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Do Internships in Master's Programmes Help Graduates to Get a Well-matched Job?

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Do Internships in Master's Programmes Help Graduates to Get a Well-matched Job?

This paper illustrates how and when master's-level internships and work placements contribute to finding a well-matched post-graduation job in Spain. Their duration and curricular or extracurricular nature are found to be irrelevant unless students remain with their placement employers for their first post-graduation job (i.e., internships function as door openers). It is only then that extracurricular and longer internships are associated with lower probabilities of vertical and horizontal educational mismatch. This finding results from the heterogeneity in master's students, which calls for more flexibility in the design of internships and work placements to better meet students' and employers' needs. But it can also respond to the heterogeneous quality of vacancies offered to master's students upon graduation, that are often unable to take full advantage of graduates' skills and knowledge.

Keywords: overeducation, vertical mismatch, field of education mismatch, horizontal mismatch, master's graduates, internships

1. Introduction

The Spanish graduate labour market is characterised by high structural levels of educational mismatch, particularly during economic recessions (Sánchez-Sánchez and Fernández (2021)). This is often explained by a disregard for employers' skills requirements in the design of many educational programmes. As a result, Spanish students often prioritise the possibility of doing internships when choosing a master's degree (Morejón et al., 2022). This is why assessing their effectiveness is such a

relevant research objective and should be of much interest to higher education institutions, among others.

This paper intends to contribute to the debate about the influence of internships and work placement schemes on the quality of the first post-graduation job match in master's graduates in Spain. Given the quick expansion of graduate education and the generalization of internships, this is an added value in itself, as most of the existing one focuses on undergraduate degrees (O'Higgins and Caro, 2021). Also, the impact of those schemes is usually measured on time needed to find the first post-graduation positions and their corresponding wages, while our interest lies on job-education mismatch, both vertical (overeducation) and horizontal (field of education and underutilization of skills or knowledge). Overeducation is a very relevant labour market outcome, highly correlated with both objective (wages, tenure) and subjective (job satisfaction) measures of the quality of post-graduation jobs (Naguib et al., 2019). And horizontal mismatch is quite prevalent amongst master's graduates in sequential educational systems like Spain, where master's programmes aim to offer either specialised or interdisciplinary advanced training oriented towards academic or professional specialisation, often tailored to a particular sector or profession as well as to research (Barone and Ortiz, 2011).

The evidence provided here also enriches the related literature by considering the duration of internship programs, their inclusion in the masters' curriculum and, particularly, whether they operate as door openers into the graduate labour market. To this end, a sample of graduates from master's programmes is drawn from the 2019 Survey on the Labour Insertion of University Graduates (EILU-19), which is representative of graduates from all Spanish universities in academic year 2013/2014.

Our main finding suggests that, regardless of their curricular or extracurricular nature and duration, internships seem unrelated to educational mismatch unless they lead directly to the first job upon graduation. Only then do extracurricular internships yield better outcomes than curricular ones, and longer internships are associated with lower mismatch probabilities than shorter ones. This finding results from the heterogeneity in master's students, which calls for more flexibility in the design of internships and work placements to better meet students' and their potential employers' needs. But it can also respond to the heterogeneous quality of vacancies offered to master's students upon graduation, often unable to take full advantage of graduates' skills and knowledge. The paper has therefore implications for higher education institutions, as it calls them to reflect on the design of their work placement schemes, but also for economic policymakers, as the disequilibrium in the graduate labour market can also be tackled from the demand side, by fostering the creation of jobs where graduates' knowledge and skills can be adequately deployed.

2. Background and hypotheses

a. Institutional Context: graduate education in Spain

The considerable expansion of graduate education in Spain in recent decades has skyrocketed demand for master's programmes. The number of graduates¹ rose from 5,587 in 2006/2007 to 67,530 in 2013/2014, the year of graduation for interviewees sampled in the EILU-2019, and to 153,119 in 2022/2023, the most recent year with available data. As argued in Capsada-Munsech (2024), in the context of sequential systems with large number of graduates (like Spain) bachelor's degree graduates

¹ According to the Integrated University Information System database, available at <https://estadisticas.universidades.gob.es/>.

undergo masters' programmes to demonstrate greater skills, motivation and productivity and compete with bachelor's degree graduates for highly skilled positions. Empirical evidence tends to support the argument, as Iriondo (2022) finds that about 5 years after graduation, bachelor's degree graduates who have pursued at least one master's programme face a lower incidence of both vertical and horizontal mismatch. More recently, Morejón and Mariel (2024) pooled the EILU-2019 subsamples of graduates from master's and bachelor's programmes and found lower overeducation and, at the same time, higher horizontal mismatch amongst the former group.

In the post-Bologna system, master's programmes comprise from 60 ECTS credits (the most common scenario) up to 120 ECTS credits, and they are expected to be completed in 1 or 2 years. Spanish universities have considerable autonomy in the design of master's programmes provided they comply with the standards set by the National Evaluation and Accreditation Agency (known by its acronym, ANECA). As a result, master's programmes vary greatly in design and content.

The design and organisation of schemes labelled as work placements, traineeships and internships differ widely across countries. In Perusso and Wagenaar (2022), work placements are defined as work-integrated learning (WIL) schemes where students get practical training (and not necessarily paid work experience) with a firm or institution external to the university. They can be part of the curriculum or just related to it. Traineeships are additional training programmes for graduates that take place by the end of the degree course and are designed to develop skills and competences needed in collaborating organisations. In this paper, both terms will be treated as synonyms because the term 'internship' denotes both types of arrangements in Spain and, for practical reasons. The EILU-19 detects work-based experiences that take place before graduation and are registered accordingly in the graduates' academic records, while in

the questionnaire, when asked about their first postgraduation job, they can report working with their work placement employer for at least six months after graduation.

In Spain, universities often include internships or work placements in firms or institutions as part of master's programmes curricula and are also open to the recognition of (extracurricular) internships not included in the master's academic schedule. In the latter case, students often have a proactive role in contacting the firms or institutions where they would like to do their training. Sometimes extracurricular internships are merely an extension of a previous curricular internship, with the same placement employer.

Some master's programmes are habilitating or authorising; i.e., they are a *sine qua non* condition to access specific, regulated professions². In those programmes, internships should not be a differential element because their content and organisation are quite standardised across the country. Also, when graduates access the corresponding occupation, the match between the level and content of master's programmes should be very close regardless of whether internships were done.

The EILU-2019 captures heterogeneity across master's programmes through detailed degree denominations. However, the organisation of internships within the programmes remains opaque, making it difficult to disentangle their contribution to post-graduation job match. For instance, the lack of a variable that denotes habilitating or authorising master's programmes in the dataset entails a potential underestimation of the real impact of work placements on graduates' employment outcomes.

b. Literature review

² Namely, secondary education and language teaching, some engineering and architecture-related, one health-related and two for specific legal practice occupations.

Internships are very important for all stakeholders in graduate education: students, employers and universities (for a deep, well-structured discussion, see Silva et al., 2016). They improve students' career prospects as they facilitate the acquisition of communication and soft skills and occupation- and sector-specific skills (Wilton, 2012) while enlarge their social networks. For instance, interaction with professionals is a very appreciated aspect of internships by Australian graduates (Jackson and Bridgstok, 2021). Work placement schemes can also help employers to screen and train appropriate candidates for their vacancies at a low cost. Finally, internships connect the content of master's programs with the needs of the productive system and reinforce the occupational specificity of the programs. Given that occupational specificity has proven to smooth graduates' transition to the labour market (Skjelbred and Nesje 2023) and to improve the quality of post-graduation job match, universities that succeed in this regard will attract more (and often better) candidates to their master's programmes.

Internships entail part of the students' training being developed in a real-world environment, which entails certain risks compared with classroom education³ (Odlin et al., 2022). Still, in line with most of the international empirical evidence, all the above-mentioned stakeholders perceive the contribution of internships to graduates' employability (Irwin et al., 2019).

In undergraduate studies internships lead to better outcomes in the labour market, including lower educational mismatch, in countries where the education system is weakly linked to the labour market (Pasaretta and Triventi, 2015). For example, in

³ The authors refer to risks for students, placement employers and universities. For example, the location and environment where the internship takes place is beyond the control of the university. Accidents may take place, students can face emotional stress if confronted with difficult situations, the tutor or person in charge might not be adequate, etc. Placement employers run into costs that are difficult to estimate *a priori*. Finally, there is a potential reputational risk for the university: students' (dis-)satisfaction with the internship may reduce their overall satisfaction with the degree, while placement employers' (dis-)satisfaction with the students' performance may affect their perception of the university.

Portugal, Silva et al. (2016; 2018) describe how the inclusion of internships in the curricula of a large set of undergraduate programmes meant lower unemployment rates amongst graduates. For its part, Tzanakou et al. (2021) discuss different institutional tools for facilitating significant employment experiences in the UK and Italy, including internships, that improve undergraduates' employability. Still, Hunt and Scott (2020) warn about unpaid internships —particularly after graduation— that some employers offer to take advantage of inexperienced graduates in the UK, asking them to do tasks that are often less related to their skills than would be expected. Also, in Italy, postgraduation internships have been found to be positively associated with overeducation amongst master's graduates (Romanò et al., 2022).

For Spain, there is already a sound line of research for bachelors' degree graduates thanks to the previous round of the EILU in 2014 for the class of 2010: Salas-Velasco (2021) describes positive effects of internships in bachelor's programs on wages and the quality of the job match, while Boto and Escalonilla (2022) find that doing curricular internships did not reduce the likelihood overeducation among under-30-year-olds, with non-curricular internships slightly decreasing it. Di Meglio et al. (2021) add a very relevant nuance in line with Albert and Davia (2018) for bachelors and Albert and Davia (2023) for masters' graduates: graduates are particularly protected against vertical and horizontal educational mismatch when they remain employed with their placement employer (the internship would *open the door* to their first post-graduation job)⁴. The impact declines in importance in the medium term, 4 or 5 years after graduation, when many graduates already hold a different position. At that stage the patterns of mobility across jobs are strong determinants of mismatch (Albert et al.,

⁴ Still, in Di Meglio et al. (2021), extracurricular internships are associated to horizontal mismatch regardless of whether they are door openers or not.

2023) and mobility across jobs or employers contributes to reducing the likelihood of mismatch unless it is too frequent or erratic.

The evidence about the impact of internships for masters' graduates is much scarcer than for undergraduates. It has often studied the likelihood of finding a job or the time to find one. For example, Baert et al. (2021) run a field experiment on profiles for master's graduates in Flanders and find a positive impact of internships on the probability of being invited to an interview by prospective employers. In Spain, Perez-Encinas and Berbegal-Mirabent (2023) estimated the time to the first post-graduation job and observed that those who did internships took longer to find it, maybe because they were more reluctant to accept certain positions. However, the most heavily analysed outcome is wages. A positive impact of compulsory internships was found on wages in Switzerland (Bolli et al., 2021) and Germany (Margarayan et al., 2022), after controlling for potential self-selection into programs with curricular internships. More recently, analysing wage dynamics amongst graduates reporting internships in the UK, Arsenis and Flores (2024) find better outcomes for those who stay with their placement employers than for the rest.

The analysis of the contribution of internships to overeducation amongst master's studies graduates is very rare. Examples are Romanò et al. (2022), where curricular and post-graduation internships are assessed on a sample of Italian master's graduates. Similarly, Jackson and Rowe (2023) find different types of WIL (work-based, non-work based and global WIL) being correlated with overeducation amongst Australian graduates from postgraduate coursework and postgraduate research programmes. This piece of research intends to contribute to this strand of literature (assessing internships at master's level) using less explored outcomes (both vertical and horizontal educational mismatch) and distinguishing diverse features of the internships

(duration, type and door opening nature). Altogether, the three novelties (target population, outcomes of interest and detailed treatments to be assessed, make our contribution, in our opinion, valuable for the existing evidence.

c. Theoretical background and hypotheses

Several economic theories propose mechanisms through which internships may improve graduates' employment prospects, as explained in Bittmann and Zorn (2020). In the first one, the human capital approach, the channel is the acquisition of human capital that cannot be obtained in the classroom (Becker, 2009). Internships entail the acquisition of both general (usable in different firms and industries) and specific skills adapted to the needs of the placement employer or other companies / entities within the same specific industry/activity. In the second one, signaling approaches (Spence, 1973), internships are seen as a tool for the most able graduates to signal their ability to operate in real-life situations and differentiate from other graduates. Similarly, screening approaches (Arrow, 1973) would postulate that employers may use internships to survey the supply of graduate workers in the search for appropriate candidates for their vacancies. Finally, from a social capital approach, internships may be an opportunity for students to create social networks that connect them with prospective employers (Bourdieu, 1986; Galbraith and Mondal, 2020; Margaryan et al., 2022). The three approaches (human capital, signaling and screening and social capital) are not mutually exclusive, and the mechanisms described might operate simultaneously. Following the discussion displayed in Silva et al. (2016; 2018), in the paragraphs below, we will draw different hypotheses to be tested in our analysis.

If the main contribution of internships were the acquisition of general human capital and marketable skills, its mere incidence should contribute to improving graduates'

outcomes in the labour market regardless the internship is a door opener for the first job or not. If it entailed the acquisition of very specific human capital, closely related to the placement employer, it would be optimal for both the trainee and the firm to prolong their collaboration, and the internship would be more rewarding when the first job upon graduation is a continuation of the internship. Signalling, screening and social capital mechanisms would be compatible with the human capital channel; even if the latter were not relevant, the internship might still function as an opportunity for students to signal their abilities and competences and for potential employers to learn about them. An additional explanation for the link between door-opening internships and overeducation may be drawn from the framework of segmentation theory or labor market duality⁵. What kind of tasks do internships consist of? Do they resemble the ones from a real job in the primary segment of the labour market? Internships are more likely to become the first postgraduation job when the placement employer offers the graduate a high-quality job upon termination. When the internship is not a door-opener, it could mean that either it is a dead-end position and has no continuation (there is no vacancy afterwards, i.e. the door of the placement employer is closed), or the internship and the subsequent/related job offer is not good enough and the graduate prefers moving somewhere else. In both scenarios the graduate will start job search ‘from scratch’, facing a higher risk of educational mismatch. Regardless of the role internships have in facilitating the selection process and reducing the time it takes for a graduate to find a job after completing their studies, internships in themselves do not contribute to educational mismatch; the quality of the first graduate job does, and door-opening internships are associated with higher quality vacancies.

⁵ We thank one of the referees for suggesting this argument, that offers a new perspective from which interpreting our results.

Regardless of the operating channel, we can expect better outcomes for door-opening internships than for non-door-opening ones. Therefore, our first hypothesis reads as follows:

- H1: Graduates who have undertaken internships will be less prone to educational mismatch, particularly when they remain with their placement employer, i.e., the work placement acts as ‘door opener’, than those with no work placement experience.

In the human capital approach, the duration of the internship might proxy the amount of general or specific human capital graduates gain through it. Even if the acquisition of human capital were irrelevant, its duration could contribute to creating opportunities for placement employers to better appreciate students’ skills and abilities; if they prove to be satisfactory, the internship will end up in a job offer. Similarly, longer internships might help students to further expand their network of contacts associated with them. The three approaches would be in line with Bittmann and Zorn (2020), who find that longer internships show/produce better outcomes in terms of wages, job match quality and job satisfaction than shorter ones. We therefore formulate our second hypothesis as follows:

- H2: The longer the internship / work placement, the more effective the protection against educational mismatch it will provide.

In the human capital approach, whether the internship is curricular or extracurricular should not be relevant, as that feature does not define its content. In the screening and signaling approaches internships would be more valuable the more they help students to signal their productivity or to firms to screen the best candidates. And given the excess supply of graduates in the Spanish labour market, the signaling channel might be more relevant than the screening channel. Under this scenario, graduates

would benefit more from extracurricular internships than from curricular internships. In the latter, the university assigns students to firms or other collaborating entities, whereas in the former they are more proactive and tend to address directly prospective placement employers. Extracurricular internships are always voluntary and may be the result of graduates' interest in making the best out of the master's degree, gaining valuable work experience. Therefore, extracurricular internships would better signal graduates' proactivity, motivation and productivity (Silva et al., 2016; 2018). This argument leads us to our third hypothesis:

- H3: Extracurricular internships will contribute more to graduates' occupational attainment than curricular internships.

Contrasting the above explained hypotheses will contribute to our understanding of the mechanisms through which internships influence postgraduation outcomes. To this end, we will analyse the impact of the duration of internships and their connection with the programme curriculum in two different scenarios: when the placement employer differs from the first post-graduation employer (non-door-opening internship) and when the first graduation job is an extension of the internship (door-opening internship).

3. Materials and Methods

a. The dataset and the selection of the sample

The Labour Insertion of University Graduates (EILU-19) survey, conducted by the Spanish statistical office, is representative of recent university graduates from all Spanish universities. It is linked to administrative and academic records with the aim of studying graduates' labour market insertion (INE 2020). In the second semester of 2019, CATI-administered questionnaires were launched to two independent random

samples of individuals who graduated from bachelor's and master's programmes, respectively, in academic year 2013/2014. The questionnaires provide information on graduates' personal and academic profiles and some characteristics of their first and current job. They also enquired about graduates' perception of the educational requirements to perform the jobs and the extent to which they used the knowledge and skills acquired in the corresponding (bachelor's or master's) programme.

The EILU-2019 provides a set of very detailed denominations (72 categories) of master's programmes. They are controlled for in the multivariate analysis to account for the peculiarities of the discipline and, indirectly, to proxy unobserved specificities of the master's programmes.

The academic records report the incidence of curricular and extra-curricular internships during the master's degree and their overall duration but lack information about their content (tasks), whether they were paid or unpaid and whether they were compulsory or elective. The latter is a very relevant distinction in the international literature, where voluntary internships are found to be related to better outcomes than mandatory ones in terms of wages (Bolli et al., 2021) and job match quality and job satisfaction (Bittmann and Zorn, 2020). Still, curricular internships are often compulsory⁶ while internships outside the curricula are always voluntary.

The dataset does not capture any information about the placement employers. This is a relevant shortcoming, as it hinders the identification of the quality of the internship and, if applicable, the vacancies they would eventually offer to their trainees. At least the questionnaires captured diverse non-mutually ways to find the first postgraduation job,

⁶ Sometimes students need to obtain the corresponding credits to graduate but can choose between doing an internship in an external firm or institution or taking an extra elective subject.

including the possibility that the graduate remained with the placement employer during at least six months after graduation. This means it is possible to detect door-opening internships, but not to offer a profile of the entities offering them.

The initial sample consisted of 11,483 observations, i.e., all interviewees who graduated from master's programmes, which represented around 60,000 graduates. We excluded 145 observations that correspond to graduates who had never had a job and 94 who had only worked as family workers after graduation. Importantly, we dropped observations of individuals who were solo self-employed (696) or self-employed (144) with employees in their first post-graduation job because none of the hypothesised channels in Section 2.c. would be applicable for them.

We also do without 194 observations which lack the information necessary to compute vertical or horizontal mismatch, 20 which do not indicate whether the internships are door openers or not and 70 which do not report their duration. After dropping 422 observations with missing values in the rest of the explanatory variables displayed in Subsection 4.d, the remaining sample comprises 9,698 observations, representing around 50,000 master's graduates.

A non-negligible number of observations (3,561, about 36.7% of the sample) correspond to graduates who were already working for pay at the beginning of the master's programme, continued in the same position throughout the programme and remained with the same employer for at least six months upon graduation. For those graduates, the master's programme should not influence educational mismatch in the first job as it started well before graduation. For our consistency check, we select those observations out of the sample and re-estimate our models on a sub-sample of 6,137 observations, which represent about 32,000 master's graduates. Table A.1. in the

Appendix displays the mean values of the explanatory variables in the whole sample and in the consistency checks subsample.

b. Measuring educational mismatch in master's graduates

Our target variables are vertical mismatch (overeducation) and horizontal mismatch, computed from the graduates' perceptions of the most appropriate level and field of education for their first job upon graduation. Overeducation is computed by recoding the answer to the following question: 'What do you think was the most appropriate level of education to perform your first job?'.⁷ Overeducation in the first job is established when the interviewee reports that the most appropriate level of education was (a) below a master's degree or, in a more extreme case, (b) below a bachelor's degree, with an overall incidence of perceived overeducation in the first job around 69.6% and 25.5%, respectively (Table 1).

[Table 1 around here]

Horizontal mismatch is identified in two ways: (a) as field of study mismatch, when interviewees reported that the most appropriate area of study for their first job⁸ was either a totally different area of study (28.2%) or no particular field (16.4%) (44.6% overall), and (b) when graduates reported not using the knowledge and skills acquired in the master's programme in their first job (39.8%). Underutilisation of knowledge and skills is often classified as a dimension of vertical mismatch, but the wording of the related question in the EILU-2019 does not intend to compare the level of knowledge or skills required for the job and the graduate's own level. Instead, it refers to the extent to

⁷ The answer is grouped into seven levels: Doctorate (3.50%); Master's (26.86%); Bachelor's degree (44.16%); Higher vocational training (8.24%); Intermediate vocational training or Baccalaureate (5.44%); Basic vocational training (2.99%); and Compulsory education (8.81%).

⁸ Graduates who reported that the most appropriate was exclusively their own field of study (12.4%) or either their own or another related area (43.0%) were considered well matched.

which the knowledge and skills acquired during the master's program were used in the job.⁹ In this case, underutilisation of knowledge and skills would be compatible with horizontal mismatch as '(...) surplus education may also be related to horizontal (or field of study) mismatch, whereby workers are employed in jobs that are not relevant to the skills and knowledge accumulated by them in formal education' (McGuinness, Pouliakas and Redmond (2018), page 986). Moreover, within the sample analyzed here, field of education mismatch and underutilisation of knowledge and skills are strongly correlated (Cramers' V = 0.6109).

Measuring educational mismatch variables through graduates' self-perceptions may imply measurement bias but is free from the credential inflation that results from the increasing requirements employers impose on candidates in certain occupations and economic sectors (Verhaest and Baert, 2018). At the same time, it is compatible with the idea that graduates' decisions are often guided by their subjective perception about employment rather than by objective trends in the graduate labour market, about which they have imperfect information.

c. Characteristics of internships in master's degrees and the associated mismatch probabilities

Table 1 displays the incidence of internship by duration, link to the curriculum and door-opening nature, and the corresponding associated average levels of educational mismatch.¹⁰ About two thirds of graduates in our sample reported at least one internship episode, 48.31% having done only curricular internships and 19.24 %

⁹The precise wording is as follows: 'Were the knowledge and skills acquired in the study programme used in that first job?' (*¿Se hacía uso en su primer empleo de los conocimientos y habilidades adquiridos en estos estudios?*).

¹⁰ Table A.2. has the same information as Table 21, for the consistency checks subsample only.

extracurricular internships, half of which were in combination with curricular ones. More than half of the total number of internship periods took between 1 and 3 months only. Longer internship periods were less common and often associated with extending one curricular internship with a non-curricular one. Only about 10% of master's graduates who did at least one internship (6.75% of all graduates) reported continuing with the placement employer after graduation. This share is higher amongst graduates who accumulated long internship periods or reported non-curricular internships.

As regards the incidence of educational mismatch associated with participation in internships, both overeducation and horizontal mismatch seem more frequent amongst graduates who do internships. Once internships are grouped into eventual door openers to a first post-graduation position and the rest, large drops in all the indicators of mismatch can be observed for the former, while all outcomes are significantly more severe for the latter. Within each group (non-door openers versus door openers) most of the computed mismatch rates are higher amongst graduates who reported short and exclusively curricular internships.¹¹

d. Multivariate strategy – specification

To estimate the probability of overeducation and horizontal educational mismatch, we adopt a set of probit models where the dependent (binary) variables are the afore explained overeducation and horizontal mismatch indicators, that comprise the vector of variables $M_m = \{M_1, M_2, M_3, M_4\}$.¹² Its components take value 1 when interviewees

¹¹ T-tests for comparisons of mean values between graduates with no internships and the different categories of internships show significant differences across the categories. For reasons of space, we summarise only the significance of the tests with asterisks (see the note below Table 1).

¹² We are aware that the observed correlation between internships or work placement and educational mismatch may be biased since that candidates who do internships are not a random subsample of all graduates, and their characteristics may already be correlated with their chances of success in the labour market. For instance, students with weaker abilities, social capital or social networks might be more prone

declared that no master's degree was needed for their first job (M_1), no bachelor's degree was required (M_2), a different field of education—or no specific field—was adequate for that job (M_3), or the knowledge and skills acquired in the master's programme were not used (M_4), and 0 otherwise. Following Cattani et al. (2018), the dependent variables take value 1 when each of the corresponding latent variables, $Y_m = \{Y_1, Y_2, Y_3, Y_4\}$, takes strictly positive values ($Y_m > 0$) and 0 when $Y_m = 0$. The latent variables are linked through a linear function to a set of variables arranged in two different specifications:

$$Y_{mi} = \alpha + \gamma_t * Durdoor_i + X'_{mi}\beta + \varepsilon_{mi} \quad (1a)$$

$$Y_{mi} = \alpha + \gamma_t * Typedoor_i + X'_{mi}\beta + \varepsilon_{mi} \quad (2a)$$

where the main explanatory variables, $Durdoor_i$ and $Typedoor_i$, take the value 0 for graduates with no internships (the reference category), and the remaining values, displayed at the lower part of Table 1, result from the combination of door-opening internships with internship duration (1-3 months; 4-6 months and 7+ months) and type of internship (curricular only versus at least one episode of non-curricular internships), respectively.¹³ The set of control variables (X_i) is common to both specifications and comprises graduates' personal and academic profiles, their academic and job search strategies or careers and prior work experience. Finally, ε_{mi} are normally and

to take part in internships, but only more able interns are invited to become part of the staff by the placement employer, which might explain the duality in the results between graduates who did an internship that opened the door to their first post-graduation job and the rest of the graduates. We have tested alternative estimation procedures to take this into account, namely, inverse-probability-weighted regression adjustment. The results, not included for space reasons but available upon request, cannot be obtained for combinations of door-opening and other internships' characteristics but are consistent the ones presented here.

¹³ It is not possible to control for two or the three variables characterizing internships in the same specification because of multicollinearity; as they are only observed for graduates with at least one internship, they overlap in the category 'no internship'. We ran estimations with the three characteristics of internships separately, and the results (not shown for reasons of space) were consistent with the ones displayed in Table 2 but a bit *blurred*, though, as longer internships and noncurricular ones are more likely to become door-openers.

independently distributed error terms. The probabilities of the diverse mismatch scenarios are expressed as:

$$P(M_m=1) = P(Y_m > 0) = P(\alpha + \gamma_{dm} * Durdoor_i + X'_{mi}\beta + \varepsilon_{mi} > 0) = P(-\varepsilon_{mi} \leq \alpha + \gamma_{dm} * Durdoor_i + X'_{mi}\beta) = \Phi(\alpha + \gamma_{dm} * Durdoor_i + X'_{mi}\beta) \quad (1b)$$

$$P(M_m=1) = P(Y_m > 0) = P(\alpha + \gamma_{tm} * Typedoor_i + X'_{mi}\beta + \varepsilon_{mi} > 0) = P(-\varepsilon_{mi} \leq \alpha + \gamma_{tm} * Typedoor_i + X'_{mi}\beta) = \Phi(\alpha + \gamma_{tm} * Typedoor_i + X'_{mi}\beta) \quad (2b)$$

where $\Phi(\cdot)$ represents the cumulative normal distribution function for ε_{mi} , a standard normal distribution function. Since some of the assumptions of the probit model such as homoscedasticity might not be fully met, standard errors are adjusted using the Huber/White or sandwich estimator to avoid bias around the estimated coefficients (White, 1980).

The specifications are rooted in the academic literature on educational mismatch. Apart from the main explanatory variables, the personal details to be considered are sex, age and parental education (at least one parent with a university degree). The academic details include average grades in the master's degree¹⁴ and holding a general studies grant, which signals low or middle family income and mid or high academic achievement. Also, the type of university (public or private, with either distant or face-to-face teaching) and detailed master's degrees denominations (72 categories) are controlled for as fixed effects. It is possible to know whether graduates did part of their master's degree in a different university within Spain or abroad, but not whether the internship took place while in the host institution. Also, graduates who had already earned at least one master's degree before the degree course that finished in 2013/2014 and those who held a bachelor's degree in a field different from the master's

¹⁴ This variable was kindly provided by the National Statistics Institute (INE) through an ex-post tailored data extraction.

programme are identified. Motivation for studying the master's programme (improving one's opportunities in the labour market, or 'other motivations', including expanding one's knowledge) is also controlled for.

Employment experience before and during the master's degree may indicate graduates' expectations from the master's programme and, implicitly, from the internships: for graduates with no previous employment experience (25.8% of the sample; see Table A.1.) or those no longer employed before the beginning of the master's programme (23.3%) or during the programme (14.2%), the internship might be very relevant and provide very valuable experience, much more valuable than others. For those who were employed at the beginning of the programme and remained employed throughout, internships might not be that meaningful, though. We ran a consistency check discarding observations of graduates who held a job before starting the degree and remained in that same job during and after the degree. The results (displayed in Table A.3) concerning the role of internships hardly changed. If anything, they were a bit more pronounced.

The specifications include control for alternative or complementary strategies graduates declare having used to find their first post-graduation job. Apart from continuing with one's placement employer, The EILU-2019 questionnaire identifies nine others.¹⁵ They comprise a variety of informal methods (mass media or Internet, temporary work agencies, direct contact with employer, personal contacts, etc.) and formal methods (public employment services, university employment services, job banks, preparation for public exams). Finally, the quality of the first job upon graduation (part-time versus full-time position) is also considered.

¹⁵ One of them, self-employment, is omitted as graduates who were self-employed in their first post-graduation job are excluded from the analysis.

4. Multivariate analysis: Results

Table 2 displays the marginal effects for the explanatory variables that predict the incidence of the four measures of educational mismatch. To test our hypotheses, we compare the reference category ('no internships during the master's programme') with each combination of door-opening internships with internship duration and (Specification 1) curricular or extracurricular nature (Specification 2). Hypothesis 1 (internships are associated with lower mismatch, particularly if they are door openers to the first job) does hold partially true as only door-opening internships are associated with a lower proneness to mismatch.

[Table 2 around here]

Hypothesis 2 (longer internships contribute more to reducing educational mismatch than shorter ones) holds only for 'door-opening' internships. They are systematically associated to lower mismatch rates; in those cases, the longer the accumulated time in internships or work placements, the greater the reduction: internship periods longer than 6 months are associated with reductions of vertical mismatch by 11 p.p. and 7 p.p. (only significant at 90% confidence) in severe vertical mismatch. In field of studies mismatch the corresponding reduction ranges from 17 to 25 p.p., and in the likelihood of not using skills and knowledge acquired in the master's programme ranges from 9 to 21 p.p.. At the same time, short-termed non-door-opening internships are correlated with higher probabilities of vertical and field of studies mismatch, 3 and 5 p.p., respectively.¹⁶

¹⁶ In the case of severe overeducation, the associated levels of overeducation in 4-6 months long internships are also higher than for graduates with no internships.

Hypothesis 3 (extracurricular internships will be more rewarding than curricular ones) also holds true for door-opening internships only: in those cases, both curricular and extracurricular work placements are associated with lower mismatch, but the reductions in all types of mismatch are more pronounced in non-curricular work placements. Amongst internships that did not turn into a formal position, no clear pattern is found between curricular and non-curricular ones.

To better understand our results, we have run several consistency checks.¹⁷ For reasons of space, only one of them is displayed in the Appendix. It consists on re-estimating the multivariate models omitting observations from graduates who were employed at the beginning of the programme, remained in paid work during the programme and kept working at the job they held during the master's degree for at least six months after graduation (36.7% of the sample). The results (displayed in Table A.3) do not differ much from those obtained from the whole sample: door-opening internships are associated to lower levels of mismatch in the first job, with longer and extracurricular internships contribute the most. But non-door opening internships are no longer related with higher proneness of mismatch than no internships at all.

The marginal effects for the rest of the explanatory variables displayed in Table 2 are discussed in the following paragraphs. Differences between the sexes are

¹⁷ They are not shown for reasons of space but are available upon request. They are quite consistent with the results presented in Table 3. In the first check, we omitted observations of graduates from master's degree programmes in which at least two thirds of the individuals reported curricular internships, most of which were part of post-compulsory education teaching programmes. This strategy resembles the one in Weiss et al. (2014), who disregarded all observations in fields of education in which more than 85% of graduates do mandatory internships as they were *de facto* universal. We would expect more positive results when those observations are excluded, but they remain largely unchanged. The second consistency check entailed the opposite strategy: dropping the observations from degrees with a low incidence of internships (one third of graduates at most). Most of them (about 70%) correspond to sciences and STEM disciplines. We would expect more nuanced effects in the remaining subgroup, but they hardly vary. In the third consistency check, we ran the multivariate estimations for first-time graduates only. Given that the share of graduates with previous master's degrees (17.5 %) is neither large nor particularly special as regards the distribution of relevant variables, the results were also quite stable.

significant only for field of studies mismatch. Women experience it less often than men, probably because of a gendered segregation of both graduate education and employment. Age seems uncorrelated with the likelihood of all types of mismatches except for severe overeducation. Personal abilities, proxied here by grades, appear related to lower levels of all kinds of mismatch. Family background (having at least one highly educated parent) is correlated with lower likelihoods of mismatch in all dimensions. Other variables possibly related to family income (graduating from face-to-face teaching programmes in private institutions and doing part of the masters' degree abroad) are also sometimes correlated with better outcomes. Holding at least one prior master's degree is only negatively correlated with the probability of vertical mismatch, while having one's master's and bachelor's programmes in different fields of study is associated with higher probabilities of horizontal mismatch and severe vertical mismatch. Interestingly, undertaking graduate education to improve one's employment prospects is associated with a lower incidence of horizontal mismatch but seems unrelated to vertical mismatch. Employment experience before or during the degree is correlated only with the probability of vertical mismatch; Graduates reporting work experience or being in paid work during the degree face systematically higher levels of overeducation, while it has no connection with horizontal mismatch.

The results for the different job search strategies are in line with the literature. Employment services provided by universities, which are often in charge of internships, are negatively correlated with all types of educational mismatch. University job services seem therefore to contribute to graduates' employability beyond managing internships. Other formal job search methods such as job banks and public exams are correlated with a lower proneness not to use one's knowledge and skills and lower severe vertical mismatch, respectively. The worst outcomes are registered amongst those who used

temporary work agencies to find their first job, followed by those using mass media and Internet. Contacts with the employer are positively correlated with vertical mismatch if initiated by the graduate, while negatively correlated with horizontal mismatch if initiated by the employer. Finally, the quality of the job also matters, as part-time positions are more affected by all types of educational mismatch.

5. Discussion

Our results have shown that the most determining feature of internships in master's programmes in Spain is whether they lead to a first postgraduation job with the placement employer, in line with existing evidence for both master's (Albert and Davia, 2023) and bachelor's degree graduates (Di Meglio et al., 2021, Albert et al., 2018, Boto and Escalonilla, 2022). Following the rationale explained in Section 2, they suggest that the quality of the first job match is not explained by internships' contribution to general human capital but to the acquisition of specific human capital, their ability to signal graduates' productivity, or to expand graduates' social networks. This result questions the contribution of most internships to the quality of graduates' job matches given that only 10% of graduates who did some internship (6.8% of the sample) reported the first job after completing their master's degree being a continuation of their internship(s). Only then the potential signalling effect of longer and extracurricular internships, as compared with shorter and curricular ones is noticeable. The cornerstone of improving internships is therefore to make them more appealing as a recruiting tool for firms and institutions.

Short and curricular internships even seemed counterproductive. A similar result was obtained by Romanò et al. (2022), who found that master's graduates who did curricular internships were not protected against overeducation in Italy. This result

might be related to the different levels of involvement of educational institutions in the design and supervision or control of internships: short curricular internships are the minimum legal requirement for graduation in many degrees, not a choice made by students. They might not have a proactive role in the selection of the placement workplaces, either. As a result, curricular internships do not seem to be effective signals for prospective employers. For their part, extracurricular internships are voluntary and more open to the students' initiative. Students undertake them to acquire valuable work experience or to increase their chances of getting a job in the placement employer or within the same industry. Sometimes, extracurricular internship(s) are a sheer continuation of the curricular ones, as students perceive they are worth the non-negligible associated opportunity costs. Still, the experience acquired at extracurricular internships seem to be so attached to the placement employer that they end up being uncorrelated with job-education match unless they become 'door openers'.

These results might be explained by the broad heterogeneity in master's graduates. For instance, not all graduates do a master's program to look for their first job. Some of them wish to opt to better positions within or outside the organizations they already work in. Jackson and Rowe (2023) suggest that, in Australia, since many graduates from postgraduate programmes already have experience in the graduate labour market, WIL programmes are of less interest to master's graduates than to bachelors' degrees. In this sense, it would be advisable for work placements to be not only optional rather than mandatory but also more flexible, to adapt to students' characteristics, expectations and needs.

Alternatively, other mechanisms could equally operate here: our results can also respond to the considerable heterogeneity in the demand side, with door opening internships signing quality positions offered after a satisfying training period. Although

the dataset does not provide information about placement and prospective employers, the segmentation in the Spanish labour market (García-Serrano and Malo, 2013), characterised by important levels of employment precariousness, suggests this may well be the case. In this context, it could be said that, to alleviate overeducation, public policies should foster the demand for qualified labour through daring innovation and industrial policies to promote technology- and knowledge-based sectors. In other words, from this viewpoint, public policies might focus on increasing the size of the primary sector, rather than redesigning the internship system.

The probability of mismatch is lower in persons with good academic outcomes, proxied here by average marks. Still, socioeconomic determinants of those outcomes, such as parents' educational background, remain significant. Moreover, general studies grant holders, whose parents tend to be less qualified, face a higher probability of severe overeducation, while graduates from private institutions with on-site teaching, characterised by highly educated parents, are less prone to suffer overeducation and skills or knowledge underutilisation. These situationsacerbate the socioeconomic gradient of success in the graduate labour market.

6. Conclusions

This paper contributes to the debate about the extent to which internship schemes improve master's graduates' employability and the underlying mechanisms that explain their effectiveness in this regard. It also enlarges the so far scarce evidence about the impact of internships amongst graduate degree students by addressing their association with job-education mismatch, also an ill-explored outcome. Rather than looking at the sheer incidence of internships, the present analysis obtains nuanced results concerning their characteristics, namely, duration, (non) curricular nature and whether they were followed by a regular job with the placement employer (i.e., they are door openers to a

graduate job).

The labour market outcomes associated with internships are found to depend vitally on the latter, so one future research question would be, ‘What makes an internship ‘open the door’ to a first post-graduation job?’ To that end, and to provide better guidance for public policymakers and universities, further information is needed about the master’s programmes: (duration, tuition fees and habilitating or authorising status) and the internships (content, tasks involved, remuneration and optional or compulsory status). Finally, it would be extremely useful to have information about the characteristics of the demand side, placement employers (industry, public or private institution, firm size, etc.) and post-graduation employers, to better assess the connection of internships the occupations and sectors that the master’s degrees are conceived for.

The present study has several limitations. Among others, the subjective definition of educational mismatch might be affected by errors of perception or lack of information about job requirements, as well as memory biases. In addition, the lack of information about the demand side prevents us from disentangling the extent to which the low incidence of door opening internships results from unfit candidates, misfunctions in the design of masters’ programs or poor-quality jobs in the graduate labour market.

Future research could be pursued down at least three avenues. One would explore the observed heterogeneity in master’s graduates. What are the characteristics of graduates who would benefit the most from doing internships? In which fields of education do internships contribute the most? Are they particularly rewarding at a given point in graduates’ career? Does their effectiveness vary across regions? The second

possible line of research would consist in addressing potential endogeneity and self-selection into work placement schemes with experimental and quasi-experimental research methods, in line with some of the analyses surveyed in this paper.¹⁸ The third avenue of research would consist of taking a longer view and analysing the impact of internships several years after graduation. It would be very interesting to see whether door-opening internships still have a positive impact in educational mismatch in ulterior positions. The three above explained lines of research may provide very useful evidence for policymakers and stakeholders in the graduate education system.

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¹⁸ Results from initial attempts to implement those techniques were significantly different from the ones presented here. Maybe unobserved heterogeneity due to insufficient information from individuals and internships hinder the adequate prediction of participation in internships and their chances to be followed by a regular job.

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Table 1. Distribution of master's graduates by type and length of internship and whether the first job upon graduation is a continuation of the internship(s). Prevalence of educational mismatch in the first job upon graduation.

		Freq. (%)	Door opener (%)	Vertical mismatch (%)				Horizontal mismatch (%)			
				Below master's		Below bachelor's		Field of studies		Knowledge / skills	
With no internships	No internship	32.46	0	67.9	---	20.1	---	43.7	---	37.2	---
With internships: characteristics											
Duration	1-3 months	35.29	6.24	73.3	***	30.5	***	50.5	***	45.1	***
	4-6 months	17.73	12.88	68.3		28.2	***	41.3		38.5	
	7+ months	14.53	15.62	66.4		22.1		36.0	***	34.3	*
Type of internship	Curricular only	48.31	9.47	70.5	*	29.3	***	46.2		41.8	*
	Extracurricular	19.24	11.32	70.6	*	25.1	***	41.8		39.2	
Door opener?	Non-door opener	60.79	0	72.1	***	29.4	***	47.8	***	43.3	***
	Door opener	6.75	100	56.6	***	16.7	***	19.8	***	20.5	***
With internships: combined characteristics											
Non-door opener	1-3 months	33.09	0	73.9	***	31.1	***	52.1	***	46.1	***
	4-6 months	15.44	0	70.5	*	30.2	***	44.7		41.6	*
	7+ months	12.26	0	69.0		23.6	*	40.0	*	38.0	
Door opener	1-3 months	2.2	100	64.7		22.5		26.7	***	29.9	***
	4-6 months	2.28	100	53.0	***	14.3	**	18.5	***	17.3	***
	7+ months	2.27	100	52.2	***	13.6		14.3	***	14.5	***
Non-door opener	Curricular only	43.73	0	71.8	***	30.4	***	48.9	***	43.8	***
	Extracurricular	17.06	0	72.7	***	26.6	***	44.9		42.0	**
Door opener	Curricular only	4.58	100	57.6	***	18.3	**	20.9	***	22.0	***
	Extracurricular	2.18	100	54.4	***	13.5	*	17.5	***	17.3	***
Total	Total	100	6.75	69.6	---	25.5	---	44.6	---	39.8	---
	Number of obs.	9,698									

* / ** / ***: p-value from t-tests that compare the mean of the values for the dependent variables between graduates with no internships and each category of graduates with internships, significant at 90% / 95% / 99%. Source: EILU-2019 (INE)

Table 2. Overeducation and horizontal mismatch risks - Marginal effects. Binary probits. Overall sample.

		Below master's		Below bachelor's		Field of studies		Knowledge / skills	
		Spec 1.	Spec 2.	Spec 1.	Spec 2.	Spec 1.	Spec 2.	Spec 1.	Spec 2.
Duration of internship (Ref.: no internship)	1-3 months, non-door opener	0.037** (0.016)		0.038*** (0.015)		0.041** (0.018)		0.027 (0.017)	
	4-6 months, non-door opener	0.007 (0.019)		0.048*** (0.017)		0.009 (0.020)		0.016 (0.020)	
	7+ months, non-door opener	0.008 (0.020)		0.006 (0.018)		-0.013 (0.022)		0.006 (0.021)	
	1-3 months, door opener	-0.043 (0.042)		-0.018 (0.033)		-0.169*** (0.038)		-0.094** (0.041)	
	4-6 months, door opener	-0.091* (0.048)		-0.051 (0.038)		-0.190*** (0.039)		-0.167*** (0.038)	
	7+ months, door opener	-0.114*** (0.043)		-0.068* (0.035)		-0.254*** (0.036)		-0.215*** (0.035)	
Type of internship (Ref.: no internship)	Curricular, non-door opener		0.013 (0.016)		0.038*** (0.014)		0.019 (0.017)		0.016 (0.016)
	Extracurricular, non-door opener		0.038** (0.017)		0.025 (0.016)		0.021 (0.019)		0.026 (0.018)
	Curricular, door opener		-0.066** (0.033)		-0.023 (0.028)		-0.188*** (0.030)		-0.137*** (0.031)
	Extracurricular, door opener		-0.115*** (0.043)		-0.084*** (0.026)		-0.232*** (0.033)		-0.198*** (0.030)
Sex (Ref.: Males)	Females	0.012 (0.012)	0.012 (0.012)	-0.016 (0.011)	-0.017 (0.011)	-0.041*** (0.013)	-0.041*** (0.013)	0.000 (0.013)	-0.000 (0.013)
Age	Age	-0.002 (0.008)	-0.001 (0.008)	-0.019*** (0.007)	-0.019*** (0.007)	0.005 (0.008)	0.006 (0.009)	0.009 (0.008)	0.009 (0.008)
	Age squared	-0.000 (0.000)	-0.000 (0.000)	0.000** (0.000)	0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)
Parental education (Ref.: No university)	At least one parent with university education	-0.059*** (0.013)	-0.061*** (0.013)	-0.068*** (0.011)	-0.069*** (0.011)	-0.085*** (0.013)	-0.086*** (0.013)	-0.063*** (0.013)	-0.064*** (0.013)
Grades	Grades	-0.061*** (0.009)	-0.061*** (0.009)	-0.049*** (0.007)	-0.049*** (0.007)	-0.048*** (0.009)	-0.047*** (0.009)	-0.055*** (0.009)	-0.055*** (0.009)

General study grant (Ref.: No)	Yes	-0.012 (0.016)	-0.011 (0.016)	0.025** (0.013)	0.026** (0.013)	-0.016 (0.016)	-0.014 (0.016)	0.017 (0.015)	0.018 (0.015)
Type of university (Ref.: public, on-site)	Public, remote / online	-0.018 (0.037)	-0.018 (0.037)	-0.048* (0.026)	-0.048* (0.026)	-0.054 (0.034)	-0.055 (0.034)	-0.032 (0.035)	-0.032 (0.035)
	Private, on-site	-0.018 (0.018)	-0.019 (0.018)	-0.058*** (0.015)	-0.059*** (0.015)	-0.028 (0.018)	-0.028 (0.018)	-0.094*** (0.018)	-0.094*** (0.018)
	Private, remote / online	0.010 (0.022)	0.010 (0.023)	-0.038* (0.020)	-0.038* (0.020)	0.010 (0.024)	0.010 (0.024)	-0.034 (0.024)	-0.033 (0.024)
Part of the master's in another university (Ref.: No)	Yes, in Spain	-0.029 (0.022)	-0.030 (0.022)	-0.014 (0.020)	-0.015 (0.020)	-0.026 (0.023)	-0.028 (0.023)	-0.027 (0.023)	-0.028 (0.023)
	Yes, abroad	-0.030 (0.027)	-0.032 (0.027)	-0.040* (0.021)	-0.040* (0.021)	-0.063** (0.027)	-0.067** (0.027)	-0.043* (0.026)	-0.045* (0.026)
Previous master's programmes (Ref.: no)	Yes	-0.109*** (0.016)	-0.111*** (0.016)	-0.059*** (0.015)	-0.059*** (0.015)	0.005 (0.018)	0.004 (0.018)	0.002 (0.017)	0.002 (0.017)
Bachelor's and master's in different fields (Ref.: no)	Yes	0.014 (0.015)	0.016 (0.015)	0.028** (0.013)	0.030** (0.013)	0.111*** (0.016)	0.114*** (0.016)	0.055*** (0.015)	0.057*** (0.015)
Motivation to study (Ref.: Other(s))	Improving one's employment prospects	0.006 (0.015)	0.006 (0.015)	0.017 (0.014)	0.016 (0.014)	-0.047*** (0.016)	-0.048*** (0.016)	-0.036** (0.016)	-0.036** (0.016)
Previous work experience (Ref.: None)	Ended before the master's began	0.052*** (0.018)	0.050*** (0.018)	0.055*** (0.015)	0.055*** (0.015)	0.019 (0.019)	0.017 (0.019)	0.010 (0.018)	0.009 (0.018)
	Ended before the master's ended	0.066*** (0.021)	0.063*** (0.021)	0.049*** (0.018)	0.047*** (0.018)	0.006 (0.021)	0.004 (0.021)	0.005 (0.021)	0.004 (0.021)
	Continued after the master's ended	0.087*** (0.018)	0.085*** (0.018)	0.042*** (0.016)	0.042*** (0.016)	0.037* (0.020)	0.035* (0.020)	0.001 (0.019)	0.000 (0.019)
Ways to find first job upon graduation (Ref.: Not that one)	Public employment services	0.033* (0.020)	0.033 (0.020)	-0.010 (0.018)	-0.008 (0.018)	-0.012 (0.020)	-0.012 (0.020)	0.015 (0.021)	0.015 (0.021)
	University employment services	-0.087*** (0.018)	-0.090*** (0.019)	-0.104*** (0.018)	-0.104*** (0.018)	-0.111*** (0.020)	-0.114*** (0.020)	-0.126*** (0.021)	-0.128*** (0.021)
	Job banks	0.002 (0.020)	0.004 (0.020)	-0.033* (0.018)	-0.033* (0.018)	-0.004 (0.022)	-0.003 (0.022)	-0.064*** (0.021)	-0.063*** (0.021)
	Prepared public exams	0.043** (0.017)	0.044** (0.017)	-0.071*** (0.016)	-0.070*** (0.016)	-0.035* (0.018)	-0.035* (0.018)	-0.025 (0.018)	-0.025 (0.018)
	Mass media, Internet, etc.	0.051*** (0.017)	0.050*** (0.017)	0.049*** (0.016)	0.050*** (0.016)	0.067*** (0.018)	0.067*** (0.018)	0.050*** (0.018)	0.050*** (0.018)

	Temporary work agencies	(0.015) 0.188***	(0.015) 0.189***	(0.012) 0.167***	(0.012) 0.168***	(0.015) 0.173***	(0.015) 0.174***	(0.015) 0.145***	(0.015) 0.146***
	Contacted employer directly or through contacts	(0.035) 0.037***	(0.035) 0.038***	(0.025) 0.047***	(0.025) 0.048***	(0.033) 0.013	(0.033) 0.014	(0.032) 0.022	(0.032) 0.023
	The employer contacted them	(0.014) -0.009	(0.014) -0.010	(0.012) -0.038**	(0.012) -0.037**	(0.015) -0.063***	(0.015) -0.063***	(0.014) -0.062***	(0.014) -0.062***
		(0.016)	(0.016)	(0.015)	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)
Work schedule (Ref.: Full-time)	Part-time	0.151*** (0.014)	0.152*** (0.014)	0.165*** (0.011)	0.166*** (0.011)	0.085*** (0.014)	0.086*** (0.014)	0.104*** (0.014)	0.105*** (0.014)
Degree-specific f.e.	Master's degrees: 72 categories	YES	YES	YES	YES	YES	YES	YES	YES
	Observations	9698	9698	9698	9698	9698	9698	9698	9698
	Wald chi2	695.26	700.77	941	949.09	821.56	825.7	710.75	723.72
	Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Log pseudolikelihood	-5366.4	-5368.0	-4655.4	-4657.6	-6012.3	-6019.3	-5926.2	-5929.6
	Pseudo R2	0.0926	0.0923	0.1488	0.1484	0.092	0.091	0.085	0.0844

Standard errors (adjusted via Huber/White estimator) in parentheses; *** p<0.01. ** p<0.05. * p<0.1

Source: EILU-2019 (INE)

Table A.1. Distribution of explanatory variables: overall sample and robustness check subsample

		Overall sample	Robustness check subsample
Sex	Males	0.532	0.548
	Females	0.468	0.452
Age	Age (mean)	34.604	32.153
	Age (s.d.)	7.160	5.009
Parental education	No parent with university education	0.598	0.567
	At least one parent with university education	0.402	0.433
Grades	Grades (average)	8.240	8.292
	Grades (s.d.)	0.760	0.739
General study grant	No	0.763	0.705
	Yes	0.237	0.295
Type of university	Public, face-to-face teaching	0.709	0.794
	Public, remote / online	0.043	0.019
	Private, face-to-face teaching	0.163	0.143
	Private, remote / online	0.085	0.044
Part of the master's in another university	No	0.873	0.863
	Yes, in Spain	0.076	0.076
	Yes, abroad	0.051	0.062
Previous master's programme(s)	Yes	0.160	0.137
	No	0.840	0.863
Degree and master's in different fields	Yes	0.623	0.604
	No	0.377	0.396
Motivation to study	Improving employment prospects	0.772	0.821
	Other motivations	0.228	0.179
Previous work experience	No	0.258	0.408
	Ended before the master's began	0.233	0.368
	Ended before the master's ended	0.142	0.224
	Continued when the master's ended	0.367	---
Ways to find first job upon graduation	Public employment services	0.110	0.105
	University employment services	0.114	0.131
	Job Banks	0.108	0.094
	Prepared public exams	0.164	0.106
	Mass media, Internet, etc.	0.279	0.306
	Temporary work agencies	0.038	0.043
	Contacted employer directly or through contacts	0.301	0.318
Work schedule	The employer contacted them	0.161	0.157
	Part-time	0.280	0.308
	Full-time	0.720	0.692
	N	9,698	6,137

Source: EILU-2019 (INE)

Table A.2 Distribution of master's graduates by type and length of internship and whether the first job upon graduation is a continuation of the internship(s). Prevalence of educational mismatch in the first job upon graduation. Robustness subsample.

		Freq. (%)	% Door opener	Vertical mismatch (%)				Horizontal mismatch (%)			
				Below master's	Below bachelor's	Field of studies	Knowledge / skills				
No internship	No internship	25.5	0	66.9	---	25.3	---	44.7		42.8	---
With internships: uncombined characteristics											
Duration	1-3 months	38.3	6.3	71.2	***	30.4	***	48.1	***	44.9	***
	4-6 months	20.2	14	66.6		28.7	***	39.9		38.5	
	7+ months	16.1	17.3	64.6		21.8		32.9	***	33.2	*
Type of internship	Curricular only	53.6	10.5	68.4	*	28.9	***	43.9		41.0	*
	Extracurricular	20.9	11.3	68.7	*	26.0	***	39.2		39.5	
Door opener?	Non-door opener	66.5	0	70.5	***	29.6	***	45.9	***	43.5	***
	Door opener	8.0	100	51.8	***	15.3	***	15.3	***	17.1	***
With internships: combined characteristics											
Non-door opener	1-3 months	35.88	0	72.0	***	31.0	***	49.8	***	46.1	***
	4-6 months	17.35	0	69.7	*	31.3	***	44.2		42.5	*
	7+ months	13.27	0	67.7		23.8	*	37.3	*	37.5	
Door opener	1-3 months	2.42	100	59.1		21.5		21.8	***	26.4	***
	4-6 months	2.82	100	47.9	***	12.9	**	13.2	***	13.5	***
	7+ months	2.78	100	49.6	***	12.2		11.7	***	12.5	***
Non-door opener	Curricular only	47.93	0	70.3	***	30.3	***	47.1	***	43.6	***
	Extracurricular	18.57	0	71.2	***	28.0	***	42.8		43.0	**
Door opener	Curricular only	5.64	100	52.7	***	17.3	**	17.2	***	18.9	***
	Extracurricular	2.37	100	49.7	***	10.3	*	10.7	***	12.7	***
Total	Total	100	8.0	69.6	---	27.4	---	43.1	---	41.2	---
	Number of obs.	6,137									

* / ** / *** : p-value from t-tests that compare the mean of the values for the dependent variables between graduates with no internships and each category of graduates with internships, significant at 90% / 95% / 99%. Source: EILU-2019 (INE)

Table A3. Overeducation and horizontal mismatch risks - Marginal effects. Binary probits (*). Robustness check subsample.

	Below master's		Below bachelor's		Field of studies		Knowledge / skills	
	Spec 1.	Spec 2.	Spec 1.	Spec 2.	Spec 1.	Spec 2.	Spec 1.	Spec 2.
Duration of internship (Ref.: no internship)	1-3 months, non-door opener	0.035* (0.021)		0.026 (0.019)		0.015 (0.022)		0.004 (0.022)
	4-6 months, non-door opener	0.002 (0.024)		0.029 (0.021)		-0.017 (0.024)		-0.017 (0.024)
	7+ months, non-door opener	0.008 (0.025)		-0.008 (0.023)		-0.052* (0.027)		-0.029 (0.027)
	1-3 months, non-door opener	-0.087* (0.051)		-0.039 (0.041)		-0.220*** (0.044)		-0.156*** (0.049)
	4-6 months, non-door opener	-0.122** (0.059)		-0.074 (0.049)		-0.251*** (0.043)		-0.224*** (0.045)
	7+ months, non-door opener	-0.137*** (0.050)		-0.088** (0.043)		-0.288*** (0.042)		-0.263*** (0.041)
Type of internship (Ref.: no internship)	Curricular, non-door opener		0.012 (0.020)		0.022 (0.018)		-0.006 (0.020)	-0.016 (0.020)
	Extracurricular, non-door opener		0.034 (0.023)		0.016 (0.020)		-0.016 (0.024)	0.004 (0.024)
	Curricular, door opener		-0.099** (0.041)		-0.036 (0.035)		-0.228*** (0.035)	-0.189*** (0.036)
	Extracurricular, door opener		-0.153*** (0.053)		-0.131*** (0.032)		-0.307*** (0.032)	-0.272*** (0.034)
Observations	6137	6137	6137	6137	6137	6137	6137	6137
Wald chi2	575.13	578.14	627.73	640.6	648.76	668.64	518.06	534.13
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Log pseudolikelihood	-3446.4	-3447.4	-3105.1	-3104.7	-3755.5	-3760.0	-3782.3	-3783.7
Pseudo R2	0.1117	0.1114	0.1463	0.1464	0.1136	0.1125	0.0991	0.0988

(*). The specification is the same as the one in Table 2. Results for control variables not shown for reasons of space but available upon request. Standard errors (adjusted via Huber/White estimator) in parentheses; *** p<0.01. ** p<0.05. * p<0.1 Source: EILU-2019 (INE)