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"The Impact of Combining Work with Study on the Labour Market Performance of Graduates: the Joint Role of Work Intensity and Job-Field Match"

Antonio Di Paolo and Alessia Matano

UBIREA
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AQR
Regional Quantitative Analysis Research Group

UBIREA | Institut de Recerca en Economia Aplicada Regional i Pública
UNIVERSITAT DE BARCELONA

WEBSITE: www.ub-irea.com • CONTACT: irea@ub.edu

AQR
Grup de Recerca Anàlisi Quantitativa Regional
Regional Quantitative Analysis Research Group

WEBSITE: www.ub.edu/aqr/ • CONTACT: aqr@ub.edu

Universitat de Barcelona
Av. Diagonal, 690 • 08034 Barcelona

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The Impact of Combining Work with Study on the Labour Market Performance of Graduates: the Joint Role of Work Intensity and Job-Field Match

Abstract

This paper investigates the effects of working during university education on students' labour market performance. We jointly consider the role of work intensity and the relationship with the field of study in a framework that accounts for self-selection into different types of jobs. The empirical analysis draws on data from three successive cohorts of graduates from the Spanish region of Catalonia. Our results point out that the probability of being employed four years after graduation is significantly higher for students who have worked in jobs well-matched with their degree relative to both full-time students and students who have worked in unrelated jobs. Further, the probability of having a permanent job is generally higher for those who worked before graduation, especially in the case of jobs related to the degree. However, the likelihood of early career job-qualification match is negatively affected by pre-graduation work experiences unrelated to degree's contents.

JEL Classification: I23, J24, J22.

Keywords: University Graduates, Pre-graduation Jobs, Employability, Job Quality, Self-Selection.

Antonio Di Paolo (corresponding author): AQR-IREA, University of Barcelona. Email: antonio.dipaolo@ub.edu

Alessia Matano: University of Rome "La Sapienza", Dipartimento di Economia e Diritto, e AQR-IREA, University of Barcelona. Email: alessia.matano@uniroma1.it

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1. Introduction

The investment in higher education represents an important decision for enhancing individuals' socioeconomic status throughout the life cycle. In fact, university graduates generally enjoy better labour market outcomes relative to less educated workers. However, a growing amount of evidence highlights the existence of significant differentials in employability, remuneration and job quality among individuals with tertiary education. On the one hand, the field of study represents one of the key elements behind such differentials since different college majors are differently rewarded in the labour market (Altonji et al., 2016). On the other hand, there are significant disparities in career performance also among graduates who have obtained the same degree. This is because graduates' career success depends not only on the overall quality of higher education, but also on the amount of human capital, skills and valuable experience that are acquired while enrolled at university, which ultimately depends on students' choices. In this respect, a fundamental aspect concerns the decision to exclusively focus on studying, or to combine university education with some kind of work activity, which might be beneficial to future labour market outcomes. In fact, the choice to engage in some kind of work activity during university — besides forced decisions due to financial constraints — is generally motivated by the willingness to gain work experience and related competences that could improve post-graduation job opportunities. Indeed, from a theoretical point of view, pre-graduation employment should improve future employability because, on the one hand, it shapes students' general and specific human capital through the acquisition of relevant work experience as well as cognitive and non-cognitive skills that increase productivity in the workplace. On the other hand, student work, especially when work activities are related to the content of university degree, could generate positive signals that improve hiring chances and the number of offers when searching for a job[1].

Nonetheless, there is an important trade-off that should be taken into account when taking the decision to work while studying, since this could divert students' effort away from academic learning, which in turn might have a negative effect on employability.

Empirically, the effects of pre-graduation employment have been widely investigated in the last decades. Most of the existing works focused on the impact of student work on academic performance (see Neyt et al., 2019, for a recent and systematic review). The overall results from this literature point out that working while studying generally has detrimental effects on academic

[1] However, working while studying, especially in jobs unrelated to the university degree, could represent a (negative) signal to the employers, reflecting students' and families' liquidity constraints, which might generate discrimination against students from less-advantaged social backgrounds. See Baert et al. (2016) for a comprehensive explanation of theoretical models that could be useful to understand the mechanisms through which pre-graduation work can affect future labour market outcomes.

outcomes, mostly in terms of increased likelihood of student dropout and — to a lesser extent —late graduation.

A smaller but growing number of papers investigate the impacts of work experiences acquired whilst pursuing a university degree on subsequent graduates' employability, using either experimental or non-experimental data.[2] The general findings point out that pre-graduation work experiences matter for future employability, job quality and earning potential. Overall, the beneficial effect of student work represents a combination of increased human capital and signalling, but the extent of these positive impacts is likely to depend on specific characteristics of the job performed during higher education. In particular, on the one hand, work intensity (e.g. part-time versus full-time employment, occasional versus regular jobs, etc.) appears to be relevant, with higher effect found for full-time jobs. On the other hand, and most importantly, the relationship between the job performed and the field of study reveals to be crucial for the chances of employability after graduation and job quality outcomes. Indeed, pre-graduation jobs related to students' degree are consistently found to be beneficial for several employability and job quality measures. This is clearly the case for internship programmes, which are generally connected with the content of the university degree, and are increasingly becoming mandatory activities in many university degrees around the world.

With this paper, we contribute to the existing literature by estimating the impact of working in jobs characterised by different combinations of work intensity and relationship with the field of study in a framework that deals with self-selection into pre-graduation employment. To the best of our knowledge, there are no papers based on non-experimental data that analyse jointly the effect of being involved in a job of a given intensity (i.e. part-time or full-time), which is related or not to the field of study, on post-graduation employability. We believe that these two job features should be jointly considered in an empirical analysis, since different combinations of work intensity and job-field match could lead to different payoffs — relative to full-time students — in terms of labour market outcomes. Hence, with this paper we try to fill this gap in the literature.

We use data from three successive waves of the "Survey on Labour Market Outcomes of University Graduates", which include information on graduate students of the Spanish region of Catalonia for the years 2011, 2014 and 2017, concerning individuals who have graduated four years before (2007, 2010 and 2013). The Spanish case is an interesting case study, given the worrying figures about the youth labour market in Spain: high risk of unemployment (also among highly educated individuals), prevalence of temporary employment and significant incidence of over-

[2] As explained below, the latter works based on survey data face an important problem of endogeneity, since student work is a choice variable that depends on students' unobservable traits, potentially related to future labour market outcomes (i.e. a self-selection issue).

qualification and skills mismatch (see Dolado et al., 2013). Therefore, a better understanding of the factors that could protect graduates' economic potential against unfavourable labour market conditions is a key issue for future policies aimed at promoting employability of recent graduates.

The data contain a wide set of information on individual academic, socio-demographic and labour market characteristics. In particular, they provide information on the working status of students during the last two years before graduation, which is classified according to work intensity (part-time and full-time) and relationship with the field of study (related or unrelated). The empirical analysis is based on a pooled sample of 24,704 individuals who were born in Spain and graduated from a public university. We analyse, first, the impact of different types of pre-graduation work activities, categorised according to job intensity and relationship with the field of study on the probability of being employed four years after graduation. Second, we explore the effects of working while studying on two measures of job quality, namely the likelihood of having a permanent contract and performing a job that requires the specific degree obtained.

We start by running simple OLS regressions, which provide conditional correlations between pre-graduation working activities and the outcomes of interest. The results obtained by OLS suggest that working in any type of pre-graduation job is associated with higher probability of being employed compared to full-time students, especially in the case of performing a job well-matched with the field of study. Working while studying is also associated with a higher likelihood of having a permanent position, this effect increasing with work intensity. Further, only working in occupations that are related to the undergraduate programme positively correlates with the chances of having a job that requires the specific degree acquired, while a negative correlation is found for jobs unrelated to the field of study.

However, as widely discussed in the literature, OLS estimates are likely to be biased due to self-selection into work activities. In fact, there are unobserved factors that might simultaneously affect the probability of working while studying and employment performance, such as individuals' cognitive and non-cognitive abilities, motivation or expectations. Hence, students are not randomly allocated into different types of jobs while enrolled at university.

In this paper, we control for self-selection through the estimation of a multinomial endogenous treatment model (Deb and Trivedi, 2006), using a novel variable as exclusion restriction: a measure of local employment potential. This variable consists in the percentage of registered employment contracts over working age population (in a given year) within a radius of 30 km from the municipality of residence of the individual two years before graduation. This measure enables capturing employment opportunities at the very local level, without constraining the local labour

market area to be defined only on the basis of administrative borders (i.e. municipality, province or regions) as done in previous papers on this topic.

The evidence obtained from the results of the multinomial endogenous treatment model reveals that selection based on unobservable traits strongly matters, thus indicating that OLS estimates do not provide a reliable picture of the effects of working while studying on early career outcomes. More specifically, after controlling for self-selection, the probability of being employed after four years from graduation is significantly higher only for graduates who have been working in occupations related to their field of study compared to full-time students, regardless of work intensity. The likelihood of having a permanent job is generally significantly higher for graduates who had a job before completing the degree, but the effect is stronger for working activities related to the field of study. This result indicates that the beneficial effect of working while studying on future job stability seems to be mostly driven by the accumulation of occupation-specific skills. Finally, working in jobs unrelated to the field of study, especially part-time jobs, increases the risk of job-education mismatch at the early stage of the career, since the probability of having a position that requires the specific degree is significantly lower relative to full-time students.

Overall, these findings point out the primary importance of working in jobs related to the field of study while enrolled in higher education to improve graduates' labour market outcomes. Moreover, our paper highlights the relevance of categorising pre-graduation working activities along different dimensions and confirms the need to account for self-selection based on unobservable traits to properly estimate the impact of combining undergraduate studies and work on future employability. Therefore, the evidence reported in this paper reinforces the policy implications emerging from recent works on the issue of working while studying, suggesting that academic policymakers should foster student work in occupations related to the field of education to generate an important value added in terms of human capital, cognitive and non-cognitive skills and relevant work experience for university students. The introduction of compulsory internship programmes as part of the learning process in several university degrees indeed represents a sensible route to follow. The structure of the paper is as follows. In Section 2, we review the existing literature on the relationship between working while studying and labour market performances. In Section 3, we describe the data and present some descriptive statistics. Section 4 explains the details of the empirical strategy, while Section 5 reports the main results. The conclusions are drawn in Section 6.

2. Related Literature

What do we know so far about the effect of working while studying on post-graduation labour market outcomes? Although there are several, possibly complementary, theoretical reasons to consider that university students' work pays off in the labour market, the existence and the amount

of such return is ultimately an empirical question, which represents the focus of several papers published over the last two decades. Most of the papers have a descriptive nature and rely on conditional correlations, since they do not take into account self-selection into pre-graduation work activities. Molitor and Leigh (2005) estimate the wage return to each additional year of in-school work experience, both at the high school and college level. They reported that work experience acquired while in education among US graduates, especially in two-year colleges, positively correlates with future wages. Geel and Gellner (2012) explicitly consider whether pre-graduation jobs are related or not to the field of study and report that only having worked in matched jobs correlates with graduates' labour market outcomes (i.e. higher earnings, lower job search duration and risk of unemployment). Similarly, Weiss et al. (2015) analyse the effect of student work among German graduates and found that only voluntary jobs related to the field of study are beneficial for employability, while unmatched jobs may even be detrimental in some cases. This evidence is confirmed in the multi-country study by Passaretta and Triventi (2015), who analyse the conditional correlation between working while studying, also taking into account the relationship with the degree. Their results indicate that experiencing any kind of pre-graduation work activities is negatively associated with the probability of being unemployed in Italy and Spain, while a negative correlation with the risk of skill mismatch emerges for jobs related to the degree. However, negligible or no relationships are found for Germany and for Finland. Finally, Sanchez-Gelabert et al. (2017), using data regarding graduates from Catalan universities, find a positive correlation between a single indicator of working while studying that does not take into account both work intensity and the match with the degree's contents, and a composite measure of employability.

However, as already stressed, the estimates reported in these studies are unlikely to represent causal relationships, since they use non-experimental data in which observed pre-graduation work activities may be impacted by potentially endogenous choice of the students. In particular, there are several unobserved students' characteristics that might jointly affect both the propensity to work before completing the university degree and future labour market outcomes. To tackle this issue, some authors apply different empirical strategies to deal with the problem of students' selection based on unobservable characteristics, in order to provide causal estimates of the returns to work while studying. The first work that highlights the importance of accounting for unobservable traits when estimating the effect of student work on performance is the paper by Hotz et al. (2002). They account for unobserved heterogeneity using a dynamic model to estimate the wage return to part-time and full-time employment among US graduates. The results show a general positive effect of working activities and wages. Also, Hakkinen (2006) estimates IV regressions using local unemployment rate as instrument for pre-graduation work activities and finds that working before

graduation generates a positive wage return among Finnish university graduates, with this effect declining with years from graduation. More recently, Margaryan et al. (2020) use an identification strategy based on the compulsory nature of internship experiences at the university programme level as source of exogenous variation. Their IV approach identifies the causal effect of student internship among those for whom this type of work experience was mandatory at degree level, and indicates that this specific work experience is rewarded in terms of earnings both in the short and medium term and reduces the risk of unemployment after graduation.

Overall, the results reported in this latter group of papers that deal with the issue of self-selection confirm the existence of positive returns to working while studying and highlight the importance of dealing with selectivity issues. Nonetheless, none of these works take into account the role played by both work intensity and, most importantly, the match with the degree. In this paper, we aim at filling this gap in the literature, by estimating the effect of different types of pre-graduation job activities, classified according to work intensity and match with the degree, in a framework that controls for self-selection into student work.

Although the majority of existing papers rely on non-experimental data proceeding from surveys, other recent works exploit experimental setups. The issue of self-selection is resolved by the experimental nature of the data, in which pre-graduation working activities are randomly allocated either according to lotteries or to field experiments. Le Barbanchon et al. (2020) make use of the Uruguayan programme that assigns jobs in public-owned firms for one year to university students according to the results of a lottery. Although the match between selected students and jobs is mostly done according to compatibility with study intensity (rather than on job-degree match), the authors report positive causal estimates of student work on earnings and employment during the subsequent four years. Other papers rely on field experiments, through the random allocation of student jobs in fictitious resumes that are sent to available job advertisements. The first analysis based on this alternative methodology is Baert et al. (2016), who sent fake CVs to job vacancies in Flanders. In this paper, pre-graduation work experiences of recent university graduates are classified either as related or unrelated to the field of study. Moreover, the unrelated jobs could be performed either during the entire academic year or limited to the summer season. The authors report no significant differences in call back rates relative to CVs with no work experience, possibly because (hypothetical) jobs related to the degree were performed during the summer only. Nunley et al. (2016) perform a similar field experiment in the US labour market, but specifically consider student internship experiences. They report a significantly higher call back rate for resumes with internship. In another experiment, Baert et al. (2019) also analyse the effect of voluntary internship experiences (in Flanders) and find a positive effect on the chances of being contacted for a job

interview, which is generally homogeneous with respect to several characteristics included in the fictitious resume. This evidence indicates that students working in internship programmes that are likely to be related (at least to some extent) to the degree field of study, generates positive signals in the labour market in terms of increasing the rate of job offers while searching for employment. Finally, the recent paper by Van Belle et al. (2020) specifically focuses on what student work signals in the CV, and provides novel evidence based on an experimental study using vignettes. They adopt a similar definition of pre-graduation jobs as in Baert et al. (2016) and try to understand which skills are signalled by different types of work activities. Their results indicate that summer jobs increase the interview rate (which is somewhat at odd with the results from other experiments). Moreover, they report that any kind of job generates signals of better horizontal skills (work attitude, sense of responsibility and maturity, increased motivation and larger social capital), but only pre-graduation jobs related to the degree generate positive signals of increased skills and better trainability. Overall, the experimental evidence confirms the existence of positive returns in the labour market of pre-graduation work activities especially when they are matched to the degree's content, since this kind of work experience not only increases graduates' endowment of human capital and skills, but also generates additional valuable signals that matter for the job search.

3. Data and Descriptive Statistics

The empirical analysis is based on data from three successive waves of the "Survey on Labour Market Outcomes of University Graduates", which is implemented by the Quality Assurance Agency for the Catalan University System (AQU). The AQU survey takes place every three years (starting from 2001) and is administered to individuals born in Spain who graduated four years before in any of the seven public universities of the Spanish region of Catalonia.[3] We use the data from the last three waves of 2011, 2014 and 2017 — covering graduates in 2007, 2010 and 2013 respectively — since they contain homogeneous information for our key variables.

The AQU survey contains information on individuals' socio-demographic characteristics, pre-graduation work activities, as well as labour market outcomes such as employment status, type of job, required qualification and type of contract that refer to the year in which the survey takes place (i.e. four years after graduation). Moreover, the AQU survey provides administrative information

[3] From the 2008 wave, private universities and on-line universities have been progressively incorporated in the survey. However, in this paper we focus only on graduates from public universities (which account for about 75% of the whole population of graduates), since not all the variables of interest are available for private and on-line universities and because these universities are fully covered only from the 2014 wave of the survey. Moreover, foreigners who graduated from Catalan universities are only covered in the last wave of the survey (2017) and represent less than 4% of the observations of this wave. Notice also that for public universities, the response rate in the last three waves is around 55%, with a sampling error of about 0.6%. More information about the AQU survey can be found at: http://www.aqu.cat/estudis/graus/index_en.html#.VouW2FKrEx9.

about the year of graduation, the specific degree obtained, the university of graduation and the municipality of residence during university attendance. The latter variable, as explained in the next section, represents an important value added of the AQU survey and is of crucial importance for our identification strategy.

Our main explanatory variable concerns work experiences while completing the degree. The question refers to the working situation in the last two years before graduation and specifically asks whether the individual was 1) a full-time student, 2) working part-time in a job related to the field of study, 3) working part-time in a job not related to the field of study, 4) working full-time in a job related to the field of study and 5) working full-time in a job not related to the field of study. Therefore, with this information, we are able to classify pre-graduation jobs according to both work intensity and job-field match; this categorisation, to the best of our knowledge, has never been considered in previous studies on this topic.

Regarding labour market outcomes, we consider employment status and two variables reflecting job quality: having a permanent contract (versus fixed-term contracts or other situations[4]) and the qualification required for the current job, in particular, if it is the specific university degree.

For the purposes of our empirical analysis, we restrict the sample to individuals who graduated when they were at most 30 years old (in order to avoid including individuals in an advanced stage of their career) and we exclude individuals who enrolled at the university while being employed in the occupation they hold in the year of the survey. Graduates in Medicine are also excluded, because they are involved in a compulsory specialisation internship four years after graduation. We excluded observations with missing values in relevant variables and we retained only individuals who resided in Catalonia while studying (88% of the whole sample), since this is a necessary requirement for the instrument that we use to rule out self-selection into working situations before graduation. In this way, we end up with a final pooled sample of 24,704 observations for the empirical analysis.

Descriptive statistics for the set of variables used in the empirical analysis are reported in Table 1, for the pooled sample and separately by wave. The raw data indicates that about 89% of individuals in our sample were employed at the time of the survey, a proportion that is quite stable across waves. Nonetheless, the incidence of permanent contracts among those who are working (53% for the pooled sample) decreases over time, reflecting the effects of the economic crisis that severely hit the Spanish labour market. Furthermore, 62% of employed individuals work in a job

[4] Other situations include the graduates in the survey who declare to be self-employed (8.5%), internship work (4.9%) or irregular employment (0.75%).

well matched with the obtained qualification, although this percentage is slightly decreasing across waves (from 65% in 2011 to 62% in 2017).

Regarding our main independent variable of interest, the data highlight that combining some kind of job with college is a common situation among individuals in our sample, since only 35% of students declare not to have been involved in working activities during the last two years of undergraduate studies. The majority of those who work while studying are employed in part-time jobs, mainly related to their field of education (29%), although an important share of graduates work in occupations unrelated to their university degree (21%). Those employed in full-time jobs account for 16% of students, and are mainly employed in jobs related to the field of education. In Table 2, we report descriptive statistics by working situation before completing the degree. It can be noted that four years after graduation, working while studying is generally associated with better labour market outcomes, even if there are differences according to both job intensity and the relationship between the job and the field of study. In fact, the unconditional probability of being employed is higher among graduates who have worked in jobs related to their field of education (91-92%). Moreover, the incidence of permanent contract among employed graduates who were already working before completing the degree is generally higher than for full-time students, especially for those working full-time in a job that matches the field of their degree (67% against 47% for full-time students). More remarkably, graduates working in occupations unrelated to their field before completing the university degree are less likely to have a job that requires their specific degree after graduation (between 41% and 55%). On the contrary, those who worked in occupations related to their field of study during university have similar chances to have a job that requires their specific degree compared to full-time students (65%-68% relative to full-time students, 64%).

4. Empirical Methodology

The starting point of our empirical analysis consists in estimating OLS equations that explain each labour market outcome as a function of exogenous covariates and indicators for different working situations before completing the degree. More specifically, we consider that each outcome (Y_i) depends on pre-determined individual characteristics included in the vector X_i (gender, age and parental education), field of study and university fixed effects (θ_f and π_u respectively), wave dummies (τ_w) and a set of indicators for each possible pre-graduation working status ($W_i = j$) taking as reference category full-time students ($j = 0$):

$$Y_i = \alpha + \beta' X_i + \sum_{j=1}^{J} \gamma_j I(W_i = j) + \theta_f + \pi_u + \tau_w + u_i \quad (1)$$

We estimate equation (1) considering as dependent variable(s): a) a dummy for being employed, b) an indicator for having a permanent contract, c) an indicator that takes the value of one if the specific degree was required during the hiring process.

However, OLS estimates of the γ_j parameters are consistent only if the unobservable factors that affect the propensity to work in a specific kind of job during the degree are unrelated to the error term of each outcome, which is unlikely to be the case, as suggested by previous empirical works. Indeed, unobservable traits — such as cognitive and non-cognitive abilities, motivation, expectation, etc. — could affect both the decision to work and any of the outcomes that we consider in this paper.

In order to control for the self-selection bias due to unobservable characteristics, we rely on the estimation of a multinomial endogenous treatment model (proposed by Deb and Trivedi, 2006), which allows to jointly model working decisions before graduation and labour market outcomes. A similar approach was previously applied by Triventi (2014), who analysed the impact of working while studying on academic performance, allowing for selection into full-time or part-time jobs (versus only studying). Here we exploit the available information in our dataset, in which pre-graduation jobs are classified according to work intensity and their relationship with the degree's content.

Specifically, we consider that the choice of working status follows a mixed multinomial logit distribution, which means that the probability of observing individual i in working status j can be described as:

$$\Pr\left(W_{im}=j\middle|X_i,Z_m,\theta_f,\pi_u,l_{ij}\right)=\frac{\exp(\mu_j+\psi_j^{'}X_i+\varphi_j Z_m+\theta_{fj}+\pi_{uj}+\tau_{wj}+\delta_j l_{ij})}{1+\sum_{k=1}^{J}\exp(\mu_k+\psi_k^{'}X_i+\varphi_k Z_m+\theta_{fk}+\pi_{uk}+\tau_{wk}+\delta_k l_{ik})}. \quad (2)$$

Equation 2 shows that the likelihood of being assigned to the working status j for the individual i residing in municipality m depends on a set of observed individual characteristics (X_i), a measure of local employment potential (Z_m, described below), field/university fixed effects (θ_f and π_u), wave dummies (τ_w) and latent factors l_{ij} that proxy the unobserved individual heterogeneity affecting the propensity of having a certain kind of job before graduation (relative to full-time students).[5] The selectivity-corrected outcome equation becomes:

$$Y_{im}=\alpha+\beta^{'}X_i+\sum_{j=1}^{J}\gamma_j I(W_{im}=j)+\theta_f+\pi_u+\tau_w+\sum_{j=1}^{J}\lambda_j l_{ij}+\varepsilon_{im} \quad (3)$$

[5] The parameters associated with the latent factors in the multinomial choice equation are normalised as $\delta_j = 1$ for every option j, as in standard multinomial logit models.

which corresponds to equation (1) augmented by the latent factors l_{ij}, capturing the unobserved factors determining the decision to work while studying that also affect the final outcome. The associated factor loadings λ_j can be interpreted as selection terms, which capture the correlation between the unobservable determinants of having a given kind of job (relative to being a full-time student) and each of the outcomes we analyse. A positive (negative) λ_j coefficient indicates that the working status j and the outcome are positively (negatively) correlated through unobserved individual characteristics, indicating the existence of positive (negative) selection relative to the base category (full-time students). Therefore, the γ_j coefficients estimated from equation (3) capture the effect of each type of pre-graduation work experience on the outcome of interest, after partialling out selection effects based on unobservable traits.

Assuming that the latent factors follow a standard normal distribution, the estimation of this joint model can be carried out through maximum simulated likelihood. To achieve identification without relying only on distributional assumption, we include an exclusion restriction in the multinomial equation (Z_m). The exclusion restriction variable has to be a strong predictor of working choices before graduation and — conditional on the set of explanatory variables included in equation (3) — has to be uncorrelated with unobserved determinants of labour market outcomes.

Several related papers exploited local/regional unemployment rate as exclusion restriction for working conditions before degree completion under the assumption that labour market conditions at the time of taking the decision to work do not affect the final outcome directly (see, among others, Hakkinen, 2006 and Triventi, 2014). In this paper we adopt a similar strategy, since we also exploit variation at the local level (i.e. the municipality of residence during the degree) to achieve identification. However, instead of using the unemployment rate, we constructed another measure to proxy for local labour market opportunities. This variable consists in the percentage of registered employment contracts over working age population (in a given year) within a radius of 30 km surrounding the student's municipality of residence two years before the graduation year. This measure allows us to capture employment potential at the very local level, without constraining the area capturing local labour markets to be defined only on the basis of administrative borders (i.e. municipality, province or regions), as done in previous papers on this issue. In particular, the instrument has been constructed as follows. We have first retrieved administrative information about the number of newly registered employment contracts for each municipality of Catalonia during a specific year.[6] Second, we have collected data on working age population from the

[6] This information is available on a monthly basis since 2005 on the webpage of the Spanish Employment Bureau: https://www.sepe.es/HomeSepe/que-es-el-sepe/estadisticas/datos-estadisticos/municipios.html.

administrative register of inhabitants at the municipality level. Finally, for each year we have computed the ratio between the total number of registered contracts and the number of working age individuals of all municipalities within a radius of 30 km from the municipality of residence of the individuals. This variable represents a proxy for (potential) local labour market opportunities in a given period. Since we aim at predicting working activities two years before graduation, we imputed our measure of employment potential to each graduation cohort according to the population-weighted average from the two years preceding the graduation (e.g. 2011 and 2012 for those graduated in 2013 and interviewed in 2017). The spatial distribution of our proxy for employment potential is displayed in Figure 1, separately for the three periods 2005-2006, 2008-2009 and 2011-2012 (which are imputed to waves 2011, 2014 and 2017 respectively) and represents the exclusion restriction used as predictor of work activities before graduation (Z_m). As long as the main exclusion restriction varies at the municipality level, we cluster standard errors accordingly.

As previously observed, employment potential before graduation can be considered a valid exclusion restriction if it has a strong predicting power to explain the probability of having a given kind of job while studying, but does not affect directly labour market outcomes. The first condition is likely to hold, since the probability of working while studying is influenced by local labour market conditions and the existence of such relationship can be directly inferred from the data. The second condition represents an identifying assumption. The validity of the use of local employment potential as exclusion restriction might be questioned in case of persistency in local labour market conditions over time, which could affect labour market status four years after graduation (Oreopoulos et al., 2012). However, there are reasons to consider that this issue is not likely to be a serious concern in this case. First, we impute employment potential according to the information from two years before graduation, while labour market outcomes are observed four years after graduation, implying a six-year lag with respect to the measurement of local labour market conditions. Second, we considered the information regarding the municipality of residence before graduation, but the completion of the university degree tends to increase geographical mobility (e.g. Haapanen and Böckerman, 2017), which might break the link with post-graduation employment potential and pre-graduation local labour market conditions. Third, the inclusion of university indicators and a large set of field of study fixed effects should capture most of the unobserved heterogeneity (due to family or local unobservables) that might create a direct correlation between our measure of employment and the residuals of the outcome equation(s).

5. Results

5.1 OLS Estimates

Table 3 shows the OLS estimates of the impact of combining working activities with university education on post-graduation labour market performance. As for the probability of being employed 4 years after graduation (column (1)), this is generally higher for those who have worked during tertiary education. The highest estimated differentials are associated with jobs related to the field of education (+3.1 percentage points and +4.8 percentage points for part-time and full-time respectively). The employment "premium" for working while studying is lower for those working in jobs not related to the field of education: +2.3 percentage points and +1.2 percentage points for part-time and full-time jobs respectively, with the latter insignificantly different with respect to full-time students. When considering the probability of getting a permanent contract (column (1) of Table 3) the picture slightly changes, since work intensity appears to be more relevant than job-field match for the chances of being in a stable job position. In fact, for those who have worked full-time the probability of having a permanent contract 4 years after graduation is higher by 9.2 percentage points and 9 percentage points (for jobs related and not related to the field of education respectively) with respect to full-time students, while for those working part-time these premiums are of 5.5 percentage points for jobs related to the field of education and 6 percentage points for not related jobs. Finally, considering the match between the job 4 years after graduation and the specific degree obtained, graduates who have worked in jobs not related to their field of education have a significantly lower probability to end up in occupations that match their specific degree (-3.9 percentage points and -14 percentage points for part-time and full-time jobs respectively), relative to their full-time student counterparts. On the contrary, individuals who have worked in occupations that match their field of education have a higher probability, with respect to full-time students, to end up in jobs that require their specific degree (+4.1 percentage points and +3.2 percentage points for part-time and full-time jobs respectively).

5.2 Multinomial Endogenous Treatment Model Estimates

The results obtained by OLS suggest that working before graduation in jobs related to the field of education, particularly full-time, is crucial in order to better perform in the labour market at the early stage of the working career. However, these estimates might be biased due to the presence of unobserved factors that might simultaneously affect the probability of working while studying and labour market performance. In order to control for this possible self-selection into working activities, we estimate multinomial endogenous treatment models that allow controlling for latent factors in

order to properly identify the impact of working while studying on future labour market outcomes. As explained in Section 4, we use as exclusion restriction the number of registered contracts over working age population for all municipalities within a radius of 30 km from the municipality of residence of the individuals, during the two years before the graduation. We report the estimates from the multinomial selection equation (Eq. (2)), expressed as average marginal effects in Table A1 in the Appendix. It is possible to see that our employment potential measure in general has a significant effect on employment decisions before graduation, thus confirming the validity of the elicited variable for predicting the endogenous working condition variable.

Table 4 shows selected estimates from the final outcome of the multinomial endogenous treatment model (Eq. (3)). First of all, the multinomial endogenous treatment model confirms the results obtained by OLS, which highlights the importance of working in a job that matches the field of study to enjoy higher chances of being employed after graduation. After ruling out self-selection, the employment premium for having worked in a job related to the field of study is 6.3 and 5.2 percentage points for part-time and full-time jobs, respectively, which are slightly higher than the corresponding OLS estimates. This is indeed due to the presence of a (modest) negative selection, as shown by the λ coefficients associated to these two working conditions, indicating that individuals who are more likely to self-select into jobs related to the degree before graduation based on their unobservable traits are less likely to be employed after completing the degree. The estimated difference in employment probability between students who worked full-time in a job unrelated to the field of education and full-time student is again not significant, whereas, after having taken into account selection, working in a part-time job mismatched with the field of education turns out to decrease the chances to be employed.

Considering the probability of ending up with a permanent contract, our selectivity-corrected estimates confirm that having worked before graduation has generally a positive effect on the chances of getting a permanent contract four years after completing university. Nonetheless, the difference in the probability of having a stable position relative to those who never worked before graduation is stronger for jobs related to the field of study.

Finally, the evidence regarding post-graduation job-qualification match obtained from the joint multinomial selection model is in line with previous OLS estimates, as for what concerns the detrimental effect of pre-graduation job experiences unrelated to the field of study on post-graduation job match. These effects are higher than the corresponding OLS estimates, especially for part-time unrelated jobs, due to the strong positive selection into this kind of work activity due to unobservable characteristics. This means that those who are more inclined to get an unrelated job before graduation due to their unobservable characteristics are more likely to be in the same status

after graduation as well. As for the estimates attached to part-time and full-time pre-graduation jobs related to the field of study, these are both positive, but not precisely estimated.

On the whole, these results point to the following findings. First of all, in order to properly gauge the impact of working while studying on future employment performance, it is crucial to take into account not only work intensity, but also the relationship between the job and the field of education. In fact, part-time and full-time pre-graduation work experiences show different payoffs after graduation according to their match with the degree's contents. Second, our findings reveal that, overall, what really matters is having a pre-graduation job that matches the field of study. In fact, those who have worked in occupations related to their studies have generally better post-graduation labour market outcomes than their counterparts who have studied full-time. The former are also more likely to be employed after graduation than individuals working in occupations unrelated to their field of study and have better chances of having a job that matches their specific degree. Even job stability is more positively affected by work experiences related to the contents of bachelor studies. Third, self-selection matters and must be taken into account in order to obtain a reliable and clear picture about the effects of working while studying on subsequent labour market outcomes. In fact, the unobservable characteristics that affect the propensity to combine working activities with university education are, in most cases, also related to post-graduation employability and job quality.

6. Conclusions

This paper investigated the relationship between work activities carried out before completing the university degree and their subsequent labour market performance. Pre-graduation jobs are classified according to two relevant dimensions: work intensity (part-time and full-time) and the relationship with the field of study.

We take into account endogenous self-selection into each type of pre-graduation jobs, using a multinomial endogenous treatment model that exploits a measure of local employment potential as identifying variable. The results indicate that the probability of being employed four years after graduation is higher for graduates who have been working in occupations related to their field of study, regardless of work intensity, than for full-time students. At the same time, those working full-time in a job not related to the field of education show the same chances to be employed as full-time students, while part-time students turn out to be penalised. Also job intensity at the early stage of the career is clearly related to pre-graduation work experiences, since the chances of having a stable position increase for graduates who worked in jobs related to their field of study, while the

likelihood of having a job that requires the specific degree obtained four years after graduation is significantly lower for those who worked in jobs unrelated to their studies before university completion.

Overall, these findings highlight the primary importance of working in jobs related to the field of education while enrolled in higher education in order to improve graduates' career success. Therefore, our results support the need to promote pre-graduation employment in activities that are matched to the degree's content, such as compulsory internship programmes. Moreover, the empirical analysis highlights the relevance of jointly considering different dimensions of pre-graduation working activities to understand whether and to what extent they affect future employability and job quality, since not every kind of work activity pays off in the graduates' labour market. Finally, our work emphasises the need to account for self-selection based on unobservable traits, in order to properly appreciate the costs and benefits of combining study and work for graduates' labour market outcomes.

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Figures and Tables

Figure 1: Employment Potential Measure by Wave

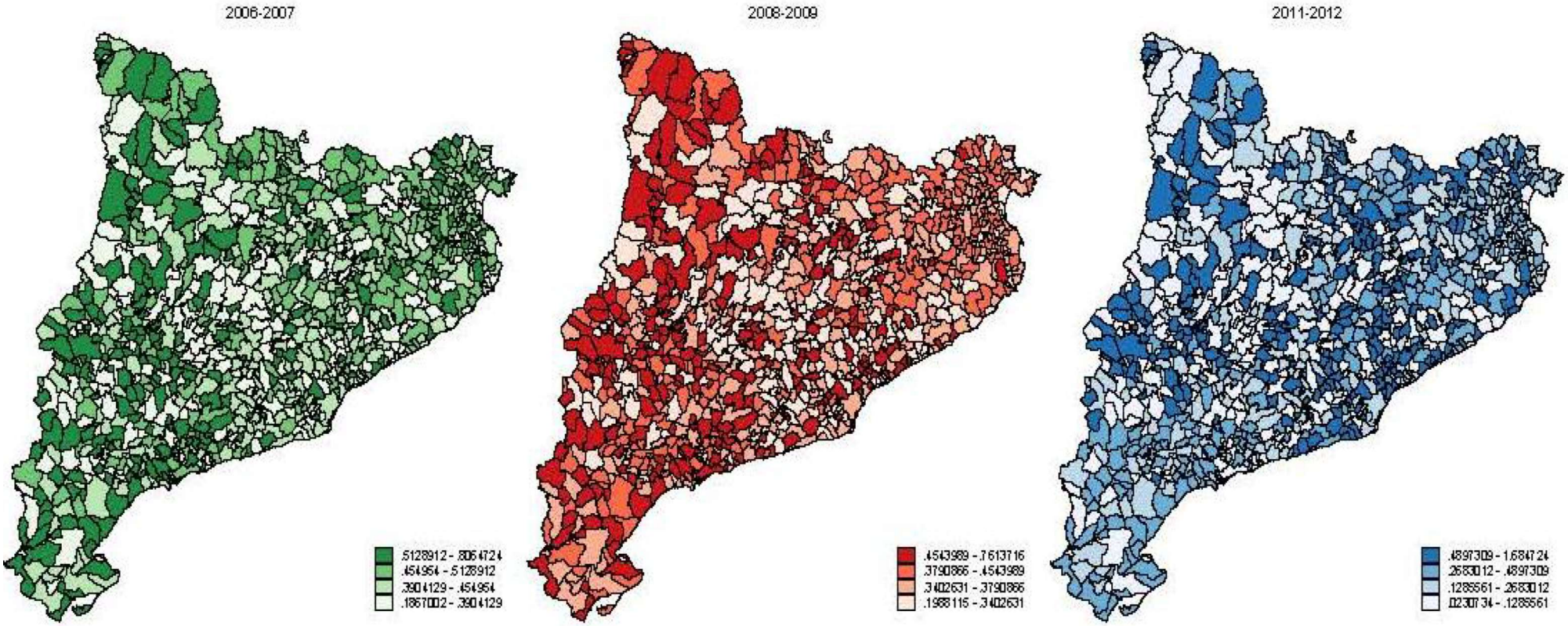

Table 1: Descriptive Statistics (pooled sample and by wave)

	Pooled Sample		Wave 2011		Wave 2014		Wave 2017	
	mean	*s.d.*	mean	*s.d.*	mean	*s.d.*	mean	*s.d.*
Employed	0.89	0.32	0.89	0.31	0.87	0.34	0.90	0.30
Permanent Contract	0.53	0.50	0.58	0.49	0.51	0.50	0.51	0.50
Specific University Degree Required	0.62	0.48	0.65	0.48	0.61	0.49	0.62	0.49
Full-Time Student	0.35	0.48	0.33	0.47	0.34	0.47	0.39	0.49
Part-Time Job —Related to the Field of Study	0.29	0.45	0.28	0.45	0.32	0.47	0.25	0.44
Part-Time Job —Not Related to the Field of Study	0.21	0.40	0.17	0.37	0.20	0.40	0.25	0.43
Full-Time Job —Related to the Field of Study	0.12	0.32	0.17	0.37	0.10	0.31	0.08	0.27
Full-Time Job —Not Related to the Field of Study	0.04	0.19	0.05	0.22	0.03	0.18	0.03	0.18
Wave 2011	0.33	0.47						
Wave 2014	0.34	0.47						
Wave 2017	0.34	0.47						
Male	0.40	0.49	0.39	0.49	0.40	0.49	0.42	0.49
Age	28.42	2.25	28.60	2.26	28.42	2.31	28.24	2.15
Highest Parental Education = Primary or Less	0.29	0.46	0.34	0.47	0.31	0.46	0.24	0.43
Highest Parental Education = Secondary	0.31	0.46	0.31	0.46	0.30	0.46	0.31	0.46
Highest Parental Education = Tertiary	0.40	0.49	0.35	0.48	0.39	0.49	0.45	0.50
Field of Study = Humanities	0.04	0.20	0.05	0.22	0.04	0.19	0.04	0.20
Field of Study = Language	0.05	0.21	0.05	0.22	0.04	0.20	0.05	0.21
Field of Study = Art	0.01	0.11	0.01	0.09	0.01	0.08	0.02	0.14
Field of Study = Business & Economics	0.13	0.34	0.12	0.33	0.14	0.35	0.13	0.34
Field of Study = Law, Sociology and Political Sciences	0.11	0.32	0.12	0.32	0.10	0.30	0.12	0.33
Field of Study = Communication & Journalism	0.05	0.21	0.05	0.22	0.05	0.22	0.04	0.20
Field of Study = Education	0.12	0.32	0.11	0.32	0.13	0.34	0.11	0.31
Field of Study = Social work	0.03	0.18	0.03	0.17	0.04	0.19	0.03	0.17
Field of Study = Biology, Geology and Environmental Sciences	0.07	0.25	0.06	0.24	0.07	0.25	0.07	0.25
Field of Study = Chemistry, Physics, Maths & Statistics	0.04	0.19	0.05	0.21	0.04	0.19	0.03	0.18
Field of Study = Health (excluding Medicine)	0.04	0.18	0.03	0.17	0.04	0.19	0.04	0.19
Field of Study = Psychology and Related Degrees	0.04	0.20	0.03	0.17	0.03	0.18	0.06	0.23
Field of Study = Farmacy, Biomedicine and Veterinary	0.03	0.17	0.02	0.15	0.02	0.15	0.04	0.20
Field of Study = Architecture & Construction	0.05	0.21	0.05	0.21	0.04	0.21	0.05	0.22
Field of Study = Industrial, Chemical & Electronic Engineering	0.09	0.29	0.09	0.29	0.09	0.28	0.09	0.29
Field of Study = Telecommunication & Informatics	0.08	0.27	0.10	0.30	0.09	0.28	0.05	0.23
Field of Study = Agricultural Engineering & Related	0.02	0.15	0.03	0.16	0.03	0.17	0.01	0.12
Universitat de Barcelona (UB)	0.30	0.46	0.30	0.46	0.27	0.44	0.33	0.47
Universitat Autònoma de Barcelona (UAB)	0.25	0.43	0.26	0.44	0.22	0.41	0.26	0.44
Universitat Politècnica de Catalunya (UPC)	0.16	0.37	0.18	0.38	0.15	0.36	0.15	0.36
Universitat Pompeu Fabra (UPF)	0.09	0.28	0.09	0.28	0.09	0.28	0.08	0.28
Universitat de Girona (UdG)	0.09	0.29	0.10	0.31	0.10	0.30	0.08	0.27
Universitat de Lleida (UdL)	0.05	0.22	0.04	0.19	0.06	0.23	0.06	0.23
Universitat Rovira i Virgili (URV)	0.06	0.24	0.03	0.16	0.12	0.32	0.04	0.19
Number of observations	24,704		8,032		8,298		8,374	

Table 2: Descriptive Statistics (pooled sample and by working situation before graduation)

	Full-Time Student		Part-Time Job Related		Part-Time Job Not Related		Full-Time Job Related		Full-Time Job Not Related	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Employed	0.87	0.34	0.91	0.29	0.87	0.33	0.92	0.27	0.86	0.35
Permanent Contract	0.47	0.50	0.57	0.50	0.50	0.50	0.67	0.47	0.60	0.49
Specific University Degree Required	0.64	0.48	0.68	0.47	0.55	0.50	0.65	0.48	0.41	0.49
Wave 2011	0.31	0.46	0.32	0.47	0.26	0.44	0.47	0.50	0.43	0.50
Wave 2014	0.32	0.47	0.38	0.48	0.33	0.47	0.30	0.46	0.27	0.45
Wave 2017	0.37	0.48	0.30	0.46	0.41	0.49	0.22	0.42	0.29	0.46
Male	0.41	0.49	0.43	0.49	0.32	0.47	0.47	0.50	0.41	0.49
Age	27.76	1.96	28.60	2.20	28.38	2.17	29.55	2.46	29.88	2.40
Highest Parental Education = Primary or Less	0.26	0.44	0.29	0.45	0.32	0.47	0.36	0.48	0.36	0.48
Highest Parental Education = Secondary	0.30	0.46	0.31	0.46	0.32	0.46	0.31	0.46	0.32	0.47
Highest Parental Education = Tertiary	0.44	0.50	0.41	0.49	0.36	0.48	0.33	0.47	0.32	0.47
Field of Study = Humanities	0.04	0.20	0.02	0.15	0.09	0.28	0.01	0.10	0.08	0.27
Field of Study = Language	0.05	0.22	0.05	0.21	0.05	0.23	0.02	0.12	0.06	0.23
Field of Study = Art	0.01	0.11	0.01	0.08	0.02	0.14	0.00	0.05	0.01	0.08
Field of Study = Business & Economics	0.12	0.32	0.14	0.35	0.09	0.29	0.24	0.43	0.12	0.32
Field of Study = Law, Sociology and Political Sciences	0.10	0.31	0.08	0.27	0.16	0.36	0.10	0.30	0.24	0.43
Field of Study = Communication & Journalism	0.05	0.21	0.06	0.23	0.05	0.21	0.03	0.18	0.04	0.19
Field of Study = Education	0.12	0.32	0.13	0.34	0.12	0.33	0.09	0.28	0.10	0.30
Field of Study = Social work	0.02	0.14	0.03	0.18	0.05	0.21	0.04	0.19	0.04	0.21
Field of Study = Biology, Geology and Environmental Sciences	0.10	0.30	0.03	0.17	0.08	0.27	0.03	0.17	0.03	0.18
Field of Study = Chemistry, Physics, Maths & Statistics	0.05	0.22	0.03	0.17	0.04	0.19	0.03	0.16	0.03	0.18
Field of Study = Health (excluding Medicine)	0.04	0.19	0.03	0.17	0.04	0.19	0.04	0.20	0.02	0.13
Field of Study = Psychology and Related Degrees	0.04	0.20	0.03	0.16	0.07	0.25	0.02	0.12	0.06	0.24
Field of Study = Farmacy, Biomedicine and Veterinary	0.04	0.20	0.03	0.17	0.02	0.14	0.02	0.14	0.01	0.10
Field of Study = Architecture & Construction	0.04	0.19	0.08	0.26	0.02	0.15	0.06	0.25	0.02	0.13
Field of Study = Industrial, Chemical & Electronic Engineering	0.09	0.29	0.11	0.31	0.05	0.22	0.13	0.34	0.07	0.26
Field of Study = Telecommunication & Informatics	0.07	0.25	0.12	0.32	0.04	0.19	0.12	0.32	0.05	0.21
Field of Study = Agricultural Engineering & Related	0.02	0.15	0.02	0.15	0.02	0.14	0.03	0.17	0.03	0.16
Universitat de Barcelona (UB)	0.27	0.45	0.29	0.45	0.37	0.48	0.28	0.45	0.38	0.48
Universitat Autònoma de Barcelona (UAB)	0.25	0.43	0.22	0.41	0.29	0.45	0.22	0.41	0.28	0.45
Universitat Politècnica de Catalunya (UPC)	0.14	0.35	0.23	0.42	0.08	0.27	0.22	0.42	0.10	0.29
Universitat Pompeu Fabra (UPF)	0.11	0.31	0.08	0.27	0.07	0.25	0.07	0.26	0.06	0.24
Universitat de Girona (UdG)	0.10	0.31	0.09	0.29	0.09	0.29	0.09	0.28	0.09	0.28
Universitat de Lleida (UdL)	0.06	0.23	0.04	0.20	0.05	0.21	0.06	0.24	0.04	0.20
Universitat Rovira i Virgili (URV)	0.07	0.25	0.05	0.22	0.06	0.24	0.06	0.24	0.06	0.24
Number of observations	8,735		7,047		5,089		2,869		964	

Table 3: OLS Results

Outcome:	Employed	Permanent Contract	Specific Degree
Full-time Student		*reference category*	
Part-Time Job —Related	0.031***	0.055***	0.041***
	(0.005)	(0.008)	(0.008)
Part-Time Job —Not Related	0.023***	0.060***	-0.039***
	(0.006)	(0.009)	(0.009)
Full-Time Job —Related	0.048***	0.092***	0.032***
	(0.007)	(0.011)	(0.011)
Full-Time Job —Not Related	0.012	0.090***	-0.140***
	(0.012)	(0.018)	(0.017)
Male	0.000	-0.017**	-0.006
	(0.005)	(0.008)	(0.007)
Age	-0.003***	0.010***	-0.014***
	(0.001)	(0.002)	(0.002)
Highest Parental Education = Primary or Les		*reference category*	
Highest Parental Education = Secondary	0.008	-0.010	0.008
	(0.005)	(0.008)	(0.008)
Highest Parental Education = Tertiary	0.004	-0.029***	0.009
	(0.005)	(0.008)	(0.008)
R squared	0.03	0.12	0.13
Number of Observations	24,704	21,870	21,883

Note: robust standard errors in parenthesis; *** significant at 1%, ** significant at 5%, * significant at 10%. All regressions include dummies for wave, field of study and university.

Table 4: Multinomial Endogenous Treatments (selected coefficients)

Outcome:	Employed	Permanent Contract	Specific Degree Required
Part-Time Job — Related	0.063***	0.310***	0.055
	(0.011)	(0.021)	(0.061)
Part-Time Job — Not Related	-0.204***	0.174***	-0.424***
	(0.010)	(0.032)	-0.027
Full-Time Job — Related	0.052***	0.230***	0.027
	(0.008)	(0.058)	(0.032)
Full-Time Job — Not Related	0.010	0.031	-0.156***
	(0.012)	(0.100)	-0.033
λ_2	-0.051***	-0.294***	-0.033
	(0.007)	(0.024)	(0.073)
λ_3	0.273***	-0.121***	0.454***
	(0.007)	(0.035)	-0.032
λ_4	-0.016**	-0.145**	-0.005
	(0.008)	(0.067)	(0.027)
λ_5	-0.007	0.074	-0.002
	(0.009)	(0.107)	(0.022)
Number of Observations	24,704	21,870	21,883

Note: standard errors (in parenthesis) are clustered at the municipality level; *** significant at 1%, ** significant at 5%, * significant at 10%. All regressions include controls for gender, age, highest parental education, dummies for wave, field of study and university.

Appendix

Table A1: Average Marginal Effects from Mixed Multinomial Logit

ΔPredicted Probability:	Full-Time Student	Part-Time Job Related	Part-Time Job Not Related	Full-Time Job Related	Full-Time Job Not Related
Employment Potential (Z_m)	-0.142***	0.025	0.056**	0.044**	0.017
	(0.029)	(0.024)	(0.023)	(0.019)	(0.013)
Male	0.047***	-0.016**	-0.033***	-0.001	0.003
	(0.007)	(0.006)	(0.006)	(0.005)	(0.003)
Age two years before graduation, 19-21			*reference category*		
Age two years before graduation, 22-25	-0.155***	0.060***	0.026***	0.043***	0.026***
	(0.008)	(0.008)	(0.006)	(0.004)	(0.002)
Age two years before graduation, 26-28	-0.273***	0.028***	0.009	0.162***	0.074***
	(0.008)	(0.011)	(0.013)	(0.008)	(0.006)
Highest Parental Education = Primary or Less			*reference category*		
Highest Parental Education = Secondary	0.020**	0.015**	-0.022***	-0.010**	-0.003
	(0.008)	(0.007)	(0.006)	(0.005)	(0.003)
Highest Parental Education = Tertiary	0.047***	0.029***	-0.043***	-0.022***	-0.010***
	(0.007)	(0.007)	(0.006)	(0.004)	(0.004)
Wave 2011			*reference category*		
Wave 2014	-0.012*	0.048***	0.043***	-0.062***	-0.017***
	(0.007)	(0.007)	(0.006)	(0.005)	(0.003)
Wave 2017	0.035***	-0.017***	0.082***	-0.087***	-0.014***
	(0.008)	(0.006)	(0.007)	(0.005)	(0.003)
Field of Study = Humanities			*reference category*		
Field of Study = Language	0.028	0.148***	-0.172***	0.013**	-0.017**
	(0.019)	(0.017)	(0.017)	(0.006)	(0.007)
Field of Study = Art	0.105***	0.029	-0.093***	0.000	-0.041***
	(0.026)	(0.032)	(0.035)	(0.009)	(0.008)
Field of Study = Business & Economics	-0.054***	0.159***	-0.261***	0.190***	-0.033***
	(0.019)	(0.022)	(0.014)	(0.007)	(0.006)
Field of Study = Law, Sociology and Political Sciences	-0.028	0.057**	-0.119***	0.075***	0.016**
	(0.022)	(0.022)	(0.015)	(0.007)	(0.007)
Field of Study = Communication & Journalism	-0.035	0.195***	-0.197***	0.066***	-0.029***
	(0.023)	(0.023)	(0.017)	(0.008)	(0.007)
Field of Study = Education	-0.014	0.184***	-0.207***	0.068***	-0.031***
	(0.018)	(0.019)	(0.015)	(0.006)	(0.006)
Field of Study = Social work	-0.134***	0.152***	-0.125***	0.117***	-0.010
	(0.019)	(0.019)	(0.020)	(0.012)	(0.009)
Field of Study = Biology, Geology and Environmental Sciences	0.174***	-0.015	-0.151***	0.038***	-0.046***
	(0.015)	(0.019)	(0.015)	(0.006)	(0.007)
Field of Study = Chemistry, Physics, Maths & Statistics	0.134***	0.057***	-0.199***	0.049***	-0.040***
	(0.016)	(0.018)	(0.017)	(0.010)	(0.006)
Field of Study = Health (excluding Medicine)	-0.012	0.101***	-0.178***	0.134***	-0.044***
	(0.027)	(0.025)	(0.021)	(0.014)	(0.008)
Field of Study = Psychology and Related Degrees	0.000	0.054***	-0.083***	0.029***	0.000
	(0.020)	(0.019)	(0.017)	(0.010)	(0.008)
Field of Study = Farmacy, Biomedicine and Veterinary	0.147***	0.123***	-0.279***	0.064***	-0.054***
	(0.036)	(0.031)	(0.018)	(0.010)	(0.006)
Field of Study = Architecture & Construction	-0.012	0.223***	-0.270***	0.114***	-0.055***
	(0.019)	(0.024)	(0.018)	(0.014)	(0.007)
Field of Study = Industrial, Chemical & Electronic Engineering	0.018	0.147***	-0.254***	0.129***	-0.040***
	(0.019)	(0.023)	(0.017)	(0.012)	(0.008)
Field of Study = Telecommunication & Informatics	-0.040**	0.244***	-0.278***	0.121***	-0.048***
	(0.018)	(0.023)	(0.015)	(0.010)	(0.006)
Field of Study = Agricultural Engineering & Related	0.030	0.109***	-0.204***	0.093***	-0.029***
	(0.024)	(0.022)	(0.024)	(0.013)	(0.011)
University of Barcelona (UB)			*reference category*		
Autonomous University of Barcelona (UAB)	0.029***	-0.026**	0	-0.001	-0.002
	(0.010)	(0.010)	(0.007)	(0.005)	(0.003)
Polytechnical University of Catalonia (UPC)	0.028**	0.045***	-0.064***	-0.003	-0.006
	(0.013)	(0.016)	(0.012)	(0.009)	(0.005)
Pompeu Fabra University (UPF)	0.102***	-0.022*	-0.057***	-0.011	-0.013***
	(0.009)	(0.012)	(0.012)	(0.007)	(0.004)
University of Girona (UdG)	0.068***	-0.014	-0.024**	-0.024***	-0.005
	(0.015)	(0.013)	(0.011)	(0.007)	(0.004)
University of Lleida (UdL)	0.106***	-0.059***	-0.038***	0.001	-0.009**
	(0.011)	(0.012)	(0.010)	(0.007)	(0.004)
Rovira i Virgili University (URV)	0.109***	-0.082***	-0.019	-0.007	-0.001
	(0.022)	(0.013)	(0.014)	(0.009)	(0.006)
Number of Observations	24,704	24,704	24,704	24,704	24,704

Note: standard errors (in parenthesis) are clustered at the municipality level; *** significant at 1%, ** significant at 5%, * significant at 10%.

UBIREA

Institut de Recerca en Economia Aplicada Regional i Públic
Research Institute of Applied Economics

WEBSITE: www.ub-irea.com • **CONTACT:** irea@ub.edu

AQR

Grup de Recerca Anàlisi Quantitativa Regional
Regional Quantitative Analysis Research Group

WEBSITE: www.ub.edu/aqr/ • **CONTACT:** aqr@ub.edu

Universitat de Barcelona
Av. Diagonal, 690 • 08034 Barcelona