Analysis of university student employment and its impact on academic performance

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Resumen

Introducción. La investigación tiene dos objetivos: caracterizar a los estudiantes universitarios que simultanean trabajo y estudios y el tipo de trabajo que desempeñan, por un lado, y analizar el efecto que tiene trabajar sobre distintas medidas de su rendimiento académico, por otro.

Método. El análisis se desarrolla a partir de información individual procedente de una encuesta (N=464) combinada con registros universitarios. Se han estimado modelos en los que se consideran distintas medidas del desempeño académico y en los que se controla por un amplio conjunto de factores (incluyendo características socioeconómicas así como medidas de motivación y de esfuerzo académico), distinguiendo entre distintos niveles de intensidad de la actividad laboral. Las técnicas usadas han sido la regresión logística, mínimos cuadrados ordinarios y variables instrumentales.

Resultados. Se confirma, en primer lugar, que una proporción significativa de los estudiantes universitarios españoles simultanea los estudios con un trabajo remunerado, siendo muy frecuente que trabajen de forma habitual durante periodos prolongados. Se observa, además, que es frecuente que quienes trabajan lo hagan motivados por necesidad y en tareas no relacionadas con el contenido de sus estudios, y que la propensión a trabajar es mayor entre los estudiantes de mayor edad, los extranjeros y los de mayor motivación. En segundo lugar, los resultados obtenidos sugieren que, en contraste con la propia percepción manifestada por los estudiantes, trabajar regularmente no tiene aparentemente un impacto significativo en sus resultados académicos.

Conclusión. El estudio añade evidencia sobre un tema relevante pero muy escasamente analizado en el caso español, sobre el que ni la teoría ni los estudios empíricos previos sobre casos internacionales ofrecen resultados concluyentes. Los resultados son útiles para la consideración que el desempeño de una actividad laboral debe recibir en el diseño de los itinerarios seguidos por los estudiantes universitarios.

Palabras Clave: Rendimiento académico, resultados académicos, educación superior, empleo estudiantil, motivación estudiantil, España.

Abstract

Introduction: The research has two objectives: to characterise college students who combine work and studies, and their jobs, on one hand; and to analyse the effect of work on various measures of academic performance, on the other.

Method. The study is developed using individual information derived from a survey (N=464) and from university records. We have estimated models that consider diverse measures of academic performance and control for a wide set of factors (including socio-economic characteristics and diverse measures of motivation and academic effort), distinguishing between different levels of intensity in the labour activity. The techniques used are logistic regression, ordinary least squares and instrumental variables.

Results. The evidence obtained confirms, first, that a noticeable proportion of Spanish university students have a paid job, and often work regularly for extended periods. It also is common for those who work to do so motivated by necessity, and to perform tasks unrelated to the content of their studies. Moreover, the likelihood of working is higher among older students, foreigners and those who have higher levels of motivation. Secondly, the results suggest that, in contrast to the perceptions expressed by students, working regularly does not appear to have a significant impact on their academic performance.

Conclusion. The article provides additional evidence on a very relevant issue that has however received very little attention in the Spanish case and for which neither theoretical studies nor previous empirical research have reached conclusive results. The article provides useful support for the consideration of employment-related issues in the designing of the itineraries followed by university students.

Keywords. Academic achievement, academic performance, academic outcomes, higher education, student employment, student motivation, Spain.

Introduction

It is very common for university students to work while pursuing their studies although this phenomenon varies significantly from one country to another. In Spain, despite the fact that student employment is lower than in other developed countries, this situation does affect a significant percentage of students, since around a third of higher education students in Spain combine work and study (Quintini, 2015).

Student employment has been analysed in-depth for other countries such as the United States or the United Kingdom (see for example Richardson, Kemp, Malinen & Haultain, 2013; Curtis, 2007; or Nonis & Hudson, 2006). Generally, evidence that working influences students' academic performance is inconclusive, as research suggests there are both positive and negative effects (Riggert, Boyle, Petrosko, Ash, & Rude-Parkins, C., 2006, and Stern & Nakata, 1991). There is, however, more conclusive evidence that employment during university studies has a positive effect on working careers and future salaries, as well as a negative impact on university permanence or duration of studies (for a comprehensive review of literature on these issues, see Riggert et al., 2006). Although in the specific case of Spain this question has been studied very little, a research by Ruesga, Da Silva & Monsueto (2014) suggests that work adversely affects academic performance, but only for students working 15 or more hours a week.

The objective of this article is twofold. First, we characterize working Spanish university students and their type of employment. Second, we analyse the effect employment has on these students' academic performance. Given that, to date, research of this nature is scarce in Spain, results of this study can help to fill this knowledge gap and, among other issues, help to determine how significant the need is to design learning and evaluation systems that guarantee equality of opportunity, training and education as well as successful learning outcomes for all student profiles, including employed students. We developed our empirical analysis using a database with very diverse information on socioeconomic, family and academic characteristics, as well as on students' jobs. This database combined individual data collected via a survey with other data coming from university records.

This research makes several contributions. First, a detailed characterization of student employment contributes novel information on an issue for which, contrary to other countries,

there is hardly any evidence in Spain, despite it affecting a substantial portion of students. Secondly, the evidence provided complements that obtained by the only other previous study to have examined the impact of student employment on academic performance in Spain (Ruesga et al., 2014). Compared to this latter work, our study explores alternative measures of academic achievement and includes a broad set of control variables including other factors that, in line with relevant literature, may be found to influence academic performance, such as student motivation or academic effort.

The relationship between work and university studies

Evidence currently available on the extent of student employment corresponds to a small number of countries, given that international comparative evidence is in general very scarce. The main exception is Quintini (2015), who, based on comparative evidence from the Survey of Adult Skills (as part of the Programme for the International Assessment of Adult Competencies or PIAAC), documents the phenomenon in 23 advanced countries or regions, showing that around 60% to 70% of students work in Anglo-Saxon and Nordic countries and between 20% to 30% work in Southern Europe. In spite of the extent of the phenomenon in many countries, and its significance for students, for educational institutions and for society as a whole, certain relevant issues, such as the relationship between work performance and academic achievement have been poorly researched. The quantity of studies is relatively modest, and an overwhelming majority of them are empirical. Consequently, although current literature answers some important questions on the impact of university student employment, important questions are left to be answered (a recent comprehensive review of studies on this subject can be found in Riggert et al., 2006; for an earlier review of literature, see Lyons, Krachenberg & Henke, 1986).

From a theoretical perspective, there are arguments both in favour of a hypothetical positive effect of student employment on academic achievement and of an opposite effect. Thus, negative effects of working can be drawn from a zero-sum model, where time spent working is taken away from time for studying. Conversely, positive effects can be substantiated using the model of primary orientation, where most motivated and skilled students may also be expected to be the most capable of balancing paid work and academic responsibilities (Warren, 2002).

Empirical evidence provided by existing studies on possible effects of employment on academic achievement is not conclusive either[1]. While some authors suggest employment has a harmful impact on academic outcomes (see, e.g., Tyler, 2003; Stinebricker & Stinebricker, 2003; or Hawkings et al., 1995), others point out that working has a neutral or even beneficial impact (Furr & Elling, 2000; Nonis and Hudson, 2006; Pascarella, Bohr, Amaury, Desler & Zusman, 1994; and Pascarella, Edison, Nora, Hagedorn & Terenzini, 1998; Hammes & Haller, 1983, and Gleason, 1993), although a negative impact is possibly more obvious in the case of longer working hours. Either way, it is important to specify that in all cases, identified effects are small. Different interpretations of results may be attributed to different research methods, or differences in the contexts under study, making it all the more relevant to extend these studies to other countries (Riggert et al., 2006).

Furthermore, it is important to note that students' employment is measured differently from one study to another (for further details see Riggert et al., 2006). Thus, while some studies consider working students as a group, without taking into account employment characteristics, other studies differentiate between part-time and full-time jobs according to the number of hours worked, based on different thresholds, the most common threshold being a 30 hour working week (see, for example, Pike, Kuh & Massa-McKinley, 2008; Lillydahl, 1990; or Hood, Craig & Ferguson, 1992). In the same way, some analyses distinguish between different motivations to work (Wenz and Yu, 2010); the extent to which the type of job is related to the nature of the studies (Stern, Finkelstein, Urquiola & Cagampang, 1997), or students' own perception of the impact of their job on their academic outcomes (Curtis, 2007). As far as measuring academic achievement is concerned, it should be noted that although a number of studies examining the relationship between employment and performance used alternative measures, such as the time needed to complete studies or attrition rates (see, for example, Canabal, 1998, or Gleason, 1993), a large part of them used a measure of students' average academic results in their degrees (in the case of the United States, the most usual being GPA, or *grade point average*) as dependent variable.

[1]This situation contradicts, as has been pointed out, the most conclusive evidence on the positive effect of student employment on subsequent professional achievements, as some studies suggest that working a moderate amount of hours can help with work accomplishments at the end of studies (Dundes and Marx, 2006), as well as in the sense that work experience acquired during study benefits future work performance, especially if the job is related to the field of study (Beffy, Fougère & Maurel, 2009).

In the case of Spain, evidence on the phenomenon of student employment is rather scant. Although there have been many studies on determining factors of academic performance and school failure among university students in Spain (see, for example, a review of these studies in Tejedor and García-Valcárcel, 2007), the effect of carrying out paid work is markedly scarce and, as far as we know, limited to the study of Ruesga et al. (2014). These authors base their empirical analysis on a survey completed by university students from a wide range of Spanish universities as well as on econometric models to estimate the determining factors of entry of university students into the labour market and its implications on academic achievement. In the first case, an estimation based on a multinomial logit model found evidence that the main determining factors of employment were: age, work experience prior to starting university studies and money transfers from families to students. In the second case, based on an instrumental variables model, they concluded that work adversely affects academic performance when students work more than 15 hours a week, although results also indicate that being employed may be positive when the workday is less than 15 hours long or when students have acquired work experience before entering university.

Method

Participants

The population under study was made up of students enrolled in the World Economy subject, part of the Business Administration and Management (ADE) degree at the University of Alicante and the double Tourism-ADE (TADE) degree of this university. This is a compulsory subject in the second year (first semester) in which 521 students were enrolled in both degrees in the academic year 2015/2016.

Instruments

Concerning the variables used in the analysis, three different measures of academic performance were used that included both measures of overall academic results (average degree grade, on a scale of 0 to 10, and number of credits approved per enrolment year) and of

the academic results obtained specifically during the semester of the survey (number of credits approved in the semester)[2].

Other variables used in the empirical analysis include socio-economic attributes (gender, age, nationality -distinguishing between Spanish, foreign and dual nationality-, position in the household -differentiating between child and other-, level of studies of both parents-tertiary studies or other types of studies- and relative level of income –self-classification in quartiles of income distribution for the whole of Spain[3]); academic (repeating a year, whether the degree is in vocational training, the extent of class attendance and the number of hours of academic preparation per week) and work variables. The latter includes relationship with employment (works / works occasionally / does not work); the number of hours worked by those who work habitually; perception of relationship with employment during the academic year; type of occupation (skilled / semi-skilled / unskilled); the employment activity sector; the reasons for working (including need or helping with family finances) and variables related to usually working legally; whether studying was possible without employment income; if the job was related to the degree; whether work negatively affected time to prepare degree subjects, and whether academic performance would improve in the absence of employment (in all cases, Likert type variables were used with values between 1 to 5, where 1 is total disagreement and 5 total agreement with the question).

Finally, different measures of students' motivation were also taken into account. Motivation was originally measured using a reduced scale of 8 items, based on two questionnaires on motivation to achieve: the MAE (Motivation and Anxiety of Execution) questionnaire by Pelechano (1975) and the MAPE-II questionnaire by Montero and Alonso (1992). Four items were taken from the MAE questionnaire that showed most loading in the Tendency toward Work Overload Factor (which are also present in the factor of Great Capacity for Work and Performance of the MAPE-II) and four items of the Ambition factor of the MAPE-II (which are also present in the MAE). Significantly, factors relating to achievement motivation

[2] Alternatively, other performance measures were taken into account, such as the number of total credits obtained in the degree or the qualification and the probability of passing the World Economy subject, respectively, but outcomes of the analysis were essentially similar. They are available upon request from the authors.

[3] It is based on the result of the OECD's online application "What's your share of the pie?" (http://www.compareyourincome.org/, OECD, 2015) where income and number of household members are introduced and the household's percentile in relation to Spain's income distribution is obtained using data from the OECD Income Distribution Database.

showed a strong relationship with academic performance and work performance in empirical analyses (Alonso, 1992; Castejón, 2014; Pelechano, 1975).

The factorial analysis carried out on these eight items, using the method of principal components extraction and varimax rotation, revealed the existence of two factors. The first factor, accounting for 36.7% of the variance, can be defined as ambition (for example, it includes items such as "I have always had ambitious aspirations in the work I have done" or " I think I'm quite ambitious"), with factorial loadings ranging from 0.85 to 0.67. The second factor accounted for 18.8% of the variance, with factorial loading ranging from 0.82 to 0.37, and is defined as Great Capacity for Work and Performance (as illustrated by the item "I often take on too much work at a time", or item 3, " when I work in collaboration with others, I am often more productive than them"). Reliability of internal consistency, estimated using the Cronbach alpha coefficient, was $\alpha = 0.79$ for the ambition factor and $\alpha = 0.69$ for the factor of great work and performance capacity.

A second-order factorial analysis performed on the factorial scores obtained in the first-order factorial analysis with the principal components and direct oblimin rotation methods revealed a single factor that explained 65.2% of the variance. Reliability of internal consistency of the eight items that made up the scale was also moderately high ($\alpha = 0.74$). Therefore, a total score consisting of the sum of all eight items on the scale was calculated, which consisted in the motivation variable finally used in the empirical analysis.

Procedure

In order to obtain information on the variables used in the analyses, the results of a survey carried out in the first semester of the course were complemented with individual information from University of Alicante records on each student[4].

A census type approach was chosen to implement the survey. Thus, all members of the population were invited to complete a questionnaire accessible through the internet, and it ob-

[4] The questionnaire used included a warning explaining that students who responded to the survey accepted that data provided would be combined with other data from records of the University of Alicante in order to perform the research. Subsequent procedures included the opening of a dossier for the transfer of personal data by the University of Alicante, which provided the requested information following a favourable report issued by the Legal Service.

tained a very high response rate (89.1%, 464 responses). The survey was carried out within a teaching network funded by the University of Alicante, which includes various members of the teaching and research staff with experience in teaching research as well as two students, in order to facilitate the exchange of experiences involving all parties.

Data analysis

Descriptive analyses

Tables A.1 and A.2 in the Annex show descriptions of the variables used in the research. Of the total number of students in the sample (464), 34.9% (162) had a paid job, thus confirming the relevance of the phenomenon in Spain, as a significant proportion of university students are affected. Paid work is habitual for 16.2% of students (75) and occasional for 18.7% (87), and the share of students working habitually full time is around 37% (full-time referring to a 30 hour working week, as typically applied in similar studies).

Table A.1 contains detailed descriptive information on academic achievement, socioeconomic and academic characteristics, as well as on motivation, differentiating between students who only study and those who are gainfully employed. Thus, our first observation regarding our main research interest group, i.e. students who work habitually, is that they have lower values in academic performance indicators, with big differences (of 5% significance) in two out of three academic performance indicators (average grade in the degree and number of credits approved in the semester). In the same way, students habitually employed show different socioeconomic characteristics compared to those who only study, because, among other circumstances, they are older (24.8 compared to 20.2 in the case of students who only study), mostly male and of foreign nationality; their parents have slightly lower levels of study and have a greater relative presence in households with lower-middle income levels). In addition, they show greater levels of motivation (the difference is significant at 1%). Finally, in terms of academic variables, students who work regularly are enrolled, in relative terms, in fewer subject credits; they show lesser class attendance; they generally devote fewer hours per week to academic work and attend the degree in a less vocational way.

Table A.2 shows additional information on the characteristics of working students and their jobs, differentiating between those who have a regular job (and, among these, those who work full-time) and, for comparative purposes, those who work only occasionally. Thus, the

average number of hours worked per week for students who work habitually is relatively high, at around 22 hours (36.5 hours for full-time students). As might be expected, most of those with a regular job say they work and study, or mainly work, especially those who work full-time (in contrast, practically all those who work on an occasional basis describe their situation as unique or mainly study). Likewise, those who work regularly and those who work occasionally are mostly employed in the service sector (96% and 88%, respectively) and around 70% in jobs requiring intermediate qualification levels. A significant portion of those who work are motivated by necessity, especially to help family finances, since around half of them declare they are very or quite in agreement that it would not be possible for them to study without their job's income. Additionally, they work mostly legally (around 60% of them declare doing so always or almost always) and in jobs that are unrelated to the subject of their studies (in 50% of cases there is no or almost no relationship). Finally, it should be noted that the general perception among students who work regularly is that working takes away time from their academic education (60% say that it affects them quite a lot or a lot) and negatively affects their academic performance (80 % declare that their academic achievement would improve quite a lot or a lot if they did not work).

Multivariate analysis

Multivariate analyses enabled to reach the two objectives pursued in this work: characterizing university students in Spain who work and study at the same time, as well as knowing the effects of working on academic performance of these students.

Starting with the first objective, in order to examine which attributes are significantly associated with a greater propensity of students to work habitually, and after eliminating composition effects, Table 1 shows results obtained via a logistic regression model estimate (results are very similar using a probit model). In this model, the dependent variable is a dichotomous variable reflecting whether students work habitually (or alternatively work full time, 30 hours or more) and independent variables are socioeconomic or motivational-related characteristics that could potentially influence the decision to work (similar analyses can be found in Richardson et al., 2013, or Quintini, 2015).

Table 1. *Determinants of working normally*

	Work normally	Work normally 30 or more hours
Male	0.015	0.025
	(0.033)	(0.021)
Age	0.033	0.026
	(0.005)***	(0.003)***
Spanish nationality	-0.097	0.026
	(0.045)**	(0.029)
Father with tertiary studies	-0.001	-0.010
	(0.039)	(0.025)
Mother with tertiary studies	-0.028	0.027
	(0.039)	(0.025)
Position in the household: son	-0.154	-0.088
	(0.081)*	(0.051)*
Middle-low household income	0.071	-0.025
	(0.051)	(0.032)
Middle-high household income	0.064	-0.013
	(0.051)	(0.033)
High household income	0.039	0.022
	(0.071)	(0.045)
Motivation	0.008	0.005
	(0.003)**	(0.002)**
Vocation with the degree	0.009	-0.007
	(0.017)	(0.011)
Constant	-0.621	-0.542
	(0.195)***	(0.124)***
R^2	0.21	0.24
N	464	464

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Results reveal that the probability of working habitually is significantly higher among older students; of foreign nationality (the estimated co-efficient is significant in this case at 5%) and those who occupy a position in the household other than that of the child (the estimated coefficient is significant at 10%). Likewise, it is observed that generally, employed students show greater motivation (the estimated co-efficient is significant at 5%). On the other hand, there is no significant influence of other attributes such as gender, parental educational level or household income level. Results, however, are very similar in general for those who habitually work 30 hours or more, the only difference being that of nationality, which in this case is not significant.

Furthermore, multivariate techniques were used to estimate several models separately in order to examine the extent to which habitual (or alternatively, full-time) work influences

students' academic performance[5]. In these estimates, different measures of academic achievement were used as dependent variables or variables related to overall academic achievement (average degree grade and number of total credits approved in relation to the number of years in the degree), or with their achievements during the semester in which the data were collected (credits approved in the semester). Socioeconomic characteristics (age, nationality, parents' level of education, household position and household income level) and certain academic characteristics (if the student repeated a year, different measures of academic effort and fixed effects per class) were used as control variables.

A potential problems in this type of model estimate is the dependent variable's possible endogeneity: if both the decision to work habitually and academic performance are influenced by the same set of unobserved factors, the models' estimate based on ordinary least squares would not be adequate, since the required absence of correlation between the dependent variable and the error term would not be respected. This may occur here, as the most motivated and more capable students may be precisely those better able to balance paid work with academic responsibilities (primary orientation model). This has led different authors to estimate the effect of employment on academic performance through instrumental variables techniques (see, for example, Stinebricker & Stinebricker, 2003, or Ruesga et al., 2014 for a Spanish case). However, to the extent that the use of this latter technique has certain shortcomings, notably the difficulty of finding appropriate instruments (in this regard, see Angrist & Pischke, 2009) and the problems associated with applying them to small samples (estimators of instrumental variables are naturally biased and their properties in finite samples are often problematic: Baum, 2006), the empirical strategy adopted in this work consists of making model estimates using both ordinary least squares (introducing control variables that allow us to produce an approximate measure of the influence of motivation and ability) and instrumental variables.

Thus, a first estimate was made using ordinary least squares, introducing two measures of motivation among the explanatory variables: general motivation based on the total score of the measures of motivation and a variable reflecting the extent to which the degree was followed in a vocational way (Tables 2 and 3). Furthermore, the same models were estimated by

[5] Estimates have also been done to examine whether the number of hours worked by working students habitually influences their academic performance (similar analyses can be found in Lang, 2012, or Richardson et al., 2013).

additionally introducing the average grade obtained in the Spanish baccalaureate and the university entrance test (also called "Selectividad") [6] (Table 4)[7] as control variables of students' capacity. Results of the regression analyses show that neither working habitually (Tables 2 and 4), nor working long daily hours (Tables 3 and 4) presented a statistically significant relation with any measure of student academic achievement. As far as control variables were concerned, the only ones showing a significant relationship with academic performance in all models were age and one of the measures of capacity (baccalaureate average grade). Conversely, neither personal nor family characteristics (including parental education, household income level or position in the household), nor motivational measures, nor academic variables in general, seemed to influence academic performance.

Table 2. *Influence of working normally on students' academic performance*

	Average mark in grade	Credits approved per year in grade	Credits approved in semester
Works normally	-0.143	0.196	0.479
	(0.099)	(-2.344)	(-1.324)
Female	0.011	-5.414	-0.796
	(0.060)	(1.573)***	(0.889)
Age	0.029	0.755	0.067
	(0.009)***	(0.228)***	(0.129)
Spanish nationality	0.130	0.809	0.475
	(0.084)	(2.218)	(1.253)
Father with tertiary studies	-0.103	-0.671	-0.470
	(0.072)	(1.903)	(1.075)
Mother with tertiary studies	0.070	0.250	1.146
	(0.072)	(1.907)	(1.077)
Middle-low household income	0.016	-0.480	-1.392
	(0.094)	(2.465)	(1.392)
Middle-high household income	-0.085	-0.314	-0.293
	(0.095)	(2.498)	(1.411)
High household income	0.026	1.394	2.930
	(0.131)	(3.453)	(1.951)
Motivation	0.004	-0.241	0.080
	(0.007)	(0.172)	(0.097)
Vocation with the degree	0.116	1.222	0.422
	(0.032)***	(0.837)	(0.473)
Repeater	-0.309	-1.944	-1.609
	(0.066)***	(1.727)	(0.976)*
Attendance all subjects: less than half	0.044	-2.612	0.224
	(0.185)	(-4.757)	(2.688)
Attendance all subjects: more than half	0.014	-7.073	-0.293
	(0.173)	(4.441)	(2.509)

The meaning of the results obtained does not change. They are available from the authors upon request.

[6] The evidence for Spain suggests that academic performance of university students is strongly influenced by results in pre-university education (see, for example, Pérez & Serrano, 2012).

[7] This estimate was made only for students attending university in this modality, which corresponds to the majority (more than 80%) of respondents. For lack of space, only coefficients relating to variables of interest are shown in Table 5.

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Attendance all subjects: almost always	0.077	-2.483	2.023
	(0.175)	(4.488)	(2.536)
Hours of study per week	0.006	0.073	0.205
	(0.004)	(0.096)	(0.054)***
Constant	4.714	26.120	5.116
	(0.338)***	(8.875)***	(5.014)
R^2	0.27	0.23	0.32
N	464	464	464

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Notes: Fixed effects per class have also been introduced as control variables.

Table 3. *Influence of working normally 30 or more hours on students' academic performance*

	Average mark in grade	Credits approved per year in grade	Credits approved in semester
Works normally 30 or more hours	0.095	-5.180	-0.819
	(0.140)	(3.618)	(2.049)
Female	0.010	-5.386	-0.792
	(0.060)	(1.570)***	(0.889)
Age	0.022	0.914	0.108
	(0.009)**	(0.236)***	(0.134)
Spanish nationality	0.146	0.829	0.426
	(0.084)*	(2.196)	(1.244)
Father with tertiary studies	-0.104	-0.649	-0.463
	(0.072)	(1.899)	(1.075)
Mother with tertiary studies	0.074	0.334	1.143
	(0.073)	(1.901)	(1.077)
Middle-low household income	0.013	-0.620	-1.396
	(0.094)	(2.459)	(1.393)
Middle-high household income	-0.089	-0.409	-0.291
	(0.095)	(2.491)	(1.411)
High household income	0.027	1.405	2.924
	(0.131)	(3.445)	(1.951)
Motivation	0.001	-0.206	0.090
	(0.007)	(0.171)	(0.097)
Vocation with the degree	0.115	1.191	0.421
	(0.032)***	(0.835)	(0.473)
Repeater	-0.315	-2.007	-1.596
	(0.066)***	(1.720)	(0.974)
Attendance all subjects: less than half	0.067	-3.259	0.062
	(0.185)	(4.756)	(2.693)
Attendance all subjects: more than half	0.042	-7.707	-0.467
	(0.173)	(4.434)	(2.511)
Attendance all subjects: almost always	0.118	-3.305	1.788
	(0.175)	(4.476)	(2.535)
Hours of study per week	0.006	0.067	0.203
	(0.004)*	(0.096)	(0.054)***
Constant	4.876	22.967	4.300
	(0.344)***	(8.948)**	(5.067)
R^2	0.27	0.24	0.32
N	464	464	464

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Notes: Fixed effects per class have also been introduced as control variables.

Table 4. *Influence of working normally on students' academic performance Alternative estimations with controls for motivation and ability*

	Works normally			Works normally 30 or more hours		
	Average mark in grade	Credits approved per year in grade	Credits approved in semester	Average mark in grade	Credits approved per year in grade	Credits approved in semester
Works normally	-0.126	-3.620	-1.062	0.069	-3.055	0.548
	(0.083)	-2.576	-1.537	(0.133)	-4.060	-2.420
Motivation	-0.002	-0.378	-0.037	-0.004	-0.398	-0.054
	(0.006)	(0.175)	(0.105)	(0.006)	(0.175)	(0.105)
Vocation with the grade	0.070	1.250	0.675	0.069	1.135	0.671
	(0.027)**	(0.845)	(0.504)	(0.027)**	(0.850)	(0.506)
Average mark in secondary	0.219	5.207	3.255	0.219	5.098	3.256
	(0.033)***	(1.028)***	(0.614)***	(0.033)***	(1.034)***	(0.616)***
Average mark PAU	0.025	0.851	0.458	0.026	0.816	0.462
	(0.018)	(0.574)	(0.342)	(0.019)	(0.576)	(0.343)
R^2	0.46	0.37	0.39	0.46	0.37	0.39
N	383	383	383	383	383	383

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Notes: Variables related to gender, age, nationality, father and mother level of education, relative level of household income, level of attendance, study hours per week and fixed effects per class have been included.

Secondly, an estimate was made based on instrumental variables. As mentioned previously, one of the main difficulties of this technique was finding an appropriate set of instruments, filling two conditions (see Greene, 2003 for example): that of relevance (instruments must be sufficiently related to the endogenous variable it replaces in the estimates) and exogeneity (the instruments must influence the dependent variable only through its effect on the endogenous variable, so that they are not correlated with the error term). In previous studies on the same subject, instruments usually chosen were characteristics that measured family socioeconomic level, since it was understood that this may be related to the choice of employment (assuming that students from families with fewer resources needed to work to a greater extent in order to cover university studying costs) but not with the academic performance of students once a certain educational stage was reached (Ruesga et al., 2014). Our estimate using instrumental variables considered the same control variables as those of ordinary least squares estimates, except for measures of motivation and capacity, and, following Ruesga et al. (2014), two instruments were used: a measure of the socio-economic status of families (in our case, a direct measure corresponding to the relative category of household

income in the country as a whole) and the study shift (using a dichotomous variable that differentiated between morning and afternoon shifts).

Table 5. *Influence of working normally on students' academic performance*
Alternative estimations with instrumental variables

	Coefficient dependent variable (p-value)	Relevance of instruments		Exogeneity instruments/ J-Hansen test (p-value)
		F first stage (p-value)	Coefficients instruments significant	
Works normally				
Average mark in grade	-1.84 (0.213)	0.702 (0.591)	No	0.271
Credits approved per year in grade	-8.28 (0.152)	0.728 (0.572)	No	0.515
Credits approved in semester	-8.96 (0.161)	0.729 (0.573)	No	0.762
Works normally full-time				
Average mark in grade	0.92 (0.624)	0.718 (0.580)	No	0.022
Credits approved per year in grade	9.29 (0.257)	0.553 (0.699)	No	0.119
Credits approved in semester	11.49 (0.175)	0.554 (0.697)	No	0.697

Results of the estimates using instrumental variables are shown in Table 5 separately for each model considered. Although the estimated coefficient for the dependent variable (alternatively, working habitually or working full-time) is not at all statistically significant at conventional levels, they show that although the assumption of instrument exogeneity can be generally accepted (the p-values of the J-Hansen test are in almost all cases high, and greater than the conventional levels of significance), the instruments do not fulfil the criterion of relevance in any of the estimated models. Thus, in all cases, the results of the first stage of the estimate of instrumental variables (where a model is estimated in which the potentially endogenous variable is taken as the dependent variable and the instruments as independent variables) show that the coefficients estimated for the different instruments are not significant and the values of the F statistic that allows comparing their joint significance are relatively small (and, consequently, their p-values relatively large). This evidence therefore indicates that, at least in the case of the population under study, the instruments used are weak, irrelevant and it is not appropriate to use them, since the estimate using instrumental variables would be bi-

ased, which, among other things, would prevent using traditional inference methods (Cameron and Trivedi, 2005)[8].

Conclusions

The purpose of this article is to examine the occurrence and characteristics of university students' employment in Spain, as well as possible effects on academic performance. We believe that this analysis can help to accurately diagnose potential difficulties encountered by working students (enabling, among other things, to design any necessary specific learning process regimes for these types of students). Furthermore, this study is especially relevant in Spain, where previous evidence on these questions is very scarce.

The basic instrument used in this research was a survey submitted to students at the University of Alicante. This survey had a very high response rate, very complete information on both individual and socioeconomic characteristics of students and their families (including the family's quartile in Spain's income distribution) and on the possible determining factors of academic achievement (including motivation, vocation and effort related to studies) as well as whether the student had a job and the job's characteristics. Worthy of note is that information provided by students in the survey was supplemented by additional information from university records. This fact significantly enriched the analysis, since it allowed taking into account more information, and thus significantly reducing measurement errors in some of the most relevant variables.

Evidence gathered in this study allowed firstly obtaining a detailed characterisation of university students working in Spain. Thus, about one-third of university students simultaneously study at university and have paid jobs, confirming that the phenomenon is quite significant in Spain. Furthermore, around half of all students with jobs work habitually. Also worthy of note is that students with regular jobs usually perceive their work as having a negative impact on their academic performance, and a significant portion of them work mostly legally, in

[8] These estimates were replicated using possible alternative instruments, such as the level of parental studies and the modality in which the degree was studied (full-time or part-time), or alternatively by means of instrumental variables using the LIML (limited information maximum likelihood), which is more appropriate than the standard two-stage estimator (2SLS) when the sample is small and the instruments are weak, as was the case here (see, for example, Anderson, Kunitomo & Sawa, 1982, and Kuni-tome & Matsushita, 2008). In both cases, the evidence obtained was similar, always pointing to the fact that the instruments were not valid and the effect of employment on academic performance was not significant.

jobs unrelated to the content of their studies, out of necessity, and they could not pursue university education without the added income from their work. Results of the estimate of multivariate models show, in turn, that certain characteristics are significantly associated to a greater occurrence of employment, where the probability of working is higher among older students, non-nationals and those with greater motivation.

Furthermore, results from the estimate of models based on multivariate analysis techniques in which various measures of academic achievement are considered and controlled by a broad set of factors (including individual and family characteristics, general motivational measures, and academic effort) suggest that, in contrast to students' own perceptions, working habitually does not have a significant impact on academic outcomes. This result is consistent with findings from previous studies in other countries that show that work is not detrimental to students' academic achievement, although this does contradict evidence obtained by Ruesga et al. (2014) in the case of Spain. While this conflicting interpretation of results could be due to different sources of information, analytical methods and researched populations in both studies, these studies do agree, however, on the inconclusive nature of previous international evidence on the effects of student employment on academic performance. Therefore it is necessary, in Spain, to deepen research on this issue.

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Appendix

Table A.1. *Descriptives of variables*

	Only studying	Students that study and work		
		Normal work	Normal work of 30 or more hours	Occasional work
Number of observations	302	75	28	87
Academic performance				
Average grade of the subjects of the degree	6.09 (0.66)	5.92 (0.94)	6.16 (0.76)	5.96 (0.49)
Number of credits passed in grade per year	32.21 (16.78)	30.80 (24.73)	28.69 (15.05)	28.74 (11.75)
Number of credits approved in semester	14.61 (10.93)	11.26 (9.77)	10.82 (8.39)	10.88 (9.28)
Socioeconomic characteristics				
Age	20.29 (2.59)	24.79 (6.43)	28.11 (7.98)	20.90 (2.44)
Man	0.51	0.56	0.64	0.57
Only Spanish nationality	0.87	0.77	0.89	0.87
Foreign nationality or dual nationality	0.14	0.23	0.11	0.13
Position in the household: son	0.97	0.77	0.64	0.98
Position in household: other	0.03	0.23	0.36	0.02
Father with higher education	0.31	0.27	0.29	0.30
Mother with higher education	0.28	0.23	0.32	0.30
Low household income	0.14	0.08	0.11	0.11
Middle-low household income	0.34	0.44	0.32	0.45
Middle-high household income	0.42	0.41	0.43	0.35
High household income	0.10	0.07	0.14	0.09
Motivation				
Measure of motivation: ambition and high capacity	26.95 (4.55)	29.12 (4.76)	29.75 (4.42)	28.90 (4.58)
Academic variables				
Attends the degree by vocation (1 = disagreement-5 = agreement)	3.61 (0.91)	3.85 (0.90)	3.82 (0.94)	3.71 (1.04)
Attends part-time degree	0.08	0.28	0.36	0.16
Credits enrolled in semester	38.58 (16.15)	33.98 (16.20)	30.43 (15.97)	40.03 (17.09)
Attends more than 75% of classes	0.47	0.36	0.32	0.45
Attends between 50 and 75% of classes	0.38	0.41	0.46	0.44
Attends between 25 and 50% of classes	0.13	0.15	0.11	0.10
Attends less than 25% of classes	0.03	0.08	0.11	0.01
Weekly academic hours of work outside of class	13.83 (8.28)	11.79 (8.78)	11.75 (9.24)	12.14 (6.50)

Notes: The standard deviation of the variable is shown in parentheses.

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Table A.2. *Characteristics of working students and their jobs*

	Normal work		Occasional work
	Total	30 hours or more	
Hours of work per week in regular work	21.87 (12.47)	36.46 (5.38)	-
Situation: only studying	0.04	0.04	0.29
Situation: mainly studying	0.31	0.18	0.64
Situation: mainly working	0.33	0.46	0.03
Situation: working and studying	0.32	0.32	0.03
Occupation: skilled	0.17	0.24	0.10
Occupation: semi-skilled	0.73	0.68	0.70
Occupation: unskilled	0.10	0.08	0.21
Employment sector: primary	0.00	0.04	0.06
Employment sector: industry	0.01	0.00	0.04
Employment sector: construction	0.03	0.00	0.01
Employment sector: services	0.96	0.96	0.88
Reason to work: need (basic income for family economy)	0.36	0.57	0.24
Reason to work: helping the family economy	0.75	0.79	0.77
I work regularly in a legal situation (1-5)	2.44 (1.45)	2.36 (1.52)	2.88 (1.39)
I could study without income from employment (1-5)	2.81 (1.54)	2.46 (1.55)	3.80 (1.40)
Employment not related to grade content (1-5)	2.74 (1.60)	2.68 (1.72)	2.11 (1.36)
Employment negatively affects the time for academic preparation (1-5)	3.73 (0.90)	3.82 (1.02)	2.68 (1.29)
Academic performance would improve if I did not work (1-5)	4.18 (0.88)	4.50 (0.69)	2.87 (1.43)

Notes: The standard deviation of the variable is shown in parentheses.