institution. We sought to assess two main hypotheses. The first regards dropout as a result of the economic, social, and academic difficulties experienced by less privileged students in higher education. Based on this hypothesis, it was expected that the phenomenon would be associated with some variables: higher age, being a graduate of public schools (especially state and municipal schools), having parents with lower educational levels and incomes, working, having benefited from affirmative action programs, and being black. The second hypothesis seeks to explain the phenomenon based on program characteristics. Those with lower material and symbolic returns, and which are generally less selective, would tend to experience higher dropout rates. Programs that prepare students for more prestigious and profitable careers, which usually have higher cutoff scores in selection processes, would be less prone to dropout. Therefore, dropout would be indirectly related to the selectivity level of the programs. The academic degree of the programs would also be relevant according to this second hypothesis, as the less prestigious and profitability of teaching degrees compared to bachelor's degrees would lead to a higher incidence of dropout.

Regarding the first hypothesis, the results are contradictory. On the one hand, there is indeed an association between the likelihood of dropout and factors such as older age, having attended state and municipal public schools, and being in employment, especially among those who work more than 20 hours per week. On the other hand, no association was observed with race or lower income, and we found lower dropout rates among children of less-educated parents and among those who benefited from the affirmative action bonus, a policy in effect at the institution from

2009 to 2012. These results do not allow us to underestimate the impact that socioeconomic and academic difficulties may have in a significant number of dropout cases. Moreover, this impact may vary greatly depending on the academic demands and practices of each program: the presence of courses considered difficult with high failure rates, more or less inclusive pedagogical projects – considering the new student populations served by the university, the existence or lack of real conditions for students to balance study and work, among others.

Despite the importance of sociodemographic variables, the results presented indicate a more significant variation in dropout rates according to the selectivity level of the courses. As predicted by our second hypothesis, individuals who enrolled in less selective courses show much higher probabilities of dropping out compared to those who entered more selective courses. Regarding the academic degree, a higher probability of dropout was expected in the undergraduate programs, but the results were not statistically significant.

However, it was still necessary to better understand how the selectivity level and the academic degree of the courses interact with sociodemographic and educational factors, leading to higher or lower probabilities of dropout. To this end, we used regression models with interaction terms, which allowed us to observe the complexity of the relationships between social and educational profile, course characteristics, and dropout. For the undergraduate programs, we found that students who had attended federal schools or those with higher incomes had a higher probability of dropout. In other words, it is the students who, initially, would be in better conditions to remain in the course who are the most likely to leave.

Regarding the selectivity of the courses, as observed specifically for the undergraduate programs, students with higher family income, higher parental education, and those from federal schools also showed higher probabilities of dropout in the group of less selective courses. These students are likely not dropping out due to socio-economic or academic difficulties, but rather by the desire to re-enter higher education in more prestigious programs that promise a greater economic return.

It is important here to revisit Tinto (2012) observations on the distinct meanings that dropout can take, depending on its reasons and perspectives. Although, from an institutional standpoint, student departure is almost always perceived as failure and waste, from the students' point of view, it may signify a search for better opportunities. It is worth noting that this possibility for students to move to more attractive courses, usually the ones most valued socially, is not equally available to everyone. It is reserved for those with a higher social and educational profile.

It is also important to emphasize that our analysis focuses on dropout itself, not on the reasons that cause it, which may differ depending on the students' social origin. Although the analyses conducted did not identify that students from more vulnerable socioeconomic positions are those most likely to leave UFMG degree programs,

compared to those from more affluent socioeconomic origin, there may be a difference in the reasons for departure, depending on the social profile. For this, more qualitative research would be required, or, in the case of more quantitative studies, the collection of more precise information on the reasons that lead students to disengage from the programs they entered.

Finally, it is necessary to acknowledge that the results of this research, especially the finding of the reduced effects of socioeconomic factors on dropout, were generated within a specific institutional context: a large public university with selectivity and prestige. It is possible that, in institutional contexts with different characteristics, the weight of the variables in explaining the dropout phenomenon may vary somewhat.

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