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Knocking on Employment´s Door: Internships and Job Attainment

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Abstract:

Undergraduate internships have gained popularity among students, universities, government and firms since the creation of the European Higher Education Area. However, empirical research on the relationship between internships and labour market performance of graduates is still scarce, particularly in Spain. This paper examines whether internships improve the job attainment in the short run (first employment after graduation) and in the medium /long term (employment four years later). We use the first Spanish University Graduate Job Placement Survey (2014) to estimate linear probability models and probit models. A novel econometric technique is also implemented to evaluate the sensitivity of our findings to omitted variable bias. We disentangle the internship effect on: (i) the speed to find the first job; (ii) the vertical, horizontal and skill/competence matching with the first job; (iii) being employed in the medium/ long term; (iv) the vertical and horizontal matching with the current employment; and (v) wage quintiles of the current job. Our results show that the internship experience smooths the university-to-work transition for Spanish graduates. Although internships effects on employment do not vanish in the medium/long term, there is weak evidence of positive effects on matching or wages four years after graduation.

Keyworks: Internships, employment, job attainment, Spain

JEL CODES: J21, J22, J40, C21

1. Introduction

The promotion of graduate employability has become the central mission of European higher education institutions after the implementation of the Bologna reform (Sin and Amaral, 2017). This process has assigned students a new role as consumers expecting 'value for money' from their investment in education (Edvardsson and Gaio, 2010). Due to this fact, there is an increasing concern about the professional insertion of graduates and the use of strategies that smooth the university-to-work transition.

Internships carried out before graduation are one of such strategies. Undergraduate internships are a particular type of University-Industry relationship (Frasquet et al., 2012) that has gained increased popularity among students, universities, governments and firms (Siedler et al., 2016)[1]. According to the data from the 'REFLEX project', the share of European graduates having participated in internships during higher education in 2005 varies from 22 per cent in Italy to 87 per cent in The Netherlands (Allen and Van der Velden, 2009). The most recent data from the Eurobarometer acknowledges that 46 per cent of all young European people reported undertaking an internship (European Commission, 2013).

Students may engage in this experience during the degree for different reasons. First, internships allow for the development of skills not provided at university. The practical knowledge obtained with hands-on experience may be a form of human capital that complements the endowments earned during higher education. As the accumulation of knowledge improves individual productivity, this should be reflected in higher wages at least at beginning of the professional career. This is in line with human capital theories early developed by Becker (1962), Mincer (1974), among others. Furthermore, in a context of asymmetry of information, job seekers rely on credentials to screen candidates and reduce uncertainty about their individual productivity. According to the signalling and screening theories (Arrow, 1973; Spence, 1973; Stiglitz, 1975), participating in an internship during higher education can represent a positive attribute for employers. Among graduates with the same level of education, it sends a positive signal to employers since it testifies the candidate's ability to successfully manage both internship and higher education learning. Finally, and in accordance with the theories of social capital (Granovetter, 1973; Lin, 1999), internships allow graduates to develop personal contacts and social relationships that could be relevant in the process of job seeking and for future success in the labour market.

In fact, several studies highlight the benefits of internships on the development of relational and technical skills (Kinash, et al., 2016) and the generation of realistic expectations when students face their first job (Knouse and Fontenot, 2008; Felício *et al.*, 2019). Moreover, students who complete internships report higher salaries and greater job satisfaction (Sanahuja and Ribes, 2015; Siedler *et al*., 2016; Gault *et al*., 2010). Internships also improve the adaptability to the workplace, team-playing capability, professionalism, computer communication skills, and career potential (Kalhil, 2015). Furthermore, the first approach to the labour market may also progress

[1] There is not an international agreement on the definition of internships (O´Higgins and Pinedo, 2018). These authors classify them into three categories: educational; open market internships and those undertaken as part of a publicly supported Active Market Labour Programme.

into direct employment as students may be offered full-time jobs in the firm where the internship was performed (Helyer and Lee, 2014).

However, evidence about the positive effects of internships is usually based on qualitative information (Silva et al., 2016), namely, perceptions or expectations of students, firms or academic tutors. Empirical based research on the relationship between internships and labour attainment of university graduates is still scarce and unsystematic (Miralles-Quirós and Jerez-Barroso, 2018). In particular, only a handful of studies deal with the endogeneity problem present in the estimation of internship effects. Students choose their participation in this experience according to their (observable and unobservable) characteristics that simultaneously affect their job attainment. To take this issue into account, scholars use regression analysis with covariates (Gault et al., 2010; Rigsby et al., 2013; Silva et al., 2016; Miller et al., 2017), matching estimation methods (Klein and Weiss, 2011; Weiss et al., 2014), instrumental variable techniques (Siedler et al., 2016) or randomized field experiments (Nunley et al., 2016; Baert et al., 2019). While some of these studies do not find any effect of internships on the speed to find the first job or wages, others find a positive impact on job invitation rates or wage returns, among others labour market outcomes.

Concerning undergraduate internships, 57% of Spanish university graduates have followed an internship during studies (Allen and Van der Velden, 2009), while 35% of people aged 18-35 report having participated an internship (Eurobarometer, 2013). Research on the impact of internships on labour market outcomes for the Spanish case is extremely limited. Some scholars have considered their role in specific labour market outcomes (i.e., underemployment) among other job search strategies (Albert and Davia, 2018), or in certain degrees within a single region (Pineda Herrero et al, 2016, Rodríguez Gómez et al, 2017, Gairín-Sallan et al, 2019) while others have restricted the analysis to a single university (Borra et al, 2009) or faculty (Di Meglio et al., 2019). Other recent studies have analyzed the larger issue of graduate employability (Perez et al., 2018).

The aim of this paper is to test if internships improve the job attainment of Spanish graduates. We consider job attainment in a broad sense encompassing both employment and employability[2]. Specifically, we examine internships effects on: (i) the first employment after graduation and, (ii) employment four years after graduation. As Callanan and Benzing (2004) point out, it is interesting to pay attention to the assessment of the degree of perceived fit with the chosen occupation some years after graduation. Concerning measures related to the first employment, we consider the speed to find a job and its match with skills, degree and field of study. The probability of being employed, the match between the job and the degree and field of study as well as wage quintiles are the measures analyzed four years after graduation. Linear probability models and Probit models are estimated on the basis of first University Graduate Job Placement Survey (EILU, 2014) conducted by the Spanish National Institute of Statistics (INE).

[2] Although used as interchangeably terms in this research, we are aware that employability is not the same as employment. The former is a complex concept related to the skills and knowledge provided by universities that enhance the probability of finding a job, whereas the latter refers to the establishment and permanence of students in the job market after graduation (Edvardsson and Gaio, 2010). As argued by Pérez et al. (2018), higher education institutions may be directly responsible for the employability of graduates but not for their employment.

This unique dataset provides information of about 30.000 graduates from Spanish universities in 2009/2010. Regressions allow us to disentangle the effect of internships from a wide range of observable factors that may simultaneously influence graduate's labour insertion: age, sex, degrees, region of origin, ownership of the university attended, granting of scholarships, knowledge of languages, etc. Moreover, we employ a novel econometric method (Oster, 2019) to explore the potential bias generated by the omission of unobservable characteristics of graduates. In this way, we attempt to examine if the estimation results reflect a causal effect or just a simple correlation.

Our paper aims to contribute to the literature on undergraduate internships and job attainment in five different ways. To begin with, the focus on Spanish graduates is interesting because of the particular features of its job market. At present, 38.3% of people under 25 years old is unemployed in Spain, a figure only surpassed by Greece (43.4%)[3]. Moreover, the Spanish economy has the highest share of overqualified employed persons with higher education across Europe (Peréz et al., 2018). The low weight of high-skilled activities in total employment increases the likelihood of over-education or underemployment for national graduates (Peréz et al., 2018). Secondly, to the best of our knowledge, we are the firsts to empirically evaluate labour market effects of internships at national level using a large-scale dataset. Thirdly, our research examines a variety of labour market outcomes in the short term (first employment after graduation) and in the medium/long term (employment four years after graduation). In this way, we are able to explore if internships have persisting effects on time. Fourthly, our empirical analysis traces the different channels that explain the internships effect in the short term. This allow us to distinguish between the role of internships as 'doors' to the first employment from its role as generators of additional competences that help graduates to reduce the time to find a job and/or to improve the match with the job. One final contribution is related to how we deal with the self-selection problem present in our sample. Owing to the design of the survey used, we rely on a regression with a rich set of covariates that capture observable individual characteristics. In addition, the role played by unobservables is explored by means of the econometric technique of Oster (2019) that allow us to evaluate the robustness of our findings to omitted variable bias.

Our results show that the internship experience opens the door to the Spanish labour market but there is no strong evidence that offers a bridge towards long term integration in terms of matching or wages. Participation in internships increases the speed to find the first job in less than 3 months and in less than 6 month in 3.4 and 3.3 pp, respectively. Nevertheless, two thirds of this effect is due to the fact that internships sometimes become jobs: graduates continue in the same workplace after the internship experience ends. Furthermore, internships enhance the matching with the first job. In particular, they increase the probability of a good horizontal matching (related to the field of study) as well as skills/competences matching. A positive effect on vertical matching (related to the level of education) is found only for those graduates staying in the same firm where the internship took place. Estimations also confirm a positive effect in the medium and long term: participation in internships increases the probability of being employed in 2014. Nevertheless, we find no internship effects on the matching with the

[3] These are latest figures released by Eurostat (2017) for EU-15 economies.

employment four years after graduation nor on being in the first quintile and the first and second quantiles.

The reminder of the paper is structured as follows: section 2 reviews the related literature and section 3 describes the empirical specification and data. Section 4 presents the main results for the effects of internships on labour attainment and section 5 concludes.

2. Literature review

While this research focuses on internships and job attainment, undergraduate employment has become a larger issue in recent years as students are working at greater rates (Routon and Walker, 2019). Several studies analyse how work experience during tertiary (and university) education affect short and long term labour market returns (Geel and Backes-Gellner, 2012; Passaretta and Triventi, 2015; among others). Although some work experience include internships (Neumann and Rothstein, 2005), there are other job experiences no related to internships or even substitutes (Oswald Egg and Renold, 2018). Other scholars have examined internships along with other determinants of the labor insertion of graduates. Salas-Velasco (2007) analyses how long it takes European university graduates to make the transition from university to work using the CHEERS (Careers after Higher Education: An European Research Survey) Graduate Survey. They find that individual characteristics such as the field/level of studies or the socioeconomic background, and individual job search are important determinants of the probability of finding a job. Also, internships considerably reduce the job search period. Using a mixed method, Finch et al. (2013) explore a wide set of factors influencing the employability of Canadian university graduates. Based on information collected by interviewing employers, both qualitative and quantitative approaches show that internships are valuable for job-seekers and their prospective employers. However, the availability of soft-skills and of problem-solving skills are the most important factors affecting graduate employability. Kinash et al. (2016) develop a descriptive and inferential quantitative analysis across 26 Australian institutions. They identify 12 strategies that have been empirically linked to improvements in graduate employability in the literature, and conclude that internships, among others, were chosen as important by 50% or more of the stakeholder groups selected. When examining the effects of different career preparation experiences (i.e.; internships, mentoring, advanced skill courses, etc.) on initial employment success in the US, Sagen et al (2000) find that doing an internship is not significant when individual variables (gender, grade score, field of study) are included in the regressions. This result warns against the influence that individual characteristics of participants have on the outcomes of college preparation.

The impact of internships on the job attainment of recent graduates has received less attention in the academic literature. Indeed, according to Miralles-Quirós and Jerez-Barroso (2018), only nineteen articles directly related to this topic have been published in highly qualified scientific journals during the past 20 years. Most of them follow a qualitative approach and only a handful provides a quantitative approach on the subject. As Table 1 shows, the empirical strategy followed by some studies is regression analysis with covariates. Gault et al (2010) evaluate the efficacy of internships from the employer's perspective. Based on a survey conducted among

185 employers from an US business college, they find that more full-time job opportunities are found for undergraduates with internship experience. Furthermore, high performing interns are also more likely to perceive higher starting salaries. Rigsby et al. (2013) examine the relationship between the participation in accounting internships and the opportunities of finding employment in that sector. Their results suggest that internships increase the number of job offers for students who do not stay at the company where the experience was done.

Table 1. *Summary of empirical studies on internships and labour market performance*

Paper	*Country*	*Sample size*	*Dependent variable*	*Internship effect*	*Methodology*
Gault et al (2010)	United States	185	Employer willingness to hire	Positive effect on hiring if interns are self-motivated and committed to work	OLS with control for observable factors
Miller et al (2017)	United States	31.000	Propensity to seek for employment or attend graduate school	Positive effects on the odds of seeking employment after graduation	Logistic regressions with control for observable factors
Rigsby et al. (2013)	United States	82	Number of job offers received	Positive effect on offers received if interns do not stay at the firm.	Probit with control for observable factors
Silva et al. (2016)	Portugal	1.158	Unemployment rate	Positive effect on graduate employment	OLS with control for observable factors
Klein and Weiss (2011)	Germany	2.594	Speed to find the first job; employment stability; and wages	No effects on job search duration; job stability nor wages	Propensity Score Matching
Weiss et al (2014)	Germany	2,252	Job search duration, working in a service class position and wages	No effects on job search duration; class position nor wages	Propensity Score Matching
Siedler et al.(2016)	Germany	19.218	Gross monthly salary	Positive effect on wage returns	OLS and IV
Baert et al. (2019)	Belgium	1.248	Number of job interviews requested	Positive effect on job interview rate.	Randomised field experiment
Nunley et al. (2016)	United States	9.400	Number of job interviews requested	Positive effect on job interview rate.	Randomised field experiment

Notes: OLS stands for Ordinary Least Squares and IV for Instrumental variables

Silva *et al.* (2016) assesses the impact of internships on the labour market outcomes of Portuguese graduates. Using data of more than one thousand first-cycle study programmes that have been adapted to the Bologna rules, they found that mandatory internships are negatively

associated with unemployment levels[4] in 2013 (Silva *et al.*, 2016). Their results indicate that work-based learning can be used as a successful instrument to bridge theoretical knowledge with practice in order to improve graduate's employability. More recently, Silva *et al.* (2018) examine internships before (2007) and after (2013) the introduction of internships in study programmes due to the signing of the Bologna Declaration. They show that programmes including internships tend to significantly reduce graduate unemployment rate. Therefore, they argue that expanding several internships throughout first-cycle degrees can enhance the possibilities of being selected for a job. Based on a large sample of more than 30.000 senior students from the US, Miller et al (2017) suggest that participation in a high-impact practice (HIP) is a significant predictor of future career plans and early job attainment. Seniors who had done an internship had almost two and a half times greater odds of starting a new job than those who did not do an internship. According to the authors, internships give students skill development, learning opportunities, and generate networking with potential employers.

As mentioned in the introductory section, only a reduced number of studies have tried to deal with the potential identification problems associated with self-selection that are present in the estimation of internship effects. In fact, one would expect that students with higher abilities and motivation are more prone to doing internships and, at the same time, are more likely to have better labour market achievements. The empirical strategy followed by those studies includes matching estimation methods, instrumental variable techniques and randomized field experiments (see Table 1).

Klein and Weiss (2011) evaluate German compulsory internships in order to reduce the number of potential confounding factors in the estimation of their effects, as students are not able to choose their participation once enrolled in a particular programme. Using propensity score matching techniques, they do not find evidence that internships affect labour market outcomes (duration of job search, employment stability or wages five years after graduation). In a later study, Weiss et al (2014) find that mandatory internships and early work experience unrelated to the field of study do not a have impact either on job search duration or on outcomes five years after graduation. On the other hand, field-related and voluntary work experience during higher education have positive effects on the job search duration.

Siedler et al. (2016) use longitudinal data from German graduate surveys and employ a two-stage least squares approach to account for the endogeneity of the student´s decision in undertaking an internship. They employ exogenous variation in the introduction and abolishment of mandatory internships at the university level as an instrument and find positive and significant wage returns of internships five years after graduation. This result is mainly explained by a higher propensity to work full-time and a lower risk of being unemployed in the first years after entering the job market. Interestingly, higher wage returns are found for careers with weak labour market orientation that qualify students for a wide range of diverse jobs (i.e., history, philosophy, political science, arts or languages).

[4] The graduate unemployment rate used in the study refers to the percentage of unemployed graduates registered in the Employment and Vocational Training Institute (IEFP) for more than 12 months in June 2013.

In the US, Nunley et al (2016) use experimental data from a résumé audit study that randomly assigned internship experience to fictitious job applicants graduated in 2010. They find that internship experience increases the interview rate by 14%, the effect being larger for non-business graduates and for applicants with higher academic abilities. This study supports signaling as the most likely explanation regarding the effect of internships on employment opportunities. By relying on a similar methodological strategy, Baert et al (2019) find that Belgian graduates with internship experience receive 12.6% more invitations to job interviews.

For the Spanish case, no studies have addressed the impact of undergraduate internships on labour market using large-scale data. Some scholars have examined their role in the training of particular degrees (i.e, education) in the case of Catalonia (Pineda Herrero et al, 2016, Rodríguez Gómez et al, 2017, Gairín-Sallan et al, 2019). Borra et al. (2009) include internships among the determinants of the first unemployment duration for a sample of economist graduating from a large public university of Seville. Among other results, they find that working while studying and getting internships increase the probability of finding the first job sooner. The authors argue that the value of the acquired experience and the contacts established smooth the university-to-work transition. Di Meglio et al (2019) analyze how work placements affect employment and wages of economics and business administration students from a large public university of Madrid. Their results show that internships allowing for the development of communication skills and problem management abilities improve the probability of being employed and earning higher salaries, respectively. Furthermore, greater satisfaction of students and perceived usefulness of internships is closely related to gaining ICT-related skills.

On the basis of the first University Graduate Job Placement Survey (EILU, 2014), Albert and Davia (2018) estimate the impact of job search strategies on underemployment in graduates´ first jobs. Results show that institutionally supported job search strategies (i.e., by means of public employment services, university career services or internship programmes) reduce underemployment risks. In contrast, individual-driven strategies (namely, the use of temporary work agencies, reviewing ads, or contacting employers) are related with higher underemployment risks. Perez et al. (2018) also use the information provided by the EILU (2014) together with other databases to analyze the labor insertion of Spanish graduates and the determinants of their employment and employability. They find that although factors unrelated to higher education (i.e, regional job market or graduate's personal characteristics) matter for explaining labour attainment, the specific degree obtained plays a crucial role. Moreover, internships are relevant to have a (long-lasting) employment, to find it quickly and to have higher salaries, particularly if the job position is a continuation of the internship programme carried out.

3. Empirical specification and data

In the first part of this section, we introduce the empirical specification used in the estimations. In the second part, we present the main characteristics of the dataset used.

3.1. Empirical specification

To measure the effect of internships on different performance variables of the labour market we estimate the following equation:

$$y_i = \beta_1 \, Internships_i + \beta_2 \, Extra \; Internships_i + \sum_k \beta_k x_{ik} + u_i \,, \qquad [1]$$

where y_i is the dependent variable, $Internships_i$ is a dummy variable that equals 1 if the graduate has participated in a curricular internship and constitutes the main explanatory variable whose effect we want to estimate, $Extra\ Internships_i$ is a dummy variable that equals 1 if the graduate took part in an internship that it is not part of the curriculum of the degree, x_{ik} are sets of k control variables, β is the vector of coefficients and u_i is the iid error term.

The set of dependent variables of our study is composed of different quantitative measures of job attainment for Spanish graduates in 2009/2010. Due to the information provided by the survey we distinguish two broad types of outputs: those related with the first employment and those related with the employment in 2014 (four years after graduation). This way, we are able to examine internships effects both in the short and in the medium/long run.

Regarding first employment, we analyse the effect of internships on the on the time to find a job and on the fitness between graduates´ competences and the type of job found. Specifically, we consider three measures of fitness: vertical matching (concerning level of education), horizontal matching (concerning field of study) and skills/competences matching. [5]

Regarding employment in 2014, we analyse if the individual is employed or not, the fitness with the job (in this case, only vertical and horizontal matching can be considered) and salary.

Nunley *et al.* (2016) point out that the identification of the effect of internships on measures of labour market performance is not easy because high-ability students are more likely to obtain internships and, in this sense, these graduates would also tend to have higher success in labour attainment[6]. It is relevant to distinguish if participation in internships reveals innate ability (or motivation) or actually increases a set of skills on graduates.

We want to analyse the causal effect of internships on different indicators of employability. However, due to the design of the survey, it is not feasible to pursue an identification strategy specially aimed at achieving causal effects (such as instrumental variables, regression discontinuity design or differences in differences). Accordingly, we have to rely on a regression

[5] Empirical literature analyzing underemployment in labor market usually measures vertical mismatch (over-education or over-qualification), horizontal mismatch and skills/competences mismatch, among others indicators. In this paper, we define the complementary concept in order to facilitate the interpretation of our econometric results.
[6] They think that the scarce number of quantitative studies studying the impact of internships on labor market performance can be due to the lack of data on internships and/or the problems associated with identification.

with covariates. We have made an effort to include all the observable individual characteristics that may be related to internships and employability.

On the one hand, we include personal observable characteristics (gender and age) and some indicators proxying for individual skills or attitudes: having studied some undergraduate course abroad, being awarded an excellent or collaboration undergraduate scholarship, or having reported a language certificate. We also control by the achievement of additional degrees, such as a Master degree or vocational training, and by the public or private nature of the university where the degree was obtained. Finally, we include fixed effects for regions and degrees. We want to highlight the importance of using fixed effects for the 120 degrees available in Spain in 2009/2010 because it allows for the comparison of much more homogenous situations. While we are able to control for the exact subject of study, previous studies on internships control for areas of study (Siedler et al., 2016); fields of study (Klein and Weiss, 2011; Baert et al., 2019), business/non-business degrees (Nunley et al., 2016).

We are aware that there are still unobservable individual characteristics that we are not able to include in our estimations. To explore the potential bias generated by the omission of these characteristics we rely on the Oster's method (Oster, 2019). The goal of the method is to estimate the lower bound of the effect if the selection on unobservables is proportional to the selection on observables. The method is explained with more detail in the Appendix 1.

Moreover, our regressions also trace the different channels that explain the internships effect on the speed or fit of the first employment. To this aim, we augment our specification with a set of dummy variables that refer to the different channels that graduates used to find a job during the degree and after graduation. One of the possibilities is that they stayed in the same firm where they did the internship so that we can distinguish between the role of internships as 'doors' to the first employment from its role as generators of additional competences that help the students to reduce the time to find a job and/or to improve the fitness with the job. Additional channels used to find a job are: ads in the newspaper or/and internet, public and university employment services, temporary work agencies, contacting the employer or relatives or friends, being contacted by the employer, preparing public state exams or starting up their own business.

We start by using OLS in every specification so that results provide a constant marginal effect that is the one analysed using the Oster's model. Of course, as our dependent variables are binary, marginal effects cannot be constant. Therefore, we use Probit models to analyse the distribution of the effects across the different individuals in our sample.

Following the theoretical models previously discussed and most of the empirical evidence and (i.e, Silva et al. 2016 and 2018, Siedler et al., 2016, Miller et al. 2017), we would expect that having participated in an internship has a positive effect on all our dependent variables.

3.2. Data

The database used in the empirical analysis is provided by the Spanish Institute of Statistics (INE). The first University Graduate Job Placement Survey 2014 (*Encuesta de Inserción Laboral de los Titulados Universitarios*, EILU) provides information about the employment situation of graduates in 2014, as well as some aspects of their job placement. The data has been collected using both administrative records[7] and direct surveys to university graduates.

The sample provides information of 30,379 graduates in the course 2009-2010. At that time, most Spanish universities had short and long-cycle programmes[8]. As 2009-2010 was the second year of the Bologna system implementation in Spain, only about 3% of the graduates of the sample had studied a degree of a 4 years programme. The fieldwork was conducted during September 2014 and February 2015 in order to leave a margin to the graduates of at least three years after the completion of the studies to stabilize their relationship with the labour market.

The data have been weighted to be representative at national level by degrees (short and long cycle), at regional level (17 autonomous regions) and at university level by branches of knowledge (see, INE 2016, for a detailed explanation of the methodology).

The definitions and descriptive statistics of all the dependent variables examined in the empirical analysis are shown in Table 2. As explained in the previous subsection, the dependent variables of our study are different quantitative measures of job attainment related to the first employment and the employment in 2014 (four years after graduation). Regarding the first employment, more than 30% (49%) of the graduates got the first job in less than three (six) months after graduation.

Concerning first employment, the survey allows us to define three different measures of the adequacy of the job to the graduates´ competences. The first one is a measure of vertical matching (when a worker has the qualification required by the job). The survey considers five categories of qualification: PhD, university degree, non-university tertiary education (vocational), higher-secondary post-compulsory education (vocational or general programmes) and compulsory education or less. We consider that graduates have a vertical match when the required qualification for the first job is equal or above the university degree. As Table 2 shows, 66% of our graduates report that the qualification required for the first job is a university degree or a PhD.[9]

The second measure refers to horizontal matching. Graduates were asked which was the most appropriate field of education for their first job upon graduation and they had four possible answers: “just my own field of study”, “my own field study and some related one”, “a completely different field of study” and “no particular field”. We identify an horizontal matching when

[7] Administrative records used in the dataset are from: the Integrated University Information System (*SIIU*), Social Security System (*TGSS*), Public Employment Services (*SEPE*), National Dataset of Persons with Disabilities (*BEPD*) and the census.

[8] Short-cycle corresponds to 3 years programmes (*Diplomaturas,* Teacher training school, and Technical Engineering) and long-cycle refers to 5 years programmes (*Licenciaturas*) and 6 years programmes (Engineering, Architecture and Medicine). Specifically, 43% (54%) of our graduates have studied a short-cycle (long-cycle) programmes (see table A1).

[9] We do not have information about how many graduates of our sample have a PhD but only 244 graduates of the sample declare that a PhD is the qualification required for his/her first job.

graduates reported one of the first two answers. According to this definition, almost 73% of the graduates have experienced field of study match in their first job.

The last measure refers to the skills/competences matching: a skill deficit signals the inadequacy of a worker´s skills relative to the requirements of her/his job. The opposite, over-skilling, occurs when a worker´s skills exceed those required by her/his job. This result is compatible with a type of underemployment referred as over-education /over-qualification as a consequence of vertical mistmach and with under-education /under-skilled (their first job requires some skills not provided by the University degree) (see Quintini, 2011). Skills/competences matching occurs when graduates report having used the knowledge and/or skills obtained in the degree at university in the first job. According to this definition more than 60% of the graduates, have experienced a skills/competences matching.[10]

Regarding the employment in 2014 (four years after graduation), two measures can be used. When considering the data of administrative records, around 68.5% of the graduates was affiliated to the social security in 68.5 in 2014. A complementary measure used in the analysis is the self-reported employment in 2014 given by the interviewers. With this variable the average percentage of graduates working in 2014 is slightly larger, 75.7%, than the figure provided by administrative records. The differences between both data could be due to various reasons: some individuals with sporadic jobs or with non-standard forms of employment such us open-market internships (O´Higgins and Pinedo, 2018), some individuals working abroad and some individuals working in the informal economy.

As in the case of the first job, the survey also provides information about the vertical and horizontal matching in the current job after four years of the graduation. [11] As Table 2 shows, the required qualification for the job in 2014 of 76% of our graduates is equal or above her university degree. Regarding horizontal matching, 77% of workers in 2014 report that the most appropriate field of education for their current job is her/his own field of study or some related one.

We also consider an indirect measure of the quality of the job. Specifically, using Social Security data, we classify the graduates in terms of the salary that they earned in 2014. Therefore, 20% (40%) of affiliated to social security in 2014 earned a salary in the quintile 1 (quintiles 1 and 2).

Regarding the independent variables (see Table 3), more than 60% of our graduates have participated in an internship during their degree. This percentage reduces to 31.4% when we consider participation in an extra internships. The survey also provides information about the different channels that graduates use to find the first job. The answers are not exclusive, i.e., the interviewees can select as many channels as they have used. Specifically, they may have found that job through ads in the newspaper or/and internet, public and university employment services, temporary work agencies, by contacting the employer or relatives or friends, by being contacted by the employer, by continuing with the internship, by preparing public state exams or starting up their own business. The most common channel used to find the first job is contacting the employer or relatives or friends (38.1%) and through ads in the newspaper or/and

[10] Albert and Davia (2018) use the same database to analyze the impact of different job search strategies on vertical, horizontal and skills mismatch. Our dependent variables are complementary those used for them.
[11] The survey does not provide information about skills/competences matching for the current job.

internet (33.3%). The use of public agencies is also important (22.1%). It is relevant for our analysis that 8.1% of the graduates continued with the internship they had during the degree.

Table 2
Description of the dependent variables

Variable	Definition	Average	N
	Dummy that takes values 1 if the graduate		
First employment after graduation			
Speed to find the first job			
Conditional on having found a job different from the job had during the degree			
Find job 3m	got the first job in less than three months	0.333	20,761
Find job 6m	got the first job in less than six months	0.492	20,761
Adequacy of the first job to the graduate's degree/field of study/competences			
Vertical matching	reports that the required qualification for the (first) job is equal or above her university degree	0,662	28,580
Horizontal matching	reports that her own field of study and/or a related one are appropriate for her (first) job	0.726	28,580
Skills/competences matching	has used knowledge and/or skills obtained in her university degree	0.631	28,580
Employment four years after graduation (2014)			
Conditional on having searched for a job			
Employed in 2014	affiliated to the social security in 2014	0.685	29,973
Self-reported employed in 2014	declares that is working in 2014	0.757	29,973
Adequacy of the current job to the worker's degree/field of study			
Vertical matching	reports that the required qualification for the (current) job is equal or above her/his university degree	0.758	22,679
Horizontal matching	reports that her own field of study or a related one are appropriate for her (current) job	0.774	22,679
Wages:			
Conditional on being affiliated to the social security			
Quintile 1	earned a salary in the quintile 1 in 2014	0.199	17,777
Quintiles 1 and 2	earned a salary in the quintiles 1 and 2 in 2014	0.398	17,777

Source: University Graduate Job Placement Survey (2014) and own elaboration.

Regarding the control variables, about 40% of our graduates are men, almost 60% is younger than 30 years old in 2014, 22.7% are still studying[12] when interviewed, and around 60% has been working during the degree.

Most graduates have studied in a public university (86.1%) and the most common field is Social Sciences and Law (44.3%), followed by Engineering & Architecture (22.4%). The smallest percentage corresponds to graduates in Sciences (9.7%) (see Table A1).

About 14% of the sample has studied some undergraduate course abroad, 9.3% has been awarded with a scholarship to study abroad and 6.1% with an excellent or collaboration

[12] Another university degree, a Master degree, a PhD or vocational training studies.

undergraduate scholarship. Almost 35% of the graduates have obtained a Master degree (MSc) in Spain.

Regarding the regional dummies, Madrid, Andalucía, Cataluña and Comunitat Valenciana are the regions with the higher number of graduates: 15.1%, 11.7%, 11.1% and 8.4% of the sample, respectively (see Table A2).

Table 3
Description of the independent variables

Variable	Definition	Average	N
	Dummy that takes values 1 if the graduate		
Internships	has participated in an internship during the degree	0.635	29,023
Extra Internships	has participated in an undergraduate internship that it is not part of the curriculum of the degree	0.314	29,023
Channels to find the first job			
Find_ads	found the job by ads in the newspapers and/or Internet	0.333	26,538
Find_pubserv	found the job using public or university employment services	0.221	26,538
Find_twa	found the job through temporary work agencies	0.104	26,538
Find_pers	found the job by contacting the employer/relatives/friends	0.381	26,538
Find_employer	found the job by being contacted by the employer	0.137	26,538
Find_internships	continued with the internships	0.081	26,538
Find_public state exams	prepared public state exams	0.120	26,538
Find_entrepreneurs	started up a business	0.050	26,538
Control variables			
Foreign grant	has been awarded an undergraduate scholarship to study abroad (included ERASMUS)	0.093	30,379
Grant	has been awarded an excellence or collaboration undergraduate scholarship	0.061	30,379
Language certificate	has reported a language official title	0.487	30,379
Male	is a male	0.403	30,379
MSc	has studied a MSc in Spain	0.346	29,007
Public university	has obtained the degree in a public university	0.861	30,379
Student in 2014	is still studying in 2014	0.227	28,828
Student_abroad	has studied some undergraduate course abroad	0.142	29,000
Student_job	has had a paid job during the degree	0.595	30,379
Vocational training	has completed Vocational Training studies	0.008	30,379
Younger 30	is younger than 30 years old	0.590	30,379
Degrees	1-121 degrees (see Table A1 of Appendix 2)		
Regions	1-17 regions (see Table A2 of Appendix 2)		

Source: University Graduate Job Placement Survey (2004) and own elaboration.

4. Results

In this section we present the results of the impact of internships on different indicators of labour market performance. First, we deal with indicators related to the first job upon graduation and, second, we deal with indicators related to the employment in 2014.

4.1 First employment

4.1.1. Speed to find the first job

Table 4 shows the results on the speed of finding the first job. For this analysis, we have excluded those individuals that stayed in the job they had when already. Degree and regional fixed effects are included in the estimates.

Columns (1) and (2) show the effect of internships on finding a job in less than 3 months and less than 6 months, respectively. We observe that, in both cases, the effect of internships is positive and significant: participation in internships increases the speed to find a job in less than 3 months in 3.4 pp and in 3.3.pp in less than 6 months. In column (1), 33.2% of individuals found employment in less than 3 months so that the effect of internships is around a 10% in the probability to find a job in less than 3 months, while in column (2), 49.0% of individuals found employment in less than 6 months so that the effect of internships is a 6.7% increase in the probability of finding a job in less than 6 months.

We are concerned with the fact that there may be some unobservables that may be biasing upwards our estimates. To delve into the issue we apply the Osters' method and we find that the lower limit for the effect, assuming that selection on unobservables is as severe as selection on observables is 2.65pp (7.5% increase) for the less than 3 months variables and 2.23pp (4.55% increase) for the less than 6 months variables. That is, it looks like that there exists an important causal effect of internships on the speed to find the first job.

In addition, we estimate a Probit model and report the results of the distribution of marginal effects in different points of the sampling distribution in Table 5 (Probit regression results are available in Appendix 3). That is, Table 5 provides the distribution of marginal effects of internships accross the individuals composing our sample. We can see that the median effect from Probit models is a bit higher than the OLS effect (3.6 pp for less than 3 months and 3.5 pp for less than 6 months) and the effect is higher than 4pp for 25% of the individuals in the sample in the less than 3 months specification.

The fact that the internships reduce the job search period in Spain is in line with the findings by Salas-Velasco (2007) for young European graduates. One potential explanation for these results could be that some individuals doing internships actually stay in the same workplace after the internship ends. As we have shown in section 3.2, 8.1% of the graduates use this channel to find their first job. Columns (3) and (4) of Table 4 explore this possibility by including a new regressor: a dummy for those individuals that remain employed in the internship workplace.

Table 4. Short Term Effect of internships

	(1) Find job 3m	(2) Find job 6m	(3) Find job 3m & channel	(4) Find job 6m & channel	(5) Find job 3m & all channels	(6) Find job 6m & all channels
Internships	0.034***	0.033***	0.012	0.014*	0.012	0.014*
	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]
Extrainternships	-0.026***	-0.028***	-0.036***	-0.035***	-0.034***	-0.035***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Foreign grant	-0.048***	-0.028	-0.050***	-0.032*	-0.049***	-0.031*
	[0.017]	[0.018]	[0.017]	[0.018]	[0.017]	[0.018]
Grant	0.039***	0.067***	0.038***	0.065***	0.034***	0.064***
	[0.013]	[0.013]	[0.013]	[0.013]	[0.013]	[0.013]
Language certificate	-0.025***	-0.037***	-0.025***	-0.037***	-0.023***	-0.036***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Male	0.016**	0.020**	0.018**	0.022***	0.016**	0.020***
	[0.007]	[0.008]	[0.007]	[0.008]	[0.007]	[0.008]
Msc	-0.046***	-0.085***	-0.048***	-0.086***	-0.050***	-0.088***
	[0.007]	[0.008]	[0.007]	[0.008]	[0.007]	[0.008]
Public university	-0.012	-0.024**	-0.013	-0.024**	-0.011	-0.023**
	[0.011]	[0.011]	[0.011]	[0.011]	[0.011]	[0.011]
Student_abroad	0.048***	0.052***	0.050***	0.055***	0.048***	0.051***
	[0.015]	[0.016]	[0.015]	[0.016]	[0.015]	[0.016]
Student_job	0.055***	0.082***	0.056***	0.084***	0.057***	0.082***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Vocational training	-0.007	-0.015	-0.004	-0.013	-0.005	-0.013
	[0.013]	[0.013]	[0.013]	[0.014]	[0.013]	[0.013]
Younger30	-0.050***	-0.059***	-0.051***	-0.061***	-0.055***	-0.066***
	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]
Find_internships			0.245***	0.196***	0.229***	0.189***
			[0.013]	[0.012]	[0.013]	[0.012]
Find_ads					-0.045***	-0.009
					[0.007]	[0.008]
Find_pubserv					-0.031***	-0.023***
					[0.008]	[0.008]
Find_twa					-0.050***	-0.063***
					[0.011]	[0.012]
Find_pers					-0.000	0.016**
					[0.007]	[0.007]
Find_employer					0.059***	0.060***
					[0.009]	[0.010]
Find_public_exams					-0.084***	-0.123***
					[0.011]	[0.013]
Find_entrepreneurs					-0.010	-0.052***
					[0.016]	[0.017]
Constant	0.380***	0.521***	0.376***	0.506***	0.404***	0.525***
	[0.060]	[0.063]	[0.061]	[0.063]	[0.061]	[0.064]
N	19624	19624	19387	19387	19387	19387

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5. Marginal effects of internships in speed to find first employment

	(1) Find job 3m	(2) Find job 6m
1%	0.013	0.015
5%	0.021	0.022
10%	0.025	0.026
25%	0.030	0.031
50%	0.036	0.035
75%	0.040	0.036
90%	0.041	0.037
95%	0.041	0.037
99%	0.041	0.037

The impact of this variable, *find_internships*, is positive and significant, and the coefficient estimated for internships is now around one third of the previous one, becoming insignificant in the shorter run. That is, we estimate that approximately two thirds of the effect of internships in the speed to find a job is due to the fact that internships sometimes become jobs, while the remaining one third is due to different reasons, such as increase in students' competences.

In columns (5) and (6) of Table 4 we explore if the remaining effect could be due to an improvement in other channels used to find a job. We find that coefficients for internships remain exactly the same as in columns (3) and (4). Therefore, it seems that the internship effect on the speed of finding a job is not driven by this fact.

Regarding covariates, on the one hand, extra-internships show a negative effect as well as studying an MSc and, to some extent, achieving a foreign grant. Younger students are usually slower in finding a job. On the other hand, males, students with excellence grant, those having studied abroad or having worked during the degree are more likely to find a job faster. Despite the ownership of the university does not seem to affect the speed to find a job in the *short run*, those graduates from private universities are faster in finding a job in less than 6 months. As Sin and Amaral (2017) point out, this may reflect the fact that private institutions have higher levels of collaboration with employers and offer greater support and guidance to graduates searching for a job (i.e: job fairs or professional training activities). Regarding other channels to find a job, being contacted by the employer or contacting the employer, relatives or friends also reduce the speed to find a job. The rest of strategies negatively affect the probability to find a job in a short run.

4.1.2. Matching with the first job

Table 6 shows the effect of internships on the matching between the degree and the first job. The estimation excludes from the sample those individuals that stayed in the same job they had while studying. Degree and regional fixed effects are included in the estimates. Column (1) proxies for an adequate vertical matching. As we have explained in the previous section, this variable takes value 1 if an university degree (or a PhD) was the more adequate training level for

the job. Column (3) proxies for an adequate horizontal matching. This variables takes value 1 if the field of study more adequate for the job was the field of the degree or some related field. Column (5) uses the skills/competences matching as the dependent variable. This variable takes value 1 if the knowledge and abilities acquired in the degree were used in the job. Columns (2), (4) and (6) augment the regression to explore the influence of staying in the internship workplace as a channel of the effect.

Results from columns (1), (3) and (5) show that internships improve the horizontal matching as well as skills/competences matching, while show no effect on vertical matching. More precisely, the effect for the horizontal matching is 2.7pp and 33.06% of individuals report lack of horizontal matching so that the relative effect of internships of horizontal matching is an 8.17% reduction in lack of horizontal matching. As Nunley *et al.* (2016) point out "employers in the field of banking may use internship experience in the banking sector as a signal of fit or a desire on the part of applicants to continue working in the banking sector. Such a signal could improve the quality of employer–employee matches". On the other hand, the effect is 4.4pp for the skills/competences matching. 32.65% of individuals report lack of fitness so that the relative effect of internships is a 13.4% decrease in the lack of skills/competences matching.

Again, we are concerned with the fact that there may be some unobservables that would be biasing upwards our estimates. To delve into the issue we apply the Osters' method and we find that the lower limit for the effect, assuming that selection on unobservables is as severe as selection on observables, is 3.14pp (a 10.41% reduction in lack of fitness) for the fitness variable and 1.53pp (a 4.63% reduction in lack of horizontal matching) for the horizontal matching. That is, it looks like that there exists an important causal effect of internships on the skills/competences matching and the horizontal matching between degrees and first jobs.

In addition, we estimate a Probit model and report the results of the distribution of marginal effects in different points of the sampling distribution in Table 7. We observe that the median effect from Probit models is a bit higher than the OLS effect (4.8pp for fitness and 3.0pp for horizontal matching). We observe that the effect on skills/competences matching is higher than 4pp for more than 75% of individuals in the sample. The effect on horizontal matching is higher than 2.3pp for 75% of the individuals in the sample.

In columns (2), (4) and (6) we explore the importance of staying in the same firm where the internship took place on the internship effect. We observe that, when we include this variable, the coefficient of internships on skills/competences matching is reduced by 36%, while the coefficient of internships on horizontal matching is reduced by 33%. That is, approximately one third of the internship effect on both types of matching can be attributed to individuals staying in the same workplace, but around two thirds of the effects is due to other reasons, such as improvement of competences or signalling in the market. Regarding vertical matching, although internship does not affect this variable, staying in the same firm where the internship took place increases the vertical matching in 10.2 pp. Our results are in accordance with Albert and Davia (2018) that analyze the impact of different job search strategies on underemployment (overeducation, skills/knowledge underutilization and mismatch in the field of education).

Table 6. Internship effect on employment matching

	(1) Vertical matching	(2) Vertical matching	(3) Horizontal matching	(4) Horizontal matching	(5) Skills/competences matching	(6) Skills/competences matching
Internships	0.007	0.001	0.027***	0.018**	0.044***	0.028***
	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]
Extra internships	0.004	0.001	0.007	0.005	0.013*	0.005
	[0.007]	[0.007]	[0.006]	[0.007]	[0.007]	[0.007]
Foreign grant	-0.050***	-0.048***	-0.027*	-0.025	0.000	-0.005
	[0.016]	[0.016]	[0.015]	[0.015]	[0.017]	[0.017]
Grant	0.070***	0.064***	0.055***	0.050***	0.041***	0.046***
	[0.012]	[0.012]	[0.011]	[0.011]	[0.012]	[0.012]
Language certificate	0.029***	0.029***	0.014**	0.014**	0.021***	0.020***
	[0.007]	[0.007]	[0.006]	[0.006]	[0.007]	[0.007]
Male	0.023***	0.023***	0.009	0.008	0.025***	0.028***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Msc	0.040***	0.039***	0.044***	0.042***	0.039***	0.040***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Public university	-0.044***	-0.043***	-0.027***	-0.025***	-0.046***	-0.046***
	[0.010]	[0.010]	[0.009]	[0.009]	[0.010]	[0.010]
Student_abroad	0.062***	0.063***	0.026**	0.026**	-0.003	-0.001
	[0.014]	[0.014]	[0.013]	[0.013]	[0.015]	[0.015]
Student_job	-0.060***	-0.059***	-0.055***	-0.054***	-0.022***	-0.023***
	[0.007]	[0.007]	[0.006]	[0.006]	[0.007]	[0.007]
Vocational training	-0.047***	-0.047***	0.010	0.012	-0.003	-0.001
	[0.013]	[0.013]	[0.012]	[0.012]	[0.013]	[0.013]
Younger30	0.001	0.001	-0.004	-0.005	0.006	0.006
	[0.008]	[0.008]	[0.007]	[0.007]	[0.008]	[0.008]
Find_internships		0.102***		0.127***		0.149***
		[0.012]		[0.010]		[0.011]
_cons	0.855***	0.849***	0.830***	0.805***	0.698***	0.752***
	[0.058]	[0.059]	[0.056]	[0.058]	[0.061]	[0.061]
N	19624	19387	19624	19387	19624	19387

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Regarding covariates, we find that the matching is better in every indicator for individuals receiving a grant, those with an MSc and those having a language certification while the matching is worse for those studying in public universities and for those working while studying. Being a male improves skills/competences matching and vertical matching, but not horizontal matching, receiving a foreign grant reduces vertical matching and horizontal matching, while studying abroad improves it. Finally, vocational training naturally reduces vertical matching.

Table 7. Marginal effects of internships on horizontal and skills/competences matching between degree and first job

	(1) Horizontal matching	(2) Skills/competences matching
1%	0.004	0.009
5%	0.008	0.020
10%	0.011	0.025
25%	0.023	0.041
50%	0.030	0.048
75%	0.035	0.052
90%	0.036	0.052
95%	0.037	0.052
99%	0.037	0.052

4.2 Employment after 4 years from graduation

4.2.1. Being employed

We analyze the employment status of individuals 4 years after graduation. We use two different sources of data. Column (1) in Table 8 uses social security data while column (2) uses self-reported data. As we have noted in the previous section, there are some reasons for these two indicators to differ: people working abroad for a foreign company will not be included in social security records, people working discontinuously or employed in an open-market internship or people working illegally. Graduates that report that they have never searched for a job have been excluded. Degree and regional fixed effects are included in the estimates.

The estimation of the effect of internships is 2.3pp with the social security data and 1.01pp with the self-reported data. These figures unveil an important relative effect. According to social security data, 30.87% of individuals do not have an employment so that the effect of internships would a 7.5% reduction in unemployment likelihood. On the other hand, according to self-reported data, 24.72% of individuals do not have an employment so that the effect of internships would be a 4.1% reduction in unemployment likelihood.

As in previous analysis, we calculate the lower limit of the internship effect using the Oster's method. This figure is 1.03pp (3.3% reduction in unemployment rate) using social security data and 1pp (4% reduction in unemployment rate) using self-reported data[13].

Table 8. Internship effect on being employed (2014)

	(1) Affiliated to Security Social	(2) Self-reported employed
Internships	0.023***	0.010*
	[0.007]	[0.006]
Extra internships	-0.007	-0.016***
	[0.006]	[0.006]
Foreign grant	0.014	0.029**
	[0.016]	[0.014]
Grant	0.043***	0.028***
	[0.011]	[0.010]
Language certificate	-0.051***	0.003
	[0.006]	[0.005]
Male	-0.012*	0.014**
	[0.006]	[0.006]
Msc	0.021***	-0.003
	[0.006]	[0.006]
Public university	-0.008	-0.017**
	[0.008]	[0.008]
Student_abroad	-0.028**	0.005
	[0.014]	[0.012]
Student_job	0.083***	0.105***
	[0.006]	[0.006]
Student in 2014	-0.015**	-0.059***
	[0.007]	[0.006]
Vocational training	0.001	-0.004
	[0.010]	[0.009]
Younger30	0.008	0.009
	[0.006]	[0.006]
_cons	0.597***	0.770***
	[0.043]	[0.040]
N	28425	28425

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9 reports the distribution of marginal effects in the sample according to Probit model. Median effect is 2.5pp when using social security data and 1.1pp when using self-reported data. The distribution shows that the effect is higher than 2.1pp and 0.8pp for 75% of individuals using social security data and self-reported data respectively.

Regarding the covariates, only having a grant and having a job during the degree show a positive coefficient on both indicators of employment while being still studying in 2014 shows a negative

[13] The reason why the lower limit almost equals the coefficient is that the estimated effect with and without covariates are very closed.

effect on both. Extra-internships show a negative effect on self-reported status as studying in a public university. Conversely, foreign grant shows a positive coefficient on self-reported status only. Regarding social security records, there are some striking results, such as a negative coefficient for males and for those individuals with a foreign language certification.

Table 9. Marginal effects of internships on employment (2014)

	(1) Affiliated to Security Social	(2) Self-reported employed
1%	0.004	0.001
5%	0.013	0.004
10%	0.016	0.006
25%	0.021	0.008
50%	0.025	0.011
75%	0.027	0.013
90%	0.028	0.014
95%	0.028	0.014
99%	0.028	0.014

4.2.2. Matching with the current employment

Table 10 reports the results for the effect of internships on the matching between the degree and current employment. Degree and regional fixed effects are included in the estimates. We only analyze vertical and horizontal matching because, as we explained in the previous section, the indicator of skills is available only for the first employment. As in the case of the first employment we observe no effect of internships on vertical matching but a positive effect on horizontal matching, although the magnitude of this positive effect is a bit smaller than in the analysis of first employment. More precisely, the estimation is 1.4pp and 23.4% of individuals report lack of horizontal matching so that internships reduce the likelihood of lack of horizontal matching by 5.98%.

When we use the Oster method to calculate the lower limit of the effect we obtain that this is practically zero. Accordingly, if selection on unobservables is of the same importance as selection on observables, there is no evidence of a positive causal effect of internships on horizontal matching with current employment, despite the estimation being positive and significant. Of course, this does not imply that there does not exist such effect, since absence of evidence is not the same as evidence of absence[14].

Regarding covariates, both vertical and horizontal matching are positively influenced by extra internships, having received a grant, being a male, having a Msc, having studied abroad, having

[14] The bias due to unobservables should be 84% or lower than bias due to observables for the lower limit of the effect being positive.

a language certificate and being younger than 30 and are negatively influenced by studying on a public university, having a job while studying and doing vocational training.

Table 10. Internship effect on matching (2014)

	(1) Vertical matching	(2) Horizontal matching
Internships	-0.002	0.014**
	[0.007]	[0.007]
Extra internships	0.016***	0.029***
	[0.006]	[0.006]
Foreign grant	-0.017	-0.015
	[0.014]	[0.014]
Grant	0.042***	0.025**
	[0.010]	[0.010]
Language certificate	0.043***	0.019***
	[0.006]	[0.006]
Male	0.029***	0.012*
	[0.006]	[0.006]
Msc	0.060***	0.044***
	[0.006]	[0.006]
Public university	-0.059***	-0.032***
	[0.008]	[0.008]
Student_abroad	0.064***	0.044***
	[0.012]	[0.012]
Student_job	-0.011*	-0.016***
	[0.006]	[0.006]
Vocational training	-0.065***	-0.022**
	[0.011]	[0.011]
Younger30	0.014**	0.028***
	[0.007]	[0.006]
_cons	0.857***	0.754***
	[0.042]	[0.039]
N	21545	21545

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.2.3. Wages

Table 11 shows the effect of internships on wages four years after the degree has finished. This analysis uses social security data and, consequently, it only takes into account those individuals that had a job in 2014 according to social security records. That is, the analysis would be representative only on the population of workers with social security code[15]. Degree and regional fixed effects are included in the estimates.

[15] To be able to extrapolate these results to the whole population of students a correction of sample selection should be employed. Unfortunately, there is no proper identifier at our disposal so that such a model could be estimated.

Table 11. Internship Effect on wages (2014)

	(1) Quintile 1	(2) Quintiles 1 and 2
Internships	0.003	0.016**
	[0.007]	[0.008]
Extra internships	0.013**	0.015*
	[0.007]	[0.008]
Foreign grant	0.007	0.025
	[0.016]	[0.020]
Grant	-0.023**	-0.011
	[0.011]	[0.014]
Language certificate	-0.002	-0.019***
	[0.006]	[0.007]
Male	-0.034***	-0.084***
	[0.007]	[0.008]
Msc	0.031***	0.038***
	[0.007]	[0.008]
Public university	0.002	0.042***
	[0.009]	[0.011]
Student_abroad	-0.021	-0.039**
	[0.014]	[0.017]
Student_job	-0.042***	-0.049***
	[0.007]	[0.008]
Student in 2014	0.008	0.030***
	[0.008]	[0.009]
Vocational training	0.023**	0.006
	[0.011]	[0.013]
Younger30	0.065***	0.096***
	[0.007]	[0.008]
_cons	0.057	0.042
	[0.048]	[0.057]
N	16990	16990

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Results show that internships have a positive effect on being in the first two quintiles of the wage distribution. More precisely, it increases the likelihood of being in one of these two quintiles by 1.6pp. However, no significant effect is found on being just in the first quintile.

Actually, the Oster's method shows that the lower limit of the effect is negative so that it is likely that the positive coefficient we observe is just a correlation and may be contaminated by unobservable characteristics of individuals. More precisely, for the lower limit of the effect to be exactly zero the bias due to selection on unobservables should be only 46% of the bias due to selection on observables.

Regarding covariates, being a male and having a job while studying show a negative effect on being in quintile 1 or quintiles 1 or 2 of wages while doing extra-internships, doing a Msc and being younger than 30 show positive coefficients in both specifications. Receiving a grant has a negative effect only on quintile 1 while doing vocational training shows a positive effect only on

quintile 1. On the other hand, having studied in a public university and being still a student in 2014 show a positive effect on quintiles 1 and 2 only while having studied abroad and having a language certificate shows a negative effect on quintiles 1 and 2 only.

5. Final remarks

Undergraduate internships have become one of the most important means of transition from university to working life, particularly after the implementation of the Bologna Reform. Despite this fact, there is little quantitative evidence studying the effects of internships on labour market outcomes. This can be due to the fact that, in Europe, it is not frequent to find large-scale databases to study the transition process from tertiary education to the first job (Salas-Velasco, 2007). Some studies observe that university work placements improve labor market outcomes (Gault, et al., 2010, Siedler et al., 2016, Silva et al., 2016 and 2018, among others).

Our paper attempts to contribute to this reduced number of empirical investigations. To do so, we examine if internships can improve labour market performance using the first University Graduate Job Placement Survey carried out in Spain. Such performance is understood in a broad sense, encompassing both matching (the adequacy of skills, education and field of study to the job of our graduates) and features of employment. Since our analysis takes into account different measures of job attainment in the short term (first employment after graduation) and the medium/long term (employment four years after graduation), we are able to explore if internships have persisting effects on time. Specifically, we examine internships effects on: (i) the speed to find the first job; (ii) the vertical, horizontal and skills matching; (iii) the probability of being employed in the medium/long term; (iii) the vertical and horizontal matching with the current job and (iv) wage quintiles four years after graduation. The linear probability models and probit models estimated include an abundant number of explanatory variables. By controlling these potential confounding factors (influencing both internships and performance), we attempt to deal with the endogeneity problem present in the estimation of internships effects. In addition, we use the Oster´s method to explore the potential bias generated by the omission of unobservable characteristics of graduates. In this way, we attempt to examine if the estimation results reflect a casual effect or just a simple correlation.

Our results show that internships open the door to the labour market but there is a weak evidence that they are a bridge towards long term integration in terms of matching or wages. Internships smooth the university-work transition for Spanish graduates as they reduce the time-to-find the first job and increase the probability of a good fit between the field area of study and the competence's graduates and the first job. It is worth noting that the increased speed in finding a job is largely explained by the fact that graduates continue in the same firm after the internship experience ends. Furthermore, our results show that internships effects on the probability of being employed in 2014 do not vanish in the medium and long term. However, there is no strong evidence of internships effect on the matching with the employment four years after graduation or on wages as the effects disappear when the lower limit for the effect is calculated according to the Oster's method. This analysis seems interesting taking into account the results of the school to work transition in Central and Eastern Europe in terms of length of

time needed to find a job and quality of the job that reveals marked country differences (Robert and Saar, 2012).

Therefore, although internships increase the skills and competences of the graduates in the short run positively affecting his/her human capital, productivity and wages, their impact in the medium/long run on matching and wages is less clear. These findings become relevant when considering the structure of labour market in southern European countries. Graduates from Spain and Italy have slower transitions from education to employment than individuals from Nordic countries and the highest levels of youth unemployment (Salas-Verdasco, 2007). In Spain, work experience during higher education prevents unemployment in a larger extent than in Italy, Germany or Norway (Passaretti and Triventi, 2015). Since Mediterranean countries mostly offer theoretical and academic oriented higher education, it is important to enhance the implementation of internships as an instrument to smooth early job market entry. This kind of experience may provide the hands-on skills needed to achieve a fast and suitable access and may represent a credential useful for screening potential job-seekers. Moreover, in countries such as Spain, graduates are allocated to jobs through less institutionalised mechanisms based more on informal than formal networks (Passaretti and Triventi, 2015). Therefore, internships allow for the development of personal contacts and relationships relevant for the process of job seeking. Higher education systems in Spain should design effective internships programme where the different stakeholders involve (students, firms, universities) participate in an active way.

Several aspects of this research deserve further attention and offer a promising future research agenda. First, while this study examines the diverse impact of internships in the short *versus* medium/long term, other heterogeneous effects (i.e, taking into account degrees or regional differences) deserve more analysis. Second, the National Institute of Statistics is preparing the Second University Graduate Job Placement Survey. These second wave of information will focus on graduates from the Bologna system, that generalised the implementation of internships across Spanish universities. It would be highly relevant to examine any potential changes in internships effects that may have occurred.

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Appendix 1: OSTER's method for the analysis of coefficient stability

The method departs from the key assumption that selection in the unobservables is proportional to selection in the observables. Accordingly, a lower bound of the coefficient can be calculated using the following formula:

$$\beta^* = \tilde{\beta} - \left[\dot{\beta} - \tilde{\beta}\right]\frac{R_{\max} - \tilde{R}}{\tilde{R} - \dot{R}},$$

where :

$\tilde{\beta}$ is the coefficient in the regression with full controls,

$\tilde{R}$ is the R^2 in the corresponding regression,

$\dot{\beta}$ is the coefficient in the regression without controls,

$\dot{R}$ is the R^2 in the corresponding regression, and

$R_{\max}$ is $1.3\tilde{R}$ (according to Oster's estimation).

The method can be implemented using the Stata package: psacalc

Appendix 2:

Table A1: Degrees (% of observations)

	DEGREES	Short-cycle programme	Long-cycle programme	Bologna System
001	Arquitecto		1.00	
002	Ing. Agrónomo		0.61	
003	Ing. Aeronáutico		0.20	
004	Ing. de Caminos, Canales y Puertos		0.44	
005	Ing. de Minas		0.17	
006	Ing. de Montes		0.21	
007	Ing. de Telecomunicación		0.64	
008	Ing. Industrial		1.15	
009	Ing. en Informática		1.62	
010	Ing. en Electrónica		0.17	
011	Ing. en Automática y Electrónica Industrial		0.20	
012	Ing. de Organización Industrial		0.30	
013	Ing. Químico		0.52	
014	Ing. en Geodesia y Cartografía		0.12	
015	Ing. Naval y Oceánico		0.11	
016	Ing. de Materiales		0.15	
017	Ing. Geólogo		0.13	
021	Grad. en Administración y Dirección de			0.04
022	Grad. en Ciencias de la Actividad Física y del			0.13
024	Grad. en Enfermería			0.15
025	Grad. en Fisioterapia			0.13
026	Grad. en Trabajo Social			0.16
031	Grad. en Relaciones Laborales			0.13
032	Grad. en Turismo			0.20
035	Grad. en Ingeniería Informática			0.17
037	Grad. en Ingeniería de la Edificación			1.45
038	Lic. en Farmacia		0.75	
039	Lic. en Veterinaria		1.23	
040	Lic. en Bellas Artes		1.19	

041	Lic. en Psicología		2.42
042	Lic. en Derecho		3.96
043	Lic. en Ciencias del Mar		0.27
044	Lic. en Odontología		0.44
045	Lic. en Medicina		2.35
046	Lic. en Física		0.54
047	Lic. en Geología		0.21
048	Lic. en Matemáticas		0.90
049	Lic. en Biología		1.86
050	Lic. en Bioquímica		0.34
051	Lic. en Administración y Dirección de Empresas		3.43
052	Lic. en Economía		2.23
053	Lic. en Investigación y Técnicas de Mercado		0.27
054	Lic. en Ciencias Políticas y de la Administración		0.56
055	Lic. en Sociología		0.47
056	Lic. en Publicidad y Relaciones Públicas		1.40
057	Lic. en Traducción e Interpretación		0.98
058	Lic. en Filosofía		0.38
059	Lic. en Filología Alemana		0.10
060	Lic. en Filología Árabe		0.11
061	Lic. en Filología Catalana		0.18
062	Lic. en Filología Clásica		0.16
063	Lic. en Filología Francesa		0.18
064	Lic. en Filología Gallega		0.08
065	Lic. en Filología Hispánica		0.66
066	Lic. en Filología Inglesa		1.19
067	Lic. en Filología Románica		0.05
068	Lic. en Filología Vasca		0.09
069	Lic. en Teoría de la Literatura y Literatura		0.13
070	Lic. en Geografía		0.36
071	Lic. en Historia		1.67
072	Lic. en Historia del Arte		0.91
073	Lic. en Antropología Social y Cultural		0.85
074	Lic. en Ciencia y Tecnología de los Alimentos		0.72
075	Lic. en Comunicación Audiovisual		1.56
076	Lic. en Periodismo		1.70
077	Lic. en Máquinas Navales		0.11
078	Lic. en Documentación		0.20
079	Lic. en Humanidades		0.70
080	Lic. en Lingüística		0.09
081	Lic. en Náutica y Transporte Marítimo		0.22
082	Lic. en Pedagogía		0.49
083	Lic. en Psicopedagogía		0.90
084	Lic. en Química		1.63
085	Lic. en Ciencias Actuariales y Financieras		0.25
086	Lic. en Ciencias Ambientales		1.31
087	Lic. en Ciencias de la Actividad Física y del		1.72
088	Lic. en Ciencias y Técnicas Estadísticas		0.15
089	Lic. en Historia y Ciencias de la Música		0.25
090	Lic. en Enología		0.12
091	Lic. en Ciencias del Trabajo		0.45
092	Lic. en Biotecnología		0.37
093	Lic. en Estudios de Asia Oriental		0.12
094	Lic. en Criminología		0.30
095	Ing. Téc. en Informática	0.73	
096	Dip. en Estadística	0.20	
097	Dip. en Biblioteconomía y Documentación	0.25	
098	Dip. en Enfermería	5.17	
099	Dip. en Fisioterapia	1.67	
100	Dip. en Trabajo Social	2.47	
101	Dip. en Ciencias Empresariales	2.99	

102	Dip. en Podología	0.23		
103	Dip. en Óptica y Optometría	0.42		
104	Dip. en Terapia Ocupacional	0.50		
105	Dip. en Gestión y Administración Pública	0.26		
106	Dip. en Relaciones Laborales	1.01		
107	Dip. en Logopedia	0.26		
108	Dip. en Educación Social	0.96		
109	Dip. en Máquinas Navales	0.12		
110	Dip. en Navegación Marítima	0.25		
111	Dip. en Turismo	2.39		
112	Dip. en Nutrición Humana y Dietética	0.66		
113	Maestro-Especialidad de Educación Infantil	3.67		
114	Maestro-Especialidad de Educación Primaria	2.24		
115	Maestro-Especialidad de Lengua Extranjera	1.51		
116	Maestro-Especialidad de Educación Física	1.51		
117	Maestro-Especialidad de Educación Musical	0.58		
118	Maestro-Especialidad de Educación Especial	0.96		
119	Maestro-Especialidad de Audición y Lenguaje	0.46		
120	Ing. Téc. en Topografía	0.24		
121	Ing. Téc. en Diseño Industrial	0.23		
122	Ing. Téc. en Informática de Gestión	0.94		
123	Ing. Téc. en Informática de Sistemas	1.02		
124	Ing. Téc. de Obras Públicas	0.97		
125	Ing. Téc. Industrial	2.39		
126	Ing. Téc. de Telecomunicación	0.97		
127	Arquitecto Técnico	1.40		
128	Ing. Téc. Aeronáutico	0.47		
129	Ing. Téc. Agrícola	1.50		
130	Ing. Téc. Forestal	0.56		
131	Ing. Téc. de Minas	0.52		
132	Ing. Téc. Naval	0.24		
998	Otros grados			0.34
999	Otras titulaciones (no grados)	0.18		
Type of programme	*Short-cycle programme*		43.1	
	Long-cycle programme		54.0	
	Bologna system		1.45	
Field of study	*Arts and Humanities*		10.6	
	Engineering & Architecture		22.4	
	Health		12.9	
	Sciences		9.7	
	Social Sciences and Law		44.3	
	N		30,379	

Notes: Short-cycle corresponds to 3 years programmes (*Diplomaturas* (Dip.), Teacher training school (Maestro), and Technical Engineering (Ing. Téc.)). Long-cycle refers to 5 years programmes (*Licenciaturas* (Lic.)) and 6 years programmes (Engineering (Ing.), Architecture and Medicine).

Table A2: Regions

	REGIONS	% Observations
01	Andalucía	11.7
02	Aragón	4,2
03	Asturias (Principado de)	3.4
04	Balears (Illes)	2.1
05	Canarias	3.6
06	Cantabria	1.9
07	Castilla y León	7.7
08	Castilla-La Mancha	3.0
09	Cataluña	11.1
10	Comunitat Valenciana	8.4
11	Extremadura	3.5
12	Galicia	6.3
13	Madrid (Comunidad de)	15.1
14	Murcia (Región de)	4.9
15	Navarra (Comunidad Foral de)	2.8
16	País Vasco	5.8
17	Rioja (La)	1.29
77	Universidades no presenciales	3.24
		N: 30,379

Appendix 3: Probit results

Table A3. Short term effect of internships

	(1) Find job 3m	(2) Find job 6m
Internships	0.103***	0.092***
	[0.024]	[0.024]
Extra internships	-0.078***	-0.078***
	[0.021]	[0.020]
Foreign grant	-0.137***	-0.078
	[0.051]	[0.051]
Grant	0.122***	0.192***
	[0.039]	[0.038]
Language certificate	-0.075***	-0.103***
	[0.021]	[0.020]
Male	0.049**	0.055**
	[0.022]	[0.022]
Msc	-0.143***	-0.235***
	[0.022]	[0.021]
Public university	-0.027	-0.065**
	[0.032]	[0.032]
Student abroad	0.139***	0.144***
	[0.044]	[0.045]
Student_job	0.169***	0.231***
	[0.020]	[0.020]
Vocational training	-0.022	-0.043
	[0.039]	[0.038]
Younger30	-0.155***	-0.167***
	[0.023]	[0.022]
_cons	-0.298*	0.060
	[0.171]	[0.165]
N	19624	19624

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4. Internship effect on employment matching

	(1) Vertical matching	(2) Horizontal matching	(3) Skills/competences matching
Internships	0.023	0.092***	0.131***
	[0.024]	[0.026]	[0.024]
Extra internships	0.007	0.018	0.035*
	[0.021]	[0.022]	[0.021]
Foreign grant	-0.164***	-0.091	0.004
	[0.054]	[0.056]	[0.052]
Grant	0.228***	0.204***	0.129***
	[0.041]	[0.043]	[0.040]
Language certificate	0.087***	0.046**	0.064***
	[0.021]	[0.022]	[0.021]
Male	0.071***	0.033	0.074***
	[0.023]	[0.024]	[0.023]
Msc	0.127***	0.155***	0.121***
	[0.022]	[0.024]	[0.022]
Public university	-0.140***	-0.098***	-0.142***
	[0.034]	[0.037]	[0.034]
Student_abroad	0.200***	0.087*	-0.016
	[0.048]	[0.050]	[0.046]
Student_job	-0.191***	-0.197***	-0.072***
	[0.020]	[0.021]	[0.020]
Vocational_training	-0.154***	0.030	-0.012
	[0.040]	[0.042]	[0.040]
Younger30	0.008	-0.013	0.019
	[0.023]	[0.024]	[0.023]
_cons	0.990***	0.929***	0.524***
	[0.174]	[0.175]	[0.167]
N	19595	19595	19592

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5. Internship Effect on being employed (2014)

	(1) Affiliated to Security Social	(2) Self-reported employed
Internships	0.072***	0.037*
	[0.020]	[0.021]
Extra internships	-0.020	-0.056***
	[0.018]	[0.019]
Foreign grant	0.046	0.105**
	[0.046]	[0.050]
Grant	0.131***	0.084**
	[0.036]	[0.038]
Language certificate	-0.155***	0.005
	[0.017]	[0.018]
Male	-0.038**	0.042**
	[0.018]	[0.019]
Msc	0.061***	-0.034*
	[0.018]	[0.019]
Public university	-0.028	-0.063**
	[0.027]	[0.029]
Student_abroad	-0.092**	0.010
	[0.040]	[0.043]
Student_job	0.249***	0.342***
	[0.017]	[0.018]
Vocationaltraining	-0.002	-0.029
	[0.030]	[0.031]
Younger30	0.027	0.023
	[0.019]	[0.020]
_cons	0.222*	0.724***
	[0.120]	[0.128]
N	28613	28613

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6. Internship effect on matching (2014)

	(1) Vertical matching	(2) Horizontal matching
Internships	-0.004	0.049*
	[0.025]	[0.025]
Extra internships	0.053**	0.105***
	[0.022]	[0.023]
Foreign grant	-0.087	-0.069
	[0.061]	[0.061]
Grant	0.178***	0.106**
	[0.044]	[0.044]
Language certificate	0.151***	0.072***
	[0.021]	[0.022]
Male	0.096***	0.043*
	[0.023]	[0.023]
Msc	0.215***	0.160***
	[0.023]	[0.024]
Public university	-0.219***	-0.118***
	[0.034]	[0.034]
Student_abroad	0.261***	0.175***
	[0.054]	[0.053]
Student_job	-0.043*	-0.066***
	[0.022]	[0.023]
Vocational training	-0.213***	-0.074**
	[0.035]	[0.036]
Younger30	0.055**	0.104***
	[0.023]	[0.024]
_cons	1.059***	0.813***
	[0.155]	[0.165]
N	21545	21439

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7. Internship effect on wages (2014)

	(1) Quintile 1	(2) Quintiles 1 and 2
Internships	0.003	0.016**
	[0.007]	[0.008]
Extra internships	0.013**	0.015*
	[0.007]	[0.008]
Foreign grant	0.007	0.025
	[0.016]	[0.020]
Grant	-0.023**	-0.011
	[0.011]	[0.014]
Language certificate	-0.002	-0.019***
	[0.006]	[0.007]
Male	-0.034***	-0.084***
	[0.007]	[0.008]
Msc	0.031***	0.038***
	[0.007]	[0.008]
Public university	0.002	0.042***
	[0.009]	[0.011]
Student_abroad	-0.021	-0.039**
	[0.014]	[0.017]
Student_job	-0.042***	-0.049***
	[0.007]	[0.008]
Student 2014	0.008	0.030***
	[0.008]	[0.009]
Vocational training	0.023**	0.006
	[0.011]	[0.013]
Younger30	0.065***	0.096***
	[0.007]	[0.008]
_cons	0.057	0.042
	[0.048]	[0.057]
N	16990	16990

Notes: Degree and regional fixed effects are included. Robust standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.