

## Article

# Propensity for Self-Employment in a Model of Occupational Choice: Evidence from a Cohort of Recent University Graduates in Spain

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**Abstract:** This paper presents a microeconomic analysis of the occupational choices that individuals make after graduating from higher education. Specifically, a binomial logit model of the self-employment decision, which can be seen as a special case of a model of utility maximization, is estimated for a large, nationally representative sample of Spanish bachelor's degree holders. The estimation of the logit model allows one to analyze the influence of the university degree and individual sociodemographic characteristics on the probability of becoming self-employed five years after graduation. Results show that graduates in Odontology, Physiotherapy, Architecture, Law, Fine Arts, Pharmacy, and Psychology are the most likely to become self-employed. Surprisingly, financially literate individuals (economics and finance-related undergraduate degree holders) are less likely to start their own businesses. The paper also shows that women are less likely to be self-employed than men, but those graduates whose mothers obtained a university degree have an increased likelihood of being self-employed. The paper highlights the need for career guidance for undergraduates contemplating a career in self-employment.

**Keywords:** self-employment; university graduates; Spain; Bologna reform; higher education; EILU2019 survey



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## 1. Introduction

Self-employment is a significant source of new jobs and an alternative to salaried employment. According to Eurostat [1], 32.6 million people in the European Union (EU) aged 15 to 74 were self-employed in 2018. They accounted for 14% of total employment. In Spain, 16% of the people employed were self-employed. However, even though there has been a growing body of empirical work on self-employment in general [2–4], there is little evidence on the extent to which self-employment is a major career destination for recent university graduates. Cross-sectional estimates of the propensity to be self-employed can be obtained using graduate surveys, but nationally representative microdata have not been available in many countries until relatively recently. This study takes advantage of the opportunity provided by the EILU2019 survey (*Encuesta de Inserción Laboral de titulados Universitarios*), which is a large, nationally representative, random sample of Spanish universities and university graduates. A total of 31,651 bachelor's degree holders from the 2013/2014 academic year were surveyed in 2019 (i.e., five years after graduation). In 2019, 86.1% of those undergraduates from the Spanish university system were working (approximately 10% of these graduates described themselves as self-employed in 2019), while 8.0% were unemployed, and 6.4% were inactive. (Higher education in Spain consists almost exclusively of universities, and about 90% of students are enrolled in undergraduate education [5]. Thus, throughout this manuscript, we will use “higher education graduates” and “university graduates” interchangeably to refer to those who completed bachelor's degree programs at Spanish universities).

The transition from university to work is a key aspect to take into account when evaluating the external efficiency of higher education systems. External efficiency is typically assessed by linking the outputs of the education system (such as degrees awarded) to educational outcomes, including labor market outcomes [6]. Therefore, new graduates' decisions about their careers are a relevant topic from a policy perspective. In this framework of external efficiency evaluation, the overall goal of the current article is to improve our understanding of the determinants of self-employment choice, with a central focus on the different undergraduate degrees granted by the Spanish university system. In this study, the self-employed are defined as those graduates who identify themselves as entrepreneurs (with or without employees) or declare that they practice a profession on their own account. The choice of occupation (self-employed vs. wage earner) is modeled using a binomial logit model, which can be seen as a special case of a general model of utility maximization. This model allows one to estimate the propensity for self-employment of the different university degrees offered by the Spanish university system, which is the main focus of this paper. In this regard, we must emphasize that the data set used in the analysis contains interviews with the first graduates of the Spanish university curriculum reform (the so-called Bologna reform). Among the objectives of the curriculum reform, in addition to the homogenization of university degrees throughout Europe, was the development of employability competencies among students. Through the development of skills for employability, universities may also play an important role in enhancing self-employment outcomes.

The remainder of the paper is organized as follows. Section 2 summarizes the empirical literature on self-employment among graduates. Next, Section 3 presents the proportion of the employed engaged in self-employment (incidence of self-employment). Section 4 presents a model of the individual's decision to become self-employed. Section 5 discusses the estimates of the model. Section 6 highlights the practical implications of self-employment in Spain. The article concludes in Section 7 by summarizing the main results of the research.

## 2. Background

For a long time, psychologists, sociologists, and economists have been interested in the question of why people decide to become self-employed. Psychological studies suggest that self-employed individuals have a high need for achievement, have internal locus-of-control beliefs, and are less risk-averse [7]. The determinants proposed by economists include, among others, entrepreneurial ability [8], and liquidity constraints [9]. Sociologists have also addressed the question of the determinants of self-employment [10]. Since these works, interest in the self-employed has grown significantly in the last decades (See [3,4] for a review of the literature). Nonetheless, there are relatively few studies that have focused solely on university graduates.

One of the first works in the literature on self-employment among university graduates is that of Dolton and Makepeace [11]. Using data from the Survey of 1980 Graduates and Diplomates, the authors found that about 5 percent of the total sample of British graduates were self-employed in their current jobs (the first six and a half years in the labor market), a percentage below the proportion in the population as a whole. The incidence of self-employment among graduates was higher for men than women, for non-whites than whites, and for polytechnic graduates than university graduates. Finnie and Laporte [12] also analyzed the patterns of self-employment in the 1980s and 1990s among several cohorts of Canadian graduates in the five years after graduation using data from the National Graduates Surveys (NGS) developed by Statistics Canada. The self-employment rates for bachelor's degree graduates ranged from 10.9 percent to 12.7 percent for males and from 6.2 percent to 7.2 percent for females. Interestingly, overall job satisfaction was greater among the self-employed than among paid employees.

Previous work has also estimated the propensity for self-employment among graduates using probabilistic models. For example, Falk and Leoni [13] investigated the characteristics of nonagricultural self-employment among university graduates in Austria based

on observations from the country's 2001 population census. Probit regressions showed that women are less likely to be self-employed than men. Indeed, a common denominator in most studies on entrepreneurial activity is the relatively low self-employment rate of women, which may partially be explained by their lower preference for entrepreneurship [14]. Subsequently, using the Current Population Survey (CPS) data between 1989 and 2011, Guo et al. [15] examined the impact of college education on the likelihood of self-employment in the United States. This study showed that individuals with a college education were more likely to have their own businesses than those without.

However, there are few studies that focus on how entrepreneurship programs affect those who really engage in entrepreneurship. In theory, entrepreneurship education has the potential to enable young graduates to gain entrepreneurial skills and create their own businesses. Kolvereid and Moen [16], using questionnaire data, measured the actual entrepreneurial behavior of graduates who had graduated during the period 1987–1994 from a Norwegian business school. The results of logistic regression showed that having a major in entrepreneurship was positively associated with new firm formation. However, to take into account that students self-select into the major they want to pursue, the impact of entrepreneurship education on actual entrepreneurial behavior was analyzed by Premand et al. [17], relying on an experimental design. Participation in an entrepreneurship track was randomized among Tunisian university students to identify impacts on students' labor market outcomes one year after graduation. The entrepreneurship track led to a small increase in self-employment.

Finally, we highlight some studies that have been carried out using Ajzen's Theory of Planned Behavior (TPB) to explain individuals' involvement in self-employment. The purpose of the TPB is to predict and understand human behavior [18,19]. According to the TPB, the proximal antecedent of any given behavior is the intention to perform the behavior in question. In turn, the TPB posits that attitude toward the behavior (this refers to the degree to which a person has a favorable appraisal of the behavior), subjective norm (this refers to the perceived social pressure to perform the behavior), and perceived behavioral control (PBC) influence behavioral intention (PBC refers to the perceived ease of carrying out the conduct and the perception of control over the action's result). The intention to perform the behavior should be stronger the more favorable the attitude, the more favorable the subjective norm with regard to the behavior, and the greater the perceived behavioral control. An application of the TPB to analyze factors influencing entrepreneurial intent among university students can be found, among other works, in [20–25]. Nevertheless, a drawback of these studies is that they measure impacts on students' intentions while in college, not actual self-employment outcomes once they have graduated and entered the workforce.

### 3. Incidence of Self-Employment among Spanish University Graduates

This section shows the incidence of self-employment among Spanish undergraduates of the class of 2014, five years beyond the receipt of a bachelor's degree. The attempt to describe the extent to which higher education graduates are entering self-employment raises an important issue regarding the definition and measurement of self-employment. We relied on the self-identified status of the respondent, who was directly asked about his or her current professional situation at the time of the interview in 2019. Following the International Classification of Status in Employment of the International Labour Organization (ILO), among the self-employed, we included entrepreneurs with employees, own-account workers or entrepreneurs without employees, and workers in family businesses. The rest of the workers were classified as employees (including paid apprentices, trainees, and interns). Thus, individuals have the choice either to become self-employed or to become an employee in one of the two sectors. Since it is assumed that this is a discrete choice, the outcome (dependent) variable in the econometric analysis of the following sections will take the value of 1 if the graduate is self-employed and 0 otherwise, following that previous classification.

Table 1 presents descriptive statistics about the employment situation five years after graduation, broken down by gender, broad fields of study, and type of university. From Table 1, the self-employment rate in 2019 among workers who graduated from the Spanish university in the 2013/2014 academic year, which is the proportion of total employment of that cohort made up of the self-employed, was 9.2 percent. Consistent with the literature, the incidence of self-employment was higher for men than women (11.1% vs. 7.7%, respectively). Self-employment is also influenced by the field of study. The highest incidence of self-employment was among graduates with health sciences university degrees (12.6 percent of those were self-employed). If we look at the type of university, the self-employment rate is higher among those who graduated from Spanish private universities.

**Table 1.** Self-identified employment status of bachelor’s degree holders five years after graduation: data for Spain from the EILU2019 survey.

	Total Sample		Male Graduates		Female Graduates		Public University		Private University	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Salaried job	24,638	90.8	10,521	88.9	14,117	92.3	20,944	91.4	3694	87.8
Self-employment	2486	9.2	1315	11.1	1171	7.7	1971	8.6	515	12.2
	27,124	100.0	11,836	100.0	15,288	100.0	22,915	100.0	4209	100.0
	Arts and Humanities		Science		Social and Legal Sciences		Engineering and Architecture		Health Sciences	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Salaried job	2094	87.8	2234	95.4	11,095	91.4	5631	91.4	3584	87.4
Self-employment	291	12.2	107	4.6	1039	8.6	533	8.7	516	12.6
	2385	100.0	2341	100.0	12,134	100.0	6164	100.0	4100	100.0
Author’s calculations										

#### 4. Conceptual Framework: A Binomial Logit Model of Occupational Choice (This Section Draws from the Methodology Developed by Jiménez and Salas-Velasco [26] in the Framework of Educational Choices)

##### 4.1. Individual’s Employment Status Choice

The decision to become self-employed may be viewed as an occupational choice. After graduating from university, an individual faces the choice of whether to work in “the self-employed sector” or “the salaried sector.” From a standard microeconomic perspective, which sector he or she chooses is determined by an evaluation of the utility of working in each sector. If a graduate (designated  $i$ ) chooses to become self-employed, this implies that:  $U_{i1} > U_{i0}$ , where  $U_{i1}$  and  $U_{i0}$  are the utilities that  $i$  associates with self-employment and salaried employment, respectively. The utility  $U_{ij}$  that the alternative  $j$  ( $j = 1$ : self-employed;  $j = 0$ : wage-earner) gives individual  $i$  is composed of two parts: a systematic term, which depends on an attributes vector  $X$ , and another random one  $\varepsilon_{ij}$ :

$$U_{ij} = \bar{U}_{ij} + \varepsilon_{ij} \quad (1)$$

Among the determinants of utility is the expected level of earnings. A higher expected net present value of future income in self-employment should, all else being equal, make the entrepreneurial choice more likely. Since higher entrepreneurial ability is associated with a greater ability to generate earnings, all else being equal, individuals with higher entrepreneurial ability will prefer self-employment to paid work. In the literature review by Le [3], intelligence quotient (IQ) score has a positive influence on the probability of self-employment. It is possible that people with a somewhat high IQ have the managerial skills necessary to start their own businesses. Self-employed individuals may also take into account non-pecuniary benefits from being their own boss that are not captured by the earnings measures [2,27].

As we have advanced, a graduate chooses to work in either the self-employed sector or the salaried sector of the labor market, selecting the sector that yields the highest benefits

measured in terms of “utility.” Nonetheless, the utility  $U_{ij}$  is not observable. What we observe is decision  $Y_i$ , which is worth 1 if individual  $i$  chooses the self-employment status and 0 if s/he chooses to work as an employee. If a rational individual chooses the alternative that gives her or him the greatest utility, then we would have:

$$\text{Probability } [Y_i = 1] = \text{Probability } [U_{i1} > U_{i0}]$$

$$\text{Probability } [Y_i = 0] = \text{Probability } [U_{i0} > U_{i1}]$$

McFadden [28] proved that, in this case, the probability that an individual  $i$  chooses alternative 1 is:

$$\text{Prob}[Y_i = 1] = \frac{e^{X_i' \beta}}{1 + e^{X_i' \beta}} \quad (2)$$

McFadden [28] provided a theoretical foundation that linked the logit model to the discrete choice theory from mathematical psychology. Other seminal works in the occupational choice literature are due to Boskin [29] and Schmidt and Straus [30]. Equation (2) would be the reduced form for the binomial logit model, which can be seen as a special case of a general model of utility maximization [31]. In Equation (2), the  $X_i'$  row vector of explanatory variables for the  $i$ -th individual contains determinants of the choice of occupation (including a constant) and  $\beta$  is the vector of parameters to be estimated. Furthermore, it is assumed that the non-observed  $\varepsilon$ 's follow a distribution of logistic probability.

#### 4.2. Determinants of the Propensity to Enter Self-Employment

As we have just discussed, the utility maximization process will induce a labor force participant to opt for self-employment if the utility of being self-employed is higher than that of being wage-employed. Therefore, the dependent variable of the binomial logit model (or binary logistic regression) to predict the probability of a university graduate becoming self-employed is a dummy variable that takes the value 1 if an individual is self-employed and the value 0 if an individual is a wage earner (according to the dichotomization explained in Section 3). In relation to the explanatory variables, the focus is on the bachelor's degree earned at university by an individual, since this article aimed to study the propensity for self-employment and entrepreneurship according to the university degree obtained. We did not have information on self-reported expected earnings in each employment sector at the time of making the decision about employment status. In fact, an econometric problem in estimating models of occupational choice is that the individuals' forecasts of future wages are unobservable [32]. One may also investigate the psychological characteristics of individuals that govern their occupational choices. For example, the choice of employment status may depend on personal attributes such as attitudes toward risk and innate ability, but we do not have this information either. As additional explanatory control variables, this study basically considers the individual's sociodemographic characteristics as having a rather fixed character. This last aspect is important and has been ignored in many applied studies of occupation choice. The individuals in the EILU2019 survey have been in the labor market for 5 years as university graduates, but we do not know when they made the decision to become self-employed. There is also no direct question in the survey about why those who have actually chosen self-employment made that choice. For example, information such as knowledge of computers and languages was available, but we do not know at what point in time such knowledge was obtained. The same happened with the possession of a master's degree. It is well known that many undergraduates, when they start working and earning money, decide to pursue a master's degree that they can afford with their income from work. However, it was decided to introduce the age group corresponding to those under 30 years. Age was measured in wide age intervals at the time of the interview in 2019, but having only been in the job market for 5 years as graduates of undergraduate degrees, the age corresponding to the first interval (under 30 years) would not have changed if we take into account that a large majority of undergraduates finish



their bachelor's programs at the age of 22. Most of the participants in the EILU2019 survey were traditional college-age students.

### 5. Propensity for Self-Employment among Spanish University Graduates

This section offers cross-sectional estimates of the probability that a graduate is self-employed rather than a salaried worker five years after graduation. These estimates are based on the occupational choice model developed above. The logistic regression results—the estimated odds ratios and average marginal effects—are shown in Table 2. (The estimates were obtained using Stata<sup>®</sup> 17 software.) University degree dummies capture the main bachelor's degrees awarded by the Spanish university system after the Bologna reform. In the EILU2019 survey, there were up to 101 different programs (detailed fields of study), which were grouped into 44 categories (narrow fields of study) for the analysis. The category chosen as a reference was Journalism, whose number of graduates (2.4% of the sample) is equal to the overall average. (This category also included Communication, and Information and Documentation.) The degree with the highest value was Business (11.7% of the sample) (this category included those who majored in Business Administration, Finance and Accounting, Economics, and Marketing), and the degree with the lowest value was Sociology (0.4% of the sample). The Chi-square test was used for the overall contrast of the estimated model. The null hypothesis,  $H_0$ , is that all the coefficients of the equation (except the constant) are null. In the analysis (Table 2), Wald  $\chi^2(49) = 1522.85$ ; the associated  $p$ -value is very low (less than 0.001). Thus, the result of this test allows one to reject the null hypothesis and accept the (global) regression as valid. Furthermore, it can be seen at the bottom of Table 2 that the Hosmer–Lemeshow test is not significant, meaning that the logistic regression model fits the data well. Figure 1 depicts the undergraduate degrees and sociodemographic characteristics that are associated with the likelihood of being self-employed five years after graduation.

**Table 2.** Propensity for self-employment among Spanish university graduates: results of the estimation of the binomial logit model.

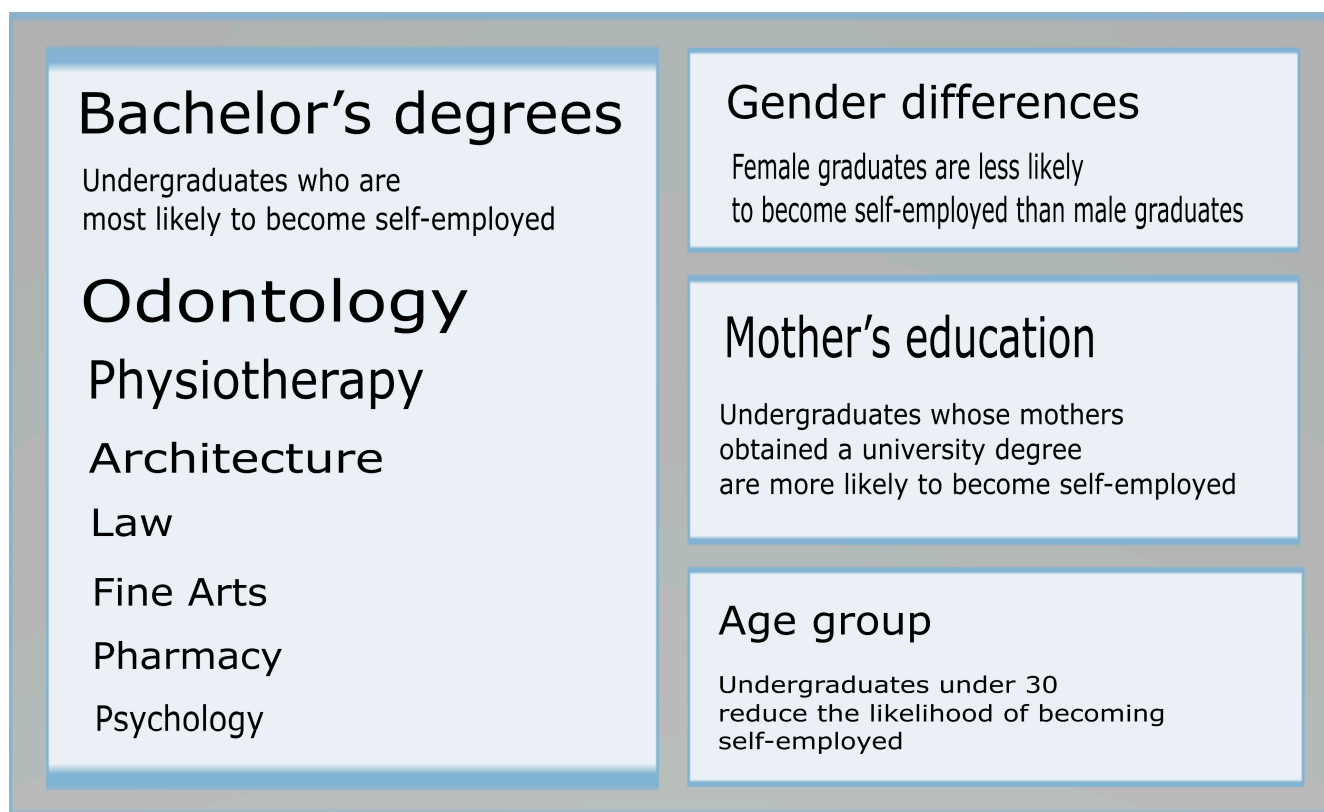
Bachelor's Degree Awarded <sup>(1)</sup>	Odds Ratio		Robust Std. Err.	dy/dx
Odontology	8.887	***	1.976	0.1675
Physiotherapy	3.523	***	0.536	0.0965
Architecture	1.768	***	0.256	0.0437
Law	1.559	***	0.216	0.0341
Fine Arts <sup>(2)</sup>	1.559	***	0.224	0.0340
Pharmacy <sup>(3)</sup>	1.529	**	0.275	0.0325
Psychology <sup>(4)</sup>	1.399	**	0.210	0.0257
Veterinary	1.221		0.232	0.0153
Foreign Languages <sup>(5)</sup>	0.916		0.169	−0.0068
Sports Science	0.816		0.149	−0.0156
Philosophy	0.801		0.197	−0.0170
Geography and History <sup>(6)</sup>	0.702	*	0.130	−0.0272
Political Sciences	0.650	*	0.153	−0.0330
Agricultural Engineering <sup>(7)</sup>	0.641	***	0.109	−0.0341
Food Engineering <sup>(8)</sup>	0.623	*	0.167	−0.0363
Geology <sup>(9)</sup>	0.614	*	0.156	−0.0374
Business degrees <sup>(10)</sup>	0.574	***	0.078	−0.0425
Physics <sup>(11)</sup>	0.499	***	0.129	−0.0533
Sociology	0.478	*	0.185	−0.0566
Language and Literature	0.455	***	0.112	−0.0604
Transport and Services	0.438	***	0.133	−0.0633
Tourism	0.430	***	0.098	−0.0647
Civil Engineering <sup>(12)</sup>	0.423	***	0.078	−0.0660
Labor Relations	0.422	***	0.108	−0.0662
Electric Engineering <sup>(13)</sup>	0.377	***	0.114	−0.0747
Environmental Sciences	0.351	***	0.087	−0.0803
Industrial Engineering	0.349	***	0.062	−0.0808
Educational Studies	0.313	***	0.069	−0.0890
Biology	0.312	***	0.086	−0.0892

Table 2. Cont.

Bachelor's Degree Awarded <sup>(1)</sup>	Odds Ratio	Robust Std. Err.	dy/dx
Teaching	0.287 ***	0.045	−0.0956
Biomedical and Health Engineering <sup>(14)</sup>	0.264 ***	0.081	−0.1020
Computing	0.252 ***	0.048	−0.1058
Telecom Engineering	0.245 ***	0.054	−0.1077
Chemical Engineering	0.245 ***	0.107	−0.1080
Naval and Aeronautical Engineering	0.206 ***	0.078	−0.1210
Mathematics and Statistics	0.192 ***	0.063	−0.1266
Chemistry	0.149 ***	0.060	−0.1458
Social Work	0.143 ***	0.043	−0.1490
Nursing	0.051 ***	0.019	−0.2282
Medicine	0.050 ***	0.023	−0.2297
Gender (=1 female)	0.694 ***	0.032	−0.0280
Age under 30 years (=1 yes)	0.646 ***	0.032	−0.0335
Graduate with recognized disability >33% (=1 yes)	0.781	0.196	−0.0189
Mother with university studies (=1 yes)	1.162 ***	0.057	0.0115
Father with secondary or tertiary vocational training (=1 yes)	0.928	0.060	−0.0057
Father born in Spain (=1 yes)	0.854	0.085	−0.0121
Graduated from an on-site public university (=1 yes)	0.842 ***	0.046	−0.0132
Double university degree (=1 yes)	0.861	0.098	−0.0114
Graduate with secondary or tertiary vocational training (=1 yes)	0.970	0.063	−0.0024
Constant	0.296 ***	0.048	

<sup>(1)</sup> The university degrees have been ordered from the highest to the lowest value of the odds ratio. The reference category was Journalism (also including Communication, and Information and Documentation). <sup>(2)</sup> This category also included History of Art, and Conservation and Restoration. <sup>(3)</sup> This category also included Human Nutrition and Diet. <sup>(4)</sup> This category also included Speech Therapy. <sup>(5)</sup> This category also included Translation and Interpreting. <sup>(6)</sup> This category also included Anthropology. <sup>(7)</sup> This category also included Forest Engineering. <sup>(8)</sup> This category also included Science and Technology of Food, and Oenology. <sup>(9)</sup> This category also included Archeology. <sup>(10)</sup> This category included those who majored in Business Administration, Finance and Accounting, Economics, and Marketing. <sup>(11)</sup> This category also included Optics and Optometry. <sup>(12)</sup> This category also included Mining Engineering. <sup>(13)</sup> This category also included Energy Engineering. <sup>(14)</sup> This category also included Biochemistry, Biotechnology, and Biomedicine. Number of obs. = 27,124 [dichotomous outcome: self-employed = 1 (9.2%); employees = 0 (90.8%)]. Wald chi2(49) = 1522.85; Prob. > chi2 = < 0.001; Pseudo R2 = 0.1097; Log pseudolikelihood = −7397.8509; Goodness-of-fit test; Hosmer–Lemeshow chi2(8) = 6.26; Prob. > chi2 = 0.6179; \*\*\*  $p < 0.01$  \*\*  $p < 0.05$  \*  $p < 0.10$ ; Source: author's calculations using the EILU2019 survey.

Let us focus on the estimation results. Table 2 shows the greater or lesser probability of being self-employed according to the university degree obtained and the individual's sociodemographic characteristics. The values of the odds ratios (ORs), along with the levels of significance, appear in the second column. The university degrees have been ordered from the highest to the lowest value of the ORs (i.e., from highest to lowest propensity for self-employment). An OR greater than 1 indicates the existence of a positive or direct relationship between the dependent variable and independent variable, while an OR less than 1 (but greater than 0) indicates the presence of a negative or inverse relationship. ORs greater than one are associated with an increased probability of being self-employed. ORs between 0 and 1 are associated with a reduced probability of being self-employed (or an increased probability of being an employee). The results show that those who graduated in Odontology (OR, 8.89), Physiotherapy (OR, 3.52), Architecture (OR, 1.77), Law (OR, 1.56), Fine Arts (OR, 1.56), Pharmacy (OR, 1.53), and Psychology (OR, 1.40) are the most likely to have developed a professional career as self-employed five years after graduation (compared with a Journalism undergraduate (reference category)).



**Figure 1.** Propensity for self-employment among Spanish university graduates: main results. Source: author's elaboration.

However, because most people do not think in terms of ORs, many would find it more helpful if they could see how the probability of being self-employed was affected by each variable. The latter is possible with the *margins* command in Stata, which provides marginal effects [33]. An advantage of marginal effects is that they provide meaningful information not available through the interpretation of ORs. The estimated average marginal effects are shown in the last column of Table 2. The marginal effects in this paper were calculated using the average marginal effects (AME) approach, which relies on actual values of the independent variables (covariates are all binary). Estimates indicate that those who graduated in Odontology have an increased average probability of being self-employed by 0.1675 (i.e., dentists on average are about 17% more likely than journalists to have a positive self-employment outcome). We also see that a degree in Physiotherapy is associated with a 10% increase in the probability of developing a career as self-employed. This probability also increases appreciably if the worker is an architect (4.4 percentage points), lawyer (3.4 percentage points), graduate in Fine Arts (3.4 percentage points), pharmacist (3.3 percentage points), or psychologist (2.6 percentage points). These results are consistent with the graduate labor market composition in Spain. Traditionally, these graduate profiles have worked as self-employed (entrepreneurs, freelancers, or liberal professionals) in Spain. For example, if we look specifically at those Spanish university graduates from the 2009/2010 academic year who were working in 2014, it can be highlighted that the highest percentages of self-employed workers were registered as architects as well as dentists and physiotherapists; following these, degrees in Optics and Optometry, Law, Fine Arts, Psychology, or Veterinary Medicine also appeared [34]. In contrast, according to the results shown in Table 2, the probability of developing a career as self-employed is significantly reduced if the worker obtained a degree in Medicine or Nursing (decreases by about 23 percentage points). This result is understandable since the main employer in Spain of healthcare professionals is the public sector. The results also indicate that graduates



with STEM degrees (Science, Technology, Engineering, and Mathematics) have a lower likelihood of being self-employed, which is found in other published studies as well [35].

Nonetheless, considering that financial literacy (financial knowledge) is an important competency for entrepreneurial activity, which requires managing finances, we get an initially unexpected result for financially literate individuals. Economics and finance-related undergraduate degree holders are less likely to start their own businesses. According to Table 2 (marginal effect shown in the last column), the probability of starting a business is significantly reduced if the worker obtained a degree in the field of business (decreases by 4.25 percentage points); or, which is the same, having a business degree represents an increase of 4.25 percentage points in the probability of working as an employee. Some recent studies have found the opposite result. For example, using data for Germany, Čumurović and Hyll [36] have shown that financial literacy positively affects the probability of being self-employed. Struckell et al.'s paper [37] also finds support for a positive association between financial literacy and self-employment in a U.S. context. In any case, the comparisons must be taken with caution since they refer to different contexts, with samples that are not always comparable, and, most importantly, the authors do not always address the problem of endogeneity correctly, tending to confuse correlation with causation [38,39].

Furthermore, this study highlights the fact that the choice of a self-employment career is also conditioned by other characteristics of the graduate. Among the sociodemographic characteristics influencing self-employment propensity, it is worth highlighting the results obtained for four of the variables incorporated in the econometric estimation. First, there is a significant direct gender effect on actual self-employment. Specifically, the results show that women are less likely to be self-employed than men: a marginal effect of  $-0.028$  for the gender variable (last column of Table 2). Alternatively, which is the same, a male with a university degree is 2.8 percentage points more likely to be self-employed than a comparable female graduate. This result is a robust conclusion emerging from a wide array of empirical studies; that is, *ceteris paribus*, men are more likely than women to be self-employed [2,4,11,14,40]. This result does not mean what it seems to imply, namely, that gender determines the capacity to develop entrepreneurial skills. What the literature suggests is that women are less risk-seeking than men, which may lead to lower self-employment preferences and activity rates for women [41]. Explanations for the gender gap might also be associated with the disadvantages of women associated with social capital and access to financial resources [4]. Second, those graduates whose mothers obtained a university degree are, all else equal, more likely to become self-employed. The (positive) influence of this determinant has been identified in the literature as well. Some studies have already shown that individuals from a "high" social class are more likely to become self-employed than individuals from "low" social classes [11]. In fact, intergenerational transfers of wealth and familial transfers of human capital have been found in the literature to be determining factors in the decision to move into entrepreneurship [2,42]. Third, age is a key determinant in explaining the propensity for self-employment among Spanish graduates, with the youngest (which are the majority) being the most likely to seek a job as salaried employees. The results indicate that, keeping everything else constant, graduates of the age group under 30 years have a lower likelihood of starting a business by 3.35 percentage points (the estimated marginal effect). This is an expected result if we take into account that young graduates have limited work experience. According to entrepreneurship studies [43], the probability of being self-employed increases with labor market experience. Finally, it is worth mentioning that, unlike other academic papers that have found that people with disabilities are more likely to be self-employed than people without disabilities [44], the estimated coefficient in our model associated with the binary variable ( $=1$  if the graduate has a recognized disability  $>33\%$ ) did not show statistical significance.

## 6. Discussion

Several countries, such as Australia, the United Kingdom, and the United States, have looked to self-employment as a possible solution to their unemployment and poverty problems. Government programs have been introduced to encourage this employment status by providing training and income support to the unemployed who wish to enter self-employment [3]. In the European Union (EU), it is also well known that fighting unemployment is a key objective for EU policymakers [45]. The EU contemplates measures to combat youth unemployment as well. The youth unemployment rate is particularly high in Spain (32.3%), well above the EU average (15.1%) (figures as of October 2022. Source: Eurostat (online data code: une\_rt\_m)). Thus, promoting self-employment and entrepreneurship can be beneficial. However, there are still social barriers in a country, Spain, with a low-entrepreneurial culture. In the ranking of the Global Entrepreneurship Index (GEI) of 2018, the United States, Switzerland, and Canada were the top three countries, while Spain was ranked 34th, behind most of its European partners [46]. To build this index, the Global Entrepreneurship and Development Institute (GEDI) methodology collects data on the entrepreneurial attitudes, abilities, and aspirations of the local population. It is also worth noting the important role that the public sector in Spain has traditionally played in the generation of graduate employment. Nonetheless, job opportunities in the Spanish public sector are nowadays fewer for young fresh university graduates. The promotion of entrepreneurship might thus facilitate the university–work transition.

Since there are many non-business university graduates with a high propensity for self-employment in Spain (for example, those who graduated in Odontology or Pharmacy), the results of this study also highlight the need for institutional actions to reform the undergraduate curricula (dating from the year 2010). Bachelor's programs should include entrepreneurship-related courses, or, at the very least, universities should provide entrepreneurship training activities aimed at undergraduates interested in running their own businesses. So far, there are very few Spanish universities with lines of action (and/or entrepreneurship centers) aimed at members of the university community who want to start a business. At these universities, entrepreneurship experts help students materialize their ideas into real businesses, offering support and guidance throughout the process. This kind of initiative should be extended to the entire Spanish system of higher education. Although the Spanish university is working on it, more is needed. According to the Global University Entrepreneurial Spirit Student's Survey (GUESSS), in its 2021 edition, two-thirds of the total sample of Spanish university students (63.5%) acknowledged never having attended entrepreneurship training ([www.guesssurvey.org](http://www.guesssurvey.org) (accessed on 14 December 2022)).

But Spanish university students need more than information and counseling. One barrier to entry for start-ups is finance. Government intervention, such as the granting of start-up loans, is essential in the small business creation process by recent university graduates. It is useless to have received economic and financial training in a bachelor's degree program if there are financial barriers to starting a business. The latter may partly explain the result that economics and finance-related undergraduate degree holders have a lower propensity for self-employment compared to peers with non-business degrees, who have fewer options to work in the salaried sector. Traditionally, a significant percentage of undergraduates from business schools in Spain have worked as bank employees in the private sector or as public sector employees in tax agencies. In an environment of economic uncertainty and financial barriers to entrepreneurship, when individuals have safer alternatives in the salaried sector, the choice is clear, although labor insertion studies show that Spanish university graduates in Business Studies and Management and Economics Studies have an increased probability of being vertically mismatched (overeducated) in salaried jobs [47].

Finally, we point out some limitations of this work. Among the main factors considered by economists in the economic theory of self-employment are the financial (liquidity) constraints faced by individuals who wish to establish a business [2–4]. Unfortunately, the EILU2019 survey does not contain such information. Other relevant variables for

starting and growing a business, such as entrepreneurial skills, ability, risk attitudes, and entrepreneur traits, are also not available in the EILU2019 survey. Thus, there is a need for future graduate surveys to take these variables into account to significantly advance our understanding of how people make rational career choices.

## 7. Conclusions

This paper examines self-employment among university graduates in Spain using microdata from a graduate survey, in particular, the EILU2019 survey conducted by the National Institute of Statistics of Spain (INE). The data set contains information on the employment status of bachelor's degree holders from the 2013/2014 academic year. In 2019, approximately 10 percent of graduates who were working were self-employed, while the remaining workers held salaried positions. University graduates' early career decisions (self-employment vs. salaried jobs) are modeled using a binomial logit model, which can be seen as a special case of a general model of utility maximization. Controlling for individual traits and family background, we find significant differences in the propensity for self-employment among different undergraduate degree holders. In particular, logistic regression results show that graduates in Odontology, Physiotherapy, Architecture, Law, Fine Arts, Pharmacy, and Psychology are the most likely to become self-employed. However, financially literate individuals (economics and finance-related undergraduate degree holders) are less likely to start their own businesses. This result is somewhat surprising if we take into account that the Bologna reform of 2010 intensified the economic and financial training received through the courses of the undergraduate curricula, including the compulsory subject of business creation, in the different majors offered by Spanish business schools. This result may reflect the theoretical training taught in business schools without immediate applicability by undergraduate degree recipients. Nonetheless, we must take into account that they are young people with limited work experience and significant credit restrictions to start a business. A longitudinal study would be desirable to assess undergraduates' propensity to launch business start-ups. Furthermore, regression results show that individual characteristics explain the likelihood of entering self-employment. With all else being equal, women are less likely to be self-employed than men. This result is consistent with previous research. Regarding the family background, this study finds that those graduates whose mothers obtained a university degree have a greater likelihood of being self-employed. The paper also highlights the need for more career advice and guidance for undergraduates contemplating a career in self-employment. Spanish universities should play a much more active role in supporting and promoting entrepreneurship and new business ventures than they have so far. Finally, in a general national context, we must emphasize the advantages of being an entrepreneur in Spain, as well as the obstacles. According to the OECD (*SME and Entrepreneurship Outlook 2021*), Spain offers very good administrative conditions for start-ups and a sound regulatory framework. However, there are growing gaps in innovation skills, such as perceived entrepreneurial abilities and computer skills. Moreover, according to expert assessments in 2014, Spain is one of the OCDE countries with the fewest financial opportunities for entrepreneurs. If a nation, like Spain, wants to use self-employment as a macroeconomic policy tool to fight youth unemployment, especially that of recent university graduates, those obstacles must be removed.

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## References

1. EUROSTAT. Self-Employed Persons. Available online: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20190430-1> (accessed on 30 April 2019).
2. Blanchflower, D.G. *Self-Employment: More May Not Be Better*; NBER Working Paper No. 10286; National Bureau of Economic Research: Cambridge, MA, USA, 2004.
3. Le, A.T. Empirical studies of self-employment. *J. Econ. Surv.* **1999**, *13*, 381–416. [[CrossRef](#)]
4. Simoes, N.; Crespo, N.; Moreira, S.B. Individual determinants of self-employment entry: What do we really know? *J. Econ. Surv.* **2016**, *30*, 783–806. [[CrossRef](#)]
5. Hernández-Armenteros, J.; Pérez-García, J.A. La universidad española en cifras 2015/2016. In *CRUE-Conferencia de Rectores de las Universidades Españolas*; Universidades Españolas: Murcia, Spain, 2017.
6. Salas-Velasco, M. The technical efficiency performance of the higher education systems based on data envelopment analysis with an illustration for the Spanish case. *Educ. Res. Policy Pract.* **2020**, *19*, 159–180. [[CrossRef](#)]
7. Brockhaus, R.S. The psychology of the entrepreneur. In *Encyclopedia of Entrepreneurship*; Kent, C., Sexton, D., Vesper, K., Eds.; Prentice-Hall Inc.: Hoboken, NJ, USA, 1982.
8. Blau, D.M. Self-employment and self-selection in developing country labor markets. *South. Econ. J.* **1985**, *52*, 351–363. [[CrossRef](#)]
9. Evans, D.S.; Jovanovic, B. An estimated model of entrepreneurial choice under liquidity constraints. *J. Political Econ.* **1989**, *97*, 808–827. [[CrossRef](#)]
10. Shapero, A.; Sokol, L. The social dimensions of entrepreneurship. In *Encyclopedia of Entrepreneurship*; Kent, C., Sexton, D., Vesper, K., Eds.; Prentice-Hall Inc.: Hoboken, NJ, USA, 1982.
11. Dolton, P.J.; Makepeace, G.H. Self employment among graduates. *Bull. Econ. Res.* **1990**, *42*, 35–54. [[CrossRef](#)]
12. Finnie, R.; Laporte, C. Self-employment among Canadian college and university graduates. *Relat. Ind. /Ind. Relat.* **2003**, *58*, 3–34.
13. Falk, M.; Leoni, T. Characteristics of self-employment among university graduates. *Appl. Econ. Lett.* **2009**, *16*, 1065–1071. [[CrossRef](#)]
14. Verheul, I.; Thurik, R.; Grilo, I.; Van der Zwan, P. Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality. *J. Econ. Psychol.* **2012**, *33*, 325–341. [[CrossRef](#)]
15. Guo, X.; Chen, W.; Yu, A. Is college education worth it? Evidence from its impacts on entrepreneurship in the United States. *J. Small Bus. Entrep.* **2016**, *28*, 1–26. [[CrossRef](#)]
16. Kolvereid, L.; Moen, Ø. Entrepreneurship among business graduates: Does a major in entrepreneurship make a difference? *J. Eur. Ind. Train.* **1997**, *21*, 154–160. [[CrossRef](#)]
17. Premand, P.; Brodmann, S.; Almeida, R.; Grun, R.; Barouni, M. Entrepreneurship education and entry into self-employment among university graduates. *World Dev.* **2016**, *77*, 311–327. [[CrossRef](#)]
18. Ajzen, I. From intentions to actions: A theory of planned behavior. In *Action-Control: From Cognition to Behavior*; Kuhl, J., Beckman, J., Eds.; Springer: Berlin/Heidelberg, Germany, 1985; pp. 11–39.
19. Ajzen, I. The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211. [[CrossRef](#)]
20. Autio, E.; Keeley, R.H.; Klofsten, M.; Parker, G.G.C.; Hay, M. Entrepreneurial intent among students in Scandinavia and in the USA. *Enterp. Innov. Manag. Stud.* **2001**, *2*, 145–160. [[CrossRef](#)]
21. Entrialgo, M.; Iglesias, V. The moderating role of entrepreneurship education on the antecedents of entrepreneurial intention. *Int. Entrep. Manag. J.* **2016**, *12*, 1209–1232. [[CrossRef](#)]
22. Krueger, N.F., Jr.; Reilly, M.D.; Carsrud, A.L. Competing models of entrepreneurial intentions. *J. Bus. Ventur.* **2000**, *15*, 411–432. [[CrossRef](#)]
23. Su, Y.; Zhu, Z.; Chen, J.; Jin, Y.; Wang, T.; Lin, C.L.; Xu, D. Factors influencing entrepreneurial intention of university students in China: Integrating the perceived university support and theory of planned behavior. *Sustainability* **2021**, *13*, 4519. [[CrossRef](#)]
24. Tkachev, A.; Kolvereid, L. Self-employment intentions among Russian students. *Entrep. Reg. Dev.* **1999**, *11*, 269–280. [[CrossRef](#)]
25. Van Gelderen, M.; Brand, M.; Van Praag, M.; Bodewes, W.; Poutsma, E.; Van Gils, A. Explaining entrepreneurial intentions by means of the theory of planned behaviour. *Career Dev. Int.* **2008**, *13*, 538–559. [[CrossRef](#)]
26. Jiménez, J.D.; Salas-Velasco, M. Modeling educational choices. A binomial logit model applied to the demand for higher education. *High. Educ.* **2000**, *40*, 293–311. [[CrossRef](#)]
27. Eisenhauer, J.G. The entrepreneurial decision: Economic theory and empirical evidence. *Entrep. Theory Pract.* **1995**, *19*, 67–79. [[CrossRef](#)]
28. McFadden, D. Conditional logit analysis of qualitative choice behavior. In *Frontiers in Econometrics*; Zarembka, P., Ed.; Academic Press: Cambridge, MA, USA, 1974; pp. 105–142.
29. Boskin, M.J. A conditional logit model of occupational choice. *J. Political Econ.* **1974**, *82*, 389–398. [[CrossRef](#)]
30. Schmidt, P.; Strauss, R.P. The prediction of occupation using multiple logit models. *Int. Econ. Rev.* **1975**, *16*, 471–486. [[CrossRef](#)]
31. Cramer, J.S. *The Logit Model: An Introduction for Economists*; Edward Arnold: Encino, CA, USA, 1991.
32. Siow, A. Occupational choice under uncertainty. *Econometrica* **1984**, *52*, 631–645. [[CrossRef](#)]
33. Williams, R. Using the margins command to estimate and interpret adjusted predictions and marginal effects. *Stata J.* **2012**, *12*, 308–331. [[CrossRef](#)]

34. Fundación, C.Y.D. Informe CYD 2016. Capítulo 2: Graduados Universitarios y Mercado de Trabajo. 2016. Available online: <https://www.fundacioncyd.org/publicaciones-cyd/informe-cyd-2016/> (accessed on 19 November 2022).
35. Benedict, M.E.; McClough, D.; Hoag, J. STEM: A path to self-employment & jobs? *J. Entrep. Educ.* **2012**, *15*, 99–122.
36. Ćumurović, A.; Hyll, W. Financial literacy and self-employment. *J. Consum. Aff.* **2019**, *53*, 455–487. [[CrossRef](#)]
37. Struckell, E.M.; Patel, P.C.; Ojha, D.; Oghazi, P. Financial literacy and self-employment—The moderating effect of gender and race. *J. Bus. Res.* **2022**, *139*, 639–653. [[CrossRef](#)]
38. Ketokivi, M.; McIntosh, C.N. Addressing the endogeneity dilemma in operations management research: Theoretical, empirical, and pragmatic considerations. *J. Oper. Manag.* **2017**, *52*, 1–14. [[CrossRef](#)]
39. Roberts, M.R.; Whited, T.M. Endogeneity in empirical corporate finance<sup>1</sup>. In *Handbook of the Economics of Finance*; Elsevier: Amsterdam, The Netherlands, 2013; Volume 2, pp. 493–572.
40. Fairlie, R.W.; Robb, A.M. Gender differences in business performance: Evidence from the Characteristics of Business Owners survey. *Small Bus. Econ.* **2009**, *33*, 375–395. [[CrossRef](#)]
41. Verheul, I.; Thurik, R. Start-up capital: “Does gender matter?” *Small Bus. Econ.* **2001**, *16*, 329–346. [[CrossRef](#)]
42. Dunn, T.; Holtz-Eakin, D. Financial capital, human capital, and the transition to self-employment: Evidence from intergenerational links. *J. Labor Econ.* **2000**, *18*, 282–305. [[CrossRef](#)]
43. Evans, D.S.; Leighton, L.S. Some empirical aspects of entrepreneurship. *Am. Econ. Rev.* **1989**, *79*, 519–535.
44. Pagán, R. Self-employment among people with disabilities: Evidence for Europe. *Disabil. Soc.* **2009**, *24*, 217–229. [[CrossRef](#)]
45. European Parliament. Reducing Unemployment: EU Policies Explained. Available online: <https://www.europarl.europa.eu/news/en/headlines/society/20190612STO54312/reducing-unemployment-eu-policies-explained> (accessed on 26 June 2019).
46. Global Entrepreneurship and Development Institute. (n.d.). Global Entrepreneurship Index. Available online: <http://thegedi.org/global-entrepreneurship-and-development-index/> (accessed on 19 November 2022).
47. Salas-Velasco, M. Mapping the (mis)match of university degrees in the graduate labor market. *J. Labour Mark. Res.* **2021**, *55*, 14. [[CrossRef](#)]

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