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Graduate employment: Does the type of higher education institution matter?

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Abstract

The paper analyses whether the type of institution from which students graduate has an impact on their unemployment propensity. It uses official data on the Portuguese higher education system, for 2018, at the program/institution level, which provides information on graduate unemployment, as well as demographic and socioeconomic background information. A fractional probit model on graduates' propensity for unemployment is estimated. Results suggest that polytechnic graduates face higher unemployment propensity than university graduates, maintaining inequalities present in students' previous trajectories. Policies targeting socioeconomic segregation need to address not only access to higher education but also the transition to the labor market.

KEYWORDS
binary systems, higher education, polytechnics, unemployment, universities, vocational education

JEL CLASSIFICATION
I23, I24, I26

1 | INTRODUCTION

The new "knowledge-based" economy creates considerable challenges for individuals, including those who are well educated (Tomlinson, 2012). Simultaneously, although young people currently have more qualifications, the transition from higher education to the labor market has become more complex, involving risks, uncertainty, unemployment, underemployment, low-wage jobs, flexible contracts, or low-skilled jobs (Alves et al., 2017; Suleman & Figueiredo, 2019), with evident impact on students' enrolment choices.

Higher education qualifications, when compared with lower levels of education, are historically associated with low levels of unemployment. In general, it is assumed that higher education contributes to the accumulation of human capital and the creation of superior skills, increasing graduates' attractiveness to employers, who are keen to increase or maintain their firms' productivity (Núñez & Livanos, 2010). The economic role currently attributed to higher education, which has to prepare graduates for the labor market (Stiwne & Alves, 2010), the massification of higher education, which has deflated the value of its qualifications, and the growing flexibility of the labor market, requiring individual strategy to deal with uncertainty (Tomlinson, 2012) are the main features of the current context. However, some authors have raised concerns regarding potential mismatches between graduates' skills and the competencies required by the job structure (Figueir, 2017). According to Figueiredo et al. (2017), graduates who are more likely to regret their enrolment choices are those more affected by unemployment. Therefore, issues related to the type of institutions from which students have graduated (and their reputation), the vocational orientation, and the field of studies are relevant to analyze graduates' unemployment propensity.

The paper aims to answer the following research questions: Is the labor market equally receptive to absorb graduates from university and polytechnic institutions? Are there differences in their unemployment propensity? It aims to contribute to the ongoing international discussion on the relationship between labor-market outcomes and the type of education, particularly whether vocational degrees represent a competitive advantage in the transition to the labor market and whether the selectivity of institutions improves labor market returns (Brunello & Cappellari, 2008; Böckerman et al., 2019). A novel contribution of this study is the inclusion of social background in the discussion of the relationship between the type of higher education institution (HEI) and the transition to the labor market.

The remainder of this paper is organized as follows. Section 2 of the paper reviews the literature on the topic, whereas Section 3 provides some background. In Section 4, the dataset and the methodology are presented. The findings are described and discussed in Section 5. Finally, some conclusions and implications are drawn in Section 6.

2 | GRADUATES' TRANSITION TO THE LABOR MARKET

Employment depends on a wide range of factors, from overall macroeconomic conditions, such as the state of the labor market, to unobservable characteristics and dispositions of individuals and their relative position in comparison to other job seekers (Brown et al., 2003). This relative position is also determined by the individuals' level and type of education (e.g., Teichler, 2015; Ali & Jalal, 2018; OECD, 2014; Lauder & Mayhew, 2020).

Despite a rapidly growing economy in need of skilled labor, unemployment has been rising among young and better educated people (Wongnaa & Seyram, 2014). On the one hand, the theory

of human capital may not be as causal as claimed, which questions the role of higher education in satisfying the immediate needs of companies (Gajderowicz et al., 2014). On the other hand, the rapid expansion of higher education has produced an unparalleled number of highly skilled workers whose employment prospects are gradually becoming more uncertain. Finally, at least part of this situation may be attributed to increased flexibilization of the labor market, which facilitated hiring people on fixed-term, and other atypical contracts (Ballarino & Bratti, 2009).

The literature on how the type of education influences the transition to the labor market and employment conditions highlights mixed results and differences by country, most likely because of the differences in the structure of the labor market and the economic sector.

Most OECD countries have a vocational nonuniversity higher education sector (Böckerman et al., 2009) aimed at endowing young people with skills closer to the demands of the labor market, thus reducing the qualification mismatch between supply and demand. There are few studies providing empirical evidence of positive returns of vocational training (Calmand et al., 2014). Böckerman et al. (2009) only found positive effects of polytechnics on employment and earnings of their graduates in business and administration, and, even in this case, the results were influenced by the selectivity of students in different schools.

Cörvers et al. (2010) found that vocational upper secondary graduates in the United Kingdom, Spain, and the Netherlands receive higher earnings at the beginning of their career, but as work experience increases, they start earning less than holders of general bachelors. Calmand et al. (2014) found that, in France, vocational bachelor graduates tend to find employment faster than holders of a general bachelor's degree, have higher employment rates, and in higher proportions manage to secure long-term contracts. On the negative side, they are usually employed in technical and intermediate positions, having a lower probability of obtaining management or professional occupations. The authors conclude that the vocational bachelor does not lead to upward social mobility and that a hierarchy of diplomas persists in France. It is, therefore, difficult to draw clear conclusions, but it appears that although the vocational degree is an asset in the transition to employment, its long-term benefits in terms of employment conditions decrease compared to nonvocational graduates. Moreover, in Finland, graduates of universities of applied science appear to have better prospects of securing employment (Leppänen, 2019).

According to Nuñez and Livanos (2010), gender affects the labor market situation of an individual, with females having lower chances of employment than males and higher chances of looking for work longer. Calmand et al. (2014) found that, in France, men have higher probabilities to be employed, to find a permanent contract and to have access to an executive profession. A lower employment status for female graduates was noted in Greece (Kalamatianou & Kougioumoutzaki, 2012), whereas the rate of unemployment for women graduates has been rising more rapidly than for male graduates in Malaysia (Ismail, 2011).

Higher education also plays the role of signaling to prospective employers the abilities of individuals (Spence, 1973), the effects of signaling acting in the same direction as those predicted by the human capital theory. Frazis (2002) showed that there is a premium for holding a diploma relative to completing any level of education but not holding one. Arcidiacono et al. (2010) found evidence that holding a college degree plays a role in disclosing one's ability to prospective employers. Using data for the United States for the period 1974–2004, they conclude that holding a college degree indicates one's ability, whereas graduates from high school see their ability only gradually revealed in the labor market. Important for our present concern is that results leave "open the possibility that sorting of individuals across colleges may play a significant role in the revelation of ability in the college market" (p.77).

Concerning the value of vocational diplomas and their returns on the labor market, Calmand et al. (2014) highlighted a persistent hierarchy of qualification levels that affects access to employment. The highest qualifications have the highest employability levels, with better work conditions. Moreover, Macmillan et al. (2015) found statistically significant differences favoring socioeconomically advantaged groups in the likelihood of accessing a top job, which is explained by the possession of other forms of cultural capital, including noncognitive skills, confidence, and self-esteem, beyond academic achievement that help them accessing top jobs.

3 | THE PORTUGUESE CASE

The Portuguese higher education system is an interesting case to study for a number of reasons, which combined may lead to expect that the institution type will influence unemployment propensity. First, it is a complex system of a binary nature comprising universities and polytechnics, public or private. Universities and polytechnics have been created with different missions in mind. Polytechnics were expected to provide more applied programs and introduce new fields of study, whereas universities should be providers of academic programs. Second, as the system diversified, the hierarchy of institutions became increasingly entrenched in students' perceptions (Tavares, 2013; Tavares & Cardoso, 2013), with universities enjoying higher prestige than polytechnics and public institutions having higher reputation than private ones. According to Silva et al. (2016), it appears that graduates of institutions where the selection process for enrolling in a specific degree is more demanding (as is the case of public universities) have easier access to employment, as employers consider HEIs' filtering and screening processes as a shortcut for their own recruitment processes. Third, the implementation of the Bologna process led to a restructuring and a new hierarchy of higher education qualifications. Employers tend to prefer the master's degree over the bachelor's (Sin, Tavares, et al., 2016; Vieira & Marques, 2014), which is confirmed by national statistics (Sin, Veiga, et al., 2016). University students, in much higher proportion, intend to enroll in a master's degree, whereas polytechnic students tend to enter the labor market, although they are eligible to enroll in a master's degree. Enrolling in a master's degree was the top choice among university students (64.6%), whereas large numbers of polytechnic students (46.3%) intended to start working rather than enroll in a master's degree (37.4%) (Sin, Tavares, et al., 2016). National statistics confirm, as well, that the bachelor is losing employability value in favor of the master's degree following the Bologna reforms as unemployment rates indicate that the labor market ascribes more value to the latter (Sin, Veiga, et al., 2016).[1] The advantages of university master graduates over vocational bachelor graduates have also been noted in the Netherlands, where employers still assume that most university students will also complete their master's degree after their bachelor's degree (Maastricht University, 2021).

The higher education system in Portugal was changed to promote a closer relationship with the labor market, by assuming the task to train intermediate level workers considered to be missing in the Portuguese industry (Tavares, 2017). It was under this argumentation that polytechnic institutes were created in Portugal. Therefore, although universities are meant to be oriented toward research and knowledge production, polytechnics are supposed to be more vocational and oriented toward applied research. As Portuguese polytechnic institutions are vocationally oriented, graduates from this subsystem would be expected to more easily enter the labor market

[1] Some professional associations with regulation power are also requiring the master before someone is allowed to enter the profession. Lawyers provide a very recent example.

and secure employment. However, the abovementioned configuration of the Portuguese higher education system may be detrimental to polytechnic graduates if employers also perceive differences between the student body of polytechnics and universities and between their expected performances. In this case, they would be less willing to hire polytechnic graduates.

The Portuguese labor market had a difficult adjustment to the euro (Pereira & Lains, 2012), and productivity growth has been disappointing over the last two decades. Data from the OECD refers that the "real GDP per hour worked grew at 0.02 per cent annually over the period 2014–18, largely behind the OECD average rate of 0.9 per cent or the EURO average rate of 0.6 per cent" (OECD, 2019). The labor market for graduate workers appears to be more volatile, flexible, and flowing than that for workers with lower education levels, as reported by Cardoso and Ferreira (2009). The authors argue that, regardless of the type of contract, workers holding a higher education qualification are asked to change jobs more often and will have to adapt more regularly to changing work environment (Cardoso & Ferreira, 2009). Additionally, as shown by Núñez and Livanos (2010), graduates from Portugal, as well as from other Southern European countries such as Italy or Greece, seem to face problems in the labor market because their degrees are ineffective in increasing their employment prospects.

Selectivity is also present in the Portuguese higher education system. Degrees from public universities, older and more prestigious, are the most sought positional goods, whereas public polytechnics, more oriented to local labor market needs, constitute the second-best alternative (Tavares, 2013; Sá & Tavares, 2018). Portuguese polytechnics generally attract students from less privileged social backgrounds (Tavares et al., 2008; Sá et al., 2022), similar to what Calmand et al. (2014) found for the French case, as the vocational tracks allow greater access for students coming from a more diverse range of social backgrounds.

4 | DATA AND ECONOMETRIC MODEL

This paper uses data from the Portuguese higher education system, both public and private, for 2018, at the program/institution level, to evaluate potential differences between the unemployment propensity of polytechnic and university graduates. Data are available at the web-portal *InfoCursos*,[2] which is managed by the DGEEC (General Directorate for Education and Science Statistics). It provides information on graduate unemployment for most of the first cycle study programs offered by Portuguese HEIs.[3] The unemployment indicator is computed as the ratio between the number of people registered as unemployed at the IEFP (Institute for Employment

[2] http://infocursos.pt

[3] Some study programs were excluded for having less than 30 graduates during the reference period, which represent about 18% of the available programs. Polytechnic institutions offer about 53% of them. As all of them were created from 2015 onward, graduate unemployment data is unavailable, which justifies its exclusion from the sample.Apart from first cycle programs, the Portuguese higher education system also comprises integrated master programs; students enrolled in these programs are assured a place at the master's level, right after the first degree, without having to apply. Integrated master programs were originally allowed for Medicine, Veterinary, Architecture, Psychology, and Engineering programs. Recently, programs in Psychology and Engineering have been restructured into two separate cycles (first and second cycle), meaning that currently, only a small number of integrated masters are offered. Furthermore, only universities are allowed to offer integrated master's programs. As the aim of the paper is to look at possible differences between the propensity to unemployment of university and polytechnic graduates, integrated masters were not considered in the present analysis.

and Vocational Training) over the total number of graduates in the previous 4 years.[4] Registration at the IEFP is voluntary and may vary across disciplines, as in some fields (e.g., Medicine) it is less likely to find a job via the unemployment office, which may deter graduates from registering with the unemployment service. Despite that, the indicator provides a good picture of the graduates' situation in the labor market in most programs; it is used by the Ministry to define the unemployment level below which *numerus clausus* increases are allowed. To avoid field-specific unemployment registration dynamics, the Ministry sets the threshold by field. The inclusion of field of study dummies minimizes the potential selection bias regarding the unemployed graduates' registration. As this is not the actual graduate unemployment rate, in this paper, that ratio is designated as the "propensity for unemployment" to ensure that there is no confusion with the official unemployment rate calculated by the National Statistics based on the Labour Force Survey.

The dataset in the web-portal *InfoCursos* is indeed vast. Beyond the unemployment indicator, this study also benefits from information about the student body in each study program, namely, demographic information, such as the number of students enrolled in each study program, the proportion of foreign students, and the share of female students. This information is complemented with data from DGES (General Directorate for Higher Education) on the number of places available and the field of study of each program. Additionally, information was gathered on socioeconomic background, including on parents' education level and scholarship holders. For programs offered by public institutions, the paper resorts to additional information on students' previous achievements.

The purpose of this paper is to analyze possible differences between universities and polytechnics regarding unemployment propensity. The dependent variable, the propensity for unemployment of a pair institution/program, is a fractional response variable. In the available data, the propensity for unemployment displays virtually no observation equal to one, despite featuring an arguably significant proportion of zeros. There is no reason to suppose that the specific value of the propensity for unemployment results from the joint effect of a process that determines, first, whether that propensity is equal to or greater than zero, and, second, its specific value, given that it is above zero. Thus, a fractional probit model[5] with robust standard errors was estimated by quasi-maximum likelihood, as proposed by Papke and Wooldridge (1996). In particular, there was interest in estimating the conditional mean, which was assumed to be given by the following equation:

$$E(UNEMP|X) = G(\beta_0 + \beta_1 PUBLIC + \beta_2 TYPE + \beta_3 OVERLAP + \beta_4 PUBLIC \times TYPE + \beta_5 PUBLIC \times OVERLAP + \beta_6 TYPE \times OVERLAP + \beta_7 PUBLIC \times TYPE \times OVERLAP + \sum_{(j=8)}^{J} \beta_j X_j),$$

where $G(.)$ is the standard normal cumulative distribution, and the regressors are strictly exogenous. UNEMP is the propensity for unemployment. The model has been estimated using a sample of 935 programs, with an average unemployment propensity that hides variation across types and sectors of higher education. The unemployment propensity of about 4.0% among university programs contrasts with 4.9% in polytechnics. Programs in public institutions face a 4.4%

[4] Information on the number of graduates comes from the RAIDES report that all Portuguese higher education institutions have to submit twice a year.

[5] This option also guarantees consistent parameter estimates, even if the true model is not a probit, provided the conditional mean of the model is correctly specified.

propensity for unemployment, whereas among private institution programs, it is about 4.8% (Table 1).

Three variables and their cross products are at the core of the analysis (see Table 1). First, the main variable of interest is TYPE, which is a dummy equal to 1 if the study program is offered by a university and 0 otherwise.[6] About 47% of the study programs in the whole sample are offered by universities. This proportion goes up to 65% in the case of private institutions. Second, as the composition of the program supply shows variation between public and private institutions, a variable PUBLIC is used, which is a dummy variable equal to 1 if the HEI offering the program is public. About 81% of the study programs are provided by public institutions, representing 77% of the places available. Third, to control for supply overlapping between polytechnics and universities, a dummy variable (OVERLAP) is included, and it is equal to 1 for programs existing simultaneously in both subsystems. Despite the difference in missions, the supply of polytechnics and universities has converged over time. As such, the set of overlapping programs can work as a group of control and creates an interesting setting to examine differences in the labor market outcomes between the two types of providers.

The model also contains three sets of control variables ($\boldsymbol{X_j}$). The first set refers to program characteristics. It includes a variable for the dimension of the study program, measured as the number of available places (SIZE). On average, study programs offered by private institutions have more places available (Table 1). Another variable that may influence the propensity for unemployment is the field of study according to the national classification CNAEF (National Classification of Education and Training Areas). A set of 67 dummy variables, for the 68 fields, is included. The baseline category is Educational Sciences. This set of dummy variables further allows to control for potential differences across fields of study on the probability of a given unemployed graduate registering with the IEFP.

The second set of controls includes some variables describing the student body of each program regarding their demographic characteristics, previous achievement, and socioeconomic background, namely, the proportion of female students (FEMALE), which is, on average, slightly higher for study programs offered by private institutions (Table 1). The variable INTERNATIONAL measures the proportion of international students in each study program, which, on average, appears to be higher in private institutions, although showing high variability across programs. Two variables are included to control for specific access routes. The proportion of students enrolled in each study program through the specific route for students older than 23 (AGE23) is relatively high in study programs offered by private institutions.[7] The variable TRANSFERRED stands for the proportion of students that have transferred from other program/institution.

The proportion of students whose mother holds a higher education diploma (MOTHEREDUC) and the proportion of scholarship holders attending the program (SCHOLARSHIP) are the closest one can get to measure the socioeconomic background, given the available data. As an alternative to these two highly correlated variables, an overall composite index for the socioeconomic background (SEB index) of the student body of each program is computed to combine the mother

[6] A peculiarity of the Portuguese higher education system is that there are some polytechnic schools—which typically offer only one specialized study program—integrated in universities. We treat them as university provided study programs, thus taking value one in our variable of interest.

[7] Potential higher education students older than 23 are subject to a different set of rules and procedures to enter higher education and most of them are already in the labor market. They may be perceived by potential employers differently than graduates without work experience.

TABLE 1 Descriptive statistics

		Entire sample		Public HEI		Private HEI	
Variable	**Description**	**Mean**	**Standard deviation**	**Mean**	**Standard deviation**	**Mean**	**Standard deviation**
UNEMP	Propensity for unemployment	0.0448	(0.0324)	0.0441	(0.0310)	0.0479	(0.0377)
Polytechnics		0.0488	(0.0338)				
Universities		0.0403	(0.0301)				
Overlapping		0.0430	(0.0305)				
Nonoverlapping		0.0454	(0.0330)				
TYPE	1 if a university program, 0 polytechnic	0.4674		0.4254		0.6461	
PUBLIC	1 if public HEI, 0 private	0.8096					
OVERLAP	1 if offered by both polytechnics and universities	0.2449		0.2246		0.3315	
SIZE	Total number of available places	51.0310	(39.0559)	48.4703	(36.4223)	61.9213	(47.2833)
AGE23	% students aged 23 and above	0.0868	(0.1251)	0.0663	(0.0985)	0.1739	(0.1781)
INTERNATIONAL	% international students	0.0836	(0.0908)	0.0779	(0.0868)	0.1079	(0.1029)
FEMALE	% female students	0.5620	(0.2420)	0.5555	(0.2406)	0.5895	(0.2463)
TRANSFERRED	% transferred students	0.0566	(0.0463)	0.0508	(0.0411)	0.0810	(0.0581)
SEB INDEX	Socioeconomic background index	0.2911	(0.0930)	0.2966	(0.1510)	0.2771	(0.2256)
MEANGPA	Average entrance GPA (for public programs)	137.8316	(15.1990)	137.8316	(15.1990)		
Observations[a]		935		757		178	

Abbreviations: GPA, grade point average; HEI, higher education institution.

[a]Missing data for some variables explain why the sum of the number of observations of study programs offered by public and private institutions that can be considered does not correspond to the number of observations for the entire sample when variables GPA and SCH are excluded.

education and the scholarship dimensions in a single measure. Following Portela (2001), the composite index value for each program i has been computed as follows:

$SEB_i = mothereduc_i(0.5 + \frac{e^{z_i}}{1+e^{z_i}})(0.5 + \frac{e^{w_i}}{1+e^{w_i}})$, where z_i and w_i are the standardized MOTHEREDUC and SCHOLARSHIP variables. The index has the advantage of positioning each study program within the classification of each dimension by comparing it with its mean. It is strictly positive, and the higher its value, the higher the socioeconomic background of the student body. Including this variable in our model allows us to control for a further factor that could lead to biased results. For instance, socioeconomic background is a factor that possibly determines the willingness of first degree graduates to pursue a master's degree. Hence, study programs with students coming from more privileged backgrounds could be associated with low unemployment simply because individuals who pursue further education do not enter the labor market and cannot register as unemployed. In public institutions, students seem to come from a slightly better cultural background, as the SEB index shows.

The MEANGPA is the mean of the grade point average (GPA) of the students admitted to each study program and intends to measure the student body's previous achievement. Given the nature of the higher education access system in Portugal, this information is available only for study programs offered by public institutions.

The third set of controls aims at characterizing the local labor market conditions, a potential major determinant of graduates' unemployment. As graduate unemployment can be heavily influenced by local economic conditions, namely, the trends in local labor markets, our regression includes a set of 53 dummy variables for 54 regions following the municipality classification. Previous studies have evidenced that most of the new higher education students prefer to enroll in nearby institutions, and therefore, it is likely that this is reflected in labor market integration (Lourenço et al., 2020). In addition, as suggested before, polytechnic institutions are supposed to design their study programs considering the needs of the local economy. Taken together, these two facts may drive graduate unemployment up for institutions located in regions with relatively higher overall unemployment and a relatively depressed economic environment. By including information on the location of HEIs, these factors were controlled.

5 | RESULTS AND DISCUSSION

Five specifications of the fractional probit model are estimated, and the marginal effects are shown in Table 2. First, the model is estimated using all observations in the sample [Table 2.A]. Then the sample is split into two groups of programs, those offered by private and public institutions, and the model is estimated separately for each of them (Table 2.B and C, respectively). The model is reestimated for public institution programs by taking advantage of an additional regressor, MEANGPA, only available for them [Table 2.D]. Finally, the model is estimated for the subset of overlapping programs [Table 2.E].

As shown in Table 2.A, estimation results for the whole sample reveal that studying in a program offered by a university, as opposed to a polytechnic, drives down the propensity for unemployment by about 0.5 percentage points. On average, it goes from 4.1% in university programs to 4.6% for programs offered by polytechnics (Table 3), but differences between public and privately supplied programs are apparent. Although the predicted unemployment propensity of about 3.7% for the public university supply is below the 4.6% of unemployment chances in

TABLE 2 Average marginal effects on unemployment propensity.

Variables	(A) Full sample	(B) Private HEI	(C) Public HEI	(D) Public HEI	(E) Overlapping
TYPE	−0.0053** (0.0027)	0.0031 (0.0097)	−0.0087*** (0.0029)	−0.0096*** (0.0029)	−0.0101** (0.0039)
PUBLIC	−0.0129** (0.0057)				−0.0119** (0.0054)
OVERLAP	−0.0035* (0.0021)	−0.0004 (0.0074)	−0.0037** (0.0019)	−0.0042** (0.0019)	
SIZE	−0.0001*** (0.0000)	−0.0000 (0.0001)	−0.0001*** (0.0000)	−0.0001*** (0.0000)	−0.0001*** (0.0000)
AGE23	−0.0089 (0.0084)	−0.0103 (0.0216)	0.0008 (0.0088)	−0.0004 (0.0096)	−0.0044 (0.0122)
INTERNATIONAL	0.0267** (0.0119)	0.0321 (0.0260)	0.0299** (0.0145)	0.0151 (0.0128)	0.0418** (0.0177)
FEMALE	0.0201*** (0.0057)	0.0325** (0.0134)	0.0186*** (0.0064)	0.0108* (0.0066)	0.0278*** (0.0096)
TRANSFERRED	0.0327* (0.0179)	0.0136 (0.0366)	0.0384** (0.0180)	0.0318* (0.0193)	0.0575** (0.0279)
SEB INDEX	−0.0341** (0.0141)	−0.0209 (0.0252)	−0.0471*** (0.0165)	−0.0423** (0.0170)	−0.0257 (0.0205)
MEANGPA				−0.0001 (0.0001)	
Field of study dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
Log pseudolikelihood	−164.8754	−32.7109	−131.7885	−126.0194	−70.1585
Observations	935	178	757	726	397

Abbreviation: HEI, higher education institution.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 3 Predicted unemployment propensity.

	Total	Public	Private	Overlapping	Nonoverlapping
University	0.0413***	0.0370***	0.0614***	0.0379***	0.0434***
	(0.0014)	(0.0015)	(0.0034)	(0.0019)	(0.0020)
Polytechnic	0.0465***	0.0460***	0.0489***	0.0450***	0.0476***
	(0.0018)	(0.0460)	(0.0107)	(0.0019)	(0.0032)
Total		0.0418***	0.0547***	0.0426***	0.0461***
		(0.0008)	(0.0055)	(0.0012)	(0.0014)

Note: Based on the estimation results in Table 2.A. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

programs of the public polytechnic sector, it is evident that programs in public institutions face lower unemployment than those offered by private institutions (4.2% vs. 5.5%, Table 3).

The advantage in the labor market of the university programs persists if considering programs simultaneously offered in the two subsystems. The propensity to unemployment in overlapping programs is almost 4.3%, which is smaller than the 4.6% of the nonoverlapping programs. When offered by universities, overlapping programs have a 3.8% propensity to unemployment, which is 0.7 percentage points lower than the unemployment propensity faced by polytechnic overlapping programs. Universities perform better than Polytechnics, on average, as even the nonoverlapping university programs have slightly lower unemployment than Polytechnic programs offered simultaneously in both types of institutions (4.3% vs. 4.5%).

When considering separately public and private institutions, a difference regarding the propensity for unemployment between universities and polytechnics is found for programs offered in the public sector (in this case, universities show a propensity of unemployment that is 0.87 percentage points lower, Table 2.B), but a not statistically significant difference is found for programs in the private sector (Table 2.C). In other words, for study programs offered by private institutions, the propensity for unemployment seems to be unaffected by whether the institution offering the program is a polytechnic or a university, whereas graduates from public university programs appear to perform better in the labor market than their polytechnic counterpart (Table 2.C). Such effect for public institutions remains relevant even in a model with control for student previous achievement (Table 2.D) as the results do not change much; a lower propensity for unemployment among university graduates is still evident (by 0.96 percentage points).

This reveals that the expectation that polytechnic graduates would more easily integrate into the labor market has failed to materialize. Although the vocational nature of their training was believed to be an advantage, other factors, for example, employers' perceptions or graduates' individual characteristics, may exert a more substantial influence on the propensity for unemployment. Indeed, the fact that university programs are associated with a lower propensity for unemployment may be due to the higher selectivity of this type of institution. Actually, university programs tend to have higher admission standards and therefore tend to attract better students who, in turn, are likely to become better graduates. This is also related to socioeconomic background, as discussed further below.

As mentioned previously, students tend to perceive universities as more prestigious, and, generally, polytechnics constitute their second-best alternative (Sá & Tavares, 2018; Sá et al., 2021, 2022). University programs are also more selective as the minimum GPA values to enter programs in the same area are significantly higher for university programs, which is a signal for prospective employers. Just as students perceive universities as more prestigious, employers may as well infer that university graduates have higher abilities, and so they tend to prefer them. Indeed, the

quality of employment was found to be lower for vocational graduates in France (Calmand et al., 2014) because they usually entered technical and intermediate positions and were less likely to obtain management or professional jobs. However, unlike the findings of the present study, the authors found that French vocational students have less difficulty in joining the labor market, have higher employment rates, and are better at securing long-term contracts. This suggests that the career prospects of vocational graduates depend on the structure of the national economy and the local labor market. In Portugal, one can therefore argue that lower value is attributed to vocational diplomas, a hierarchy that affects both access to and quality of employment.

Furthermore, according to students' perceptions (Tavares & Cardoso, 2013; Tavares, 2013), public institutions are preferred over private ones, as these latter charge higher fees and are less prestigious given their lower selectivity.[8] It appears that these differences are also a signal for employers (in-line with Arcidiacono et al., 2010).

The socioeconomic background of students emerges as an important factor determining the propensity for unemployment, especially in publicly offered programs: The less privileged the background, the higher the propensity for unemployment. Previous studies (Sá et al., 2022) have shown that students from deprived contexts face less favorable conditions for access to higher education and are more likely to enter a polytechnic rather than a university. Moreover, when unable to enter a local public HEI and when private HEIs are available in the home district, students are less likely to opt for public HEIs in another district and prefer to enroll in a private institution nearby. When calculating costs and benefits, even though private HEIs have higher fees, the costs associated with accommodation and transportation of enrolling in a public HEI far from home can be even greater (Lourenço et al., 2020). This may suggest that students enrolling in private institutions face financial constraints.

One can therefore argue that the social segregation present at the point of entry to higher education is likely to be replicated in the transition to the labor market (Macmillan et al., 2015; Calmand et al., 2014). As Macmillan et al. (2015) suggested, graduates from privileged socioeconomic backgrounds are better positioned to access top jobs, not only because of their academic achievement but also because of other forms of cultural capital (noncognitive skills, confidence, and self-esteem). An implication of these results is that vocational degrees, which tend to enroll students from more diverse socioeconomic backgrounds, are less effective in leading to upward social mobility (Calmand et al., 2014).

Concerning the size of the programs, the larger ones, that is, those with more available places, have slightly lower unemployment, namely, an increase in the number of places by 10 results in a decrease of about 0.1 percentage points in the proportion of unemployed graduates. A good record of graduate employment is a requirement for programs that want to increase the number of places, so programs with more places are also the ones with better employment rates.

Moreover, study programs with a higher proportion of female students are associated with a higher propensity for unemployment. Individual level analyses conducted elsewhere found that gender is a factor that influences labor market prospects. Females were found to have lower chances of employment than males and higher chances of looking for work longer, following an analysis of Labour Force Survey data across Europe (Nuñez & Livanos, 2010). In France, too, males have higher probability to find permanent employment and to access executive

[8] Perceptions of prestige are linked to perceptions of quality. However, an acceptable threshold of quality is assured by the higher education assessment and accreditation system in Portugal for all programs and institutions in operation (Sin, Tavares, & Amaral, 2017).

professions (Calmand et al., 2014). Findings in Portugal are not different as far as the gender effect on unemployment propensity is concerned.

Programs with higher quotas of students who have been transferred from other programs or institutions seem to be related to a higher propensity for unemployment, whereas the presence of a higher proportion of mature students (aged 23 and over) in a program appears to have no role in determining the proportion of unemployment graduates.

As a general result, programs with high quotas of international students are those with higher unemployment levels. A limitation regarding this variable is the impossibility of discriminating the type of international students (on credit or degree mobility). Nonetheless, the HEIs that struggle to fill their available places tend to enroll larger numbers of degree mobile international students as a way to compensate for weak national demand. These institutions are mostly public polytechnics in inland regions, which are not attractive locations for national students, who tend to perceive them as less appealing from an economic and cultural point of view, with fewer career opportunities. Demography is another factor for low national demand because these regions have aging populations and lack a sufficient number of local candidates. Therefore, it is likely that these institutions resort more to international recruitment.

6 | CONCLUSIONS

It became clear with this study that the Portuguese labor market is not equally receptive to absorbing graduates from university and polytechnic institutions. The type of institution where students graduate seems to account for the unemployment propensity. In fact, polytechnic graduates find it more difficult to enter the labor market than their university colleagues do. Therefore, the expectation that the vocational nature of polytechnic education would ease the transition into employment is not verified. This may happen for several reasons that are worth studying in the future. On the one hand, the hierarchy of esteem present in students' perceptions may be shared by employers, who also tend to rank a university degree higher than a polytechnic degree. Similar results were found in France, where vocational bachelor's fail to lead to upward social mobility because of a persistent hierarchy of diplomas (Calmand et al., 2014). However, vocational graduates secure employment more easily, which was also observed in Finland (Leppänen, 2019). The degree of difficulty experienced by graduates from different types of institutions to get employment is related to the features of different national labor markets. Although the implementation of the Bologna process and of the European Higher Education Area has promoted the convergence of national systems, including an increasing share of tertiary educated labor in the workforce (one of the targets of Europe 2020) (Eurofund, 2019; Green & Henseke, 2021), there has been no convergence of national graduate labor markets across Europe (Green & Henseke, 2021: 11), namely, in what regards the growth of demand, the prevalence of underemployment and salaries. This means that although higher education systems have converged, their effect at the level of the labor market strongly depends on national or/and regional conditions. As argued by Marginson, "modern higher education is a creature of the nation-state (Scott, 2011) and national aspects remain primary" (Marginson, 2016: 264).

Núñez and Livanos (2010) already suggested that graduates from Portugal and other Southern European countries faced problems in the job market because their degrees are ineffective in increasing the likelihood of employment. Polytechnic graduates are exposed to unemployment in a higher degree than university graduates because they tend to enter the labor market right at the end of the first degree, whereas most of their university colleagues opt for a continuation

of studies, enrolling in a master's degree. In a context of job scarcity and the changing nature of employment, polytechnic graduates may therefore be penalized because they are less likely to continue studies at the level of the master's degree.

Contrary to universities, polytechnics enroll students from more diverse socioeconomic and academic backgrounds. An aspect that has emerged from the study is that the transition to the labor market is reflecting these socioeconomic inequalities already visible within higher education, where selectivity and reputation play a significant role. This study suggests that structural inequalities in Portugal are replicated in the access to higher education and in employers' decisions and preferences. Shavit et al. (2007) already found that massification generated additional stratification and, consequently, higher inequality of opportunities. Therefore, one can argue that vocational studies may lead to a lesser degree to upward social mobility and that employers reinforce this hierarchy of diplomas through their recruitment choices. The higher propensity for unemployment of polytechnic graduates is therefore a reflection of these inequalities and not a failure of polytechnic institutions to fulfill their vocational mission. Moreover, the regional development asymmetries of the country are also a factor for the higher unemployment propensity of polytechnic graduates. Polytechnic institutions have a broader geographical distribution, serving, more than universities, economically deprived inland regions, with fewer employment prospects. As Portuguese students are little mobile (Lourenço et al., 2020), young people from these deprived areas enroll in a nearby polytechnic and have poorer career opportunities upon graduation.

Higher education in Portugal does not seem to eliminate inequalities present in the social fabric of the country but perpetuates them via the stratification of institutions. Therefore, the identification and softening of inequalities should be the target of national policy measures to avoid socioeconomic segregation, not only regarding access but also concerning the transition to the labor market. One example could be policy measures to turn universities more inclusive and consequently less selective. It is also to be seen if the European Union is successful in promoting the convergence of national labor markets (Eurofund, 2019).

Our analysis could have benefited if there was data on the percentage of students enrolling in exchange programs in higher institutions in other countries. Indeed, participating in international exchange programs may bring benefits in terms of labor market outcomes (Sin, Tavares, & Neave, 2017), which possibly decrease the propensity to unemployment for students attending polytechnic institutions. Another related question is whether students from universities, who are typically coming from more advantaged backgrounds, tend to participate more in these experiences, which may further contribute to their employability. Future research should also extend to the analyses of employment considering the specificities of scientific areas.

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