

Economics applicants in the UK labour market

University reputation and employment outcomes

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Abstract

Purpose – The purpose of this paper is to estimate whether job applicants who have obtained a BSc in economics from 15 UK universities face different labour market prospects. The author examines whether university entry standards and Russell Group membership affect UK economics applicants' occupational access and entry-level annual salaries when unobserved heterogeneities, such as ability, motivation, family characteristics and networks, are minimized.

Design/methodology/approach – The author evaluate the research question by recording the job search processes of 90 British economics applicants from randomly selected universities. The key elements of the approach are as follows: third-year undergraduate students apply for early career jobs that are relevant to their studies. Applications are closely matched in terms of age, ethnicity, experience and other core characteristics. Differential treatment in the access to vacancies and entry-level annual salaries per university applicant are systematically measured.

Findings – By observing as much information as a firm does, the estimations suggest that both entry standards and Russell Group membership positively affect applicants' labour market prospects. Although the firms cannot evaluate by themselves whether graduates from highly reputable universities are more or less capable and motivated than graduates from less reputable universities, it appears that the university attended affects firms' recruitment policies. Importantly, valuable variables that capture firms' and jobs' heterogeneities, such as occupational variation, regions, workplace size, establishment age, and the existence of trade unions and human resources, are also considered and provide new results.

Practical implications – Understanding the impact of entry standards and university reputation on students' labour market outcomes is critical to understanding the role of human capital and screening strategies. In addition, obtaining accurate estimates of the payoff of attending a university with a high entry threshold and reputation is of great importance not only to the parents of prospective students who foot tuition bills but also to the students themselves. Furthermore, universities will be interested in the patterns estimated by this study, which will allow recent UK economists to evaluate the current employment environment. In addition, universities should be keen to know how their own graduates have fared in the labour market compared with graduates of other universities.

Originality/value – In the current study, the author attempt to solve the problem of firms' seeing more information than econometricians by looking at an outcome that is determined before firms see any unobservable characteristics. In the current study, ability, motivation, family characteristics and networks cannot affect applicants' access to vacancies and entry-level salaries. The current study can estimate the effect of university enrolment on applicants' occupational access and entry-level salaries, controlling for unobserved characteristics that would themselves affect subsequent outcomes in the labour market.

Keywords Employment, Job analysis, Human capital, Labour market, Earnings, Education, Human resource strategies, Qualifications, Data collection

Paper type Research paper



1. Introduction

One of the most important decisions that UK students make during their school-age years is whether to pursue a higher education (Sodexo, 2010). This decision, in turn, affects their employment prospects and the range of incomes that they will have at their disposal to organize their future households. Chevalier *et al.* (2004), in reviewing several different studies, estimate the returns of education (as measured by increases in salary) at nearly 10 per cent per additional year of schooling. The reward for higher education is perceived as the combined effect of human capital accumulation and the effect of being identified as a skilled individual (Kjelland, 2008).

UK universities set various entry requirements, which typically involve qualifying grades. Students decide which set of universities to apply to for admission, and universities independently decide whether to admit or reject the students. The parents and students decide which university the student will attend from the range of universities that admit them[1]. A timeless and endless debate in UK society is whether the reputation of the university affects graduates' prospects in the labour market. The reputation of the university is traditionally related to the university's entry standards (Black and Smith, 2004; Dale and Krueger, 2002; Dill and Soo, 2005; Volkwein and Sweitzer, 2006).

The aim of the current study is to estimate whether job applicants that have obtained a BSc in economics from 15 randomly selected UK universities face different labour market prospects. In the current study, the variables related to universities' entry standards (UCAS tariff score[2]) and universities' Russell Group membership[3] are those that enter the reputation function. The research design will enable us to provide answers to the following questions. Do universities' entry standards (UCAS tariff score) affect their occupational access and entry-level annual salaries? Does Russell Group membership affect the applicants' job prospects? The key elements of our approach are as follows: third-year undergraduate students applied for early career jobs relevant to their studies (see Jowell and Prescott-Clarke, 1970; McIntosh and Smith, 1974; Bovenkerk, 1992; Fix *et al.*, 1993). Applications were closely matched in terms of age, ethnicity, experience and other core characteristics. Differential treatment in the access to vacancies and entry-level annual salaries per university applicant was systematically measured.

The major strength of this study is that based on the data gathering design, we observe as much information as a firm does. UK and US studies have found that students who attended reputable universities tend to have higher returns (employment rates and salaries), which are observed in the labour market (Behrman *et al.*, 1996; Brewer *et al.*, 1999; Dale and Krueger, 2002; Chevalier and Conlon, 2003; Norton, 2008; Power and Whitty, 2008; Hoekstra, 2009; Hussain *et al.*, 2009; Broecke, 2012). Importantly, however, these studies emphasise that convincingly estimating the economic returns based on the universities attended requires overcoming the biases arising from the fact that attendance at more reputable universities is likely to be correlated with unobserved characteristics that themselves will affect future earnings (Hoekstra, 2009; Broecke, 2012). For instance, the very attributes (i.e. students' motivation, ability, personality characteristics) that lead admissions committees to select certain applicants for admission may be rewarded in the labour market (Berkowitz and Hoekstra, 2011). In the current study, we try to solve the problem of firms seeing more information than econometricians by looking at an outcome that is determined before firms see any unobservable characteristics (see Dale and Krueger, 2002; Hoekstra, 2009).

In addition, studies suggest that students' socioeconomic backgrounds can affect their labour market outcomes, and thus, students who attend certain universities may have greater salary capacity regardless of where they attend university (Brewer *et al.*, 1999; Hoekstra, 2009; Dale and Krueger, 2002; Hoekstra, 2009). In the current study, family characteristics, parental support and networks cannot affect applicants' access to vacancies and entry-level salaries. The current study can estimate the effect of university enrolment on applicants' occupational access and entry-level salaries, minimizing unobserved characteristics that would themselves affect subsequent outcomes in the labour market.

In the last five years, the economic recession in the UK economy, the rising recent-graduate unemployment rate, and the tripling of UK tuition fees (Office for National Statistics, 2012a) have increased students' anxiety regarding whether the university attended or the universities under consideration will boost their chances for immediate job placement. Because of the absence of standardized economy-wide data on hiring, there is no information regarding applicants' access to job vacancies. This study will offer answers to the aforementioned considerations. In addition, the UK and US data sets do not contain information regarding firms' and jobs' characteristics and occupational variation. This heterogeneity might affect applicants' labour market prospects. The current study gathers valuable data. By including firm and job characteristics in the regression stage, we are able to offer new results. In addition, with education and training expenditures making up 6 per cent of GDP in 2011-2012, understanding the impact of entry standards and universities attended on students' labour market outcomes is critical to understanding the role of human capital (Public Expenditure Statistical Analyses, 2012). Moreover, obtaining accurate estimates of the payoff of attending a university with high entry thresholds is of great importance not only to the parents of prospective students who foot tuition bills but also to the students themselves (Dale and Krueger, 2002). Ultimately, higher education students view themselves to be in competition with a growing supply of graduates entering the labour market with similar profiles and aspirations. The credentials of these students are vital commodities in the pursuit of relatively well-paid and rewarding forms of graduate employment (Tomlinson, 2008). Furthermore, universities will be interested in the patterns estimated by this study, which will allow the evaluation of the current employment environment by recent UK economists.

The rest of the paper is organized as follows. The next section provides the theoretical framework. Section 3 presents a brief overview of the various league tables and economics graduates' employment prospects. Section 4 describes the methodology in detail. Section 5 presents descriptive statistics, and Section 6 presents the estimations followed by a discussion and conclusions.

2. Conceptual framework

Reputation is the most important criterion for judging the quality of a university (Morley and Aynsley, 2007). Based on the analysis by van Vught (2008), the reputation of a higher education institution is defined as the image of quality, influence and trustworthiness that it has in the eyes of others, and studies suggest that institutions are intensely concerned with both reputation and quality (Garvin, 1980; Brewer *et al.*, 2002; Geiger, 2004). Under these conditions, universities' entry standards and Russell Group membership may highlight graduates' inherent quality bringing to their new jobs.

Students make choices regarding investments in their own human capital (Schultz, 1961; Becker, 1962, 1975; Carnoy, 1995; Hanushek and Kimko, 2000; Hanushek and

Welch, 2006; Arcidiacono *et al.*, 2010)[4]. Students decide whether they will make a significant investment in terms of time, effort and money for their school graduation qualification scores, and these investments should result in increased rewards from firms. More motivated, qualified and successful individuals have more options because they have increased their human capital investment (Hanushek and Welch, 2006). In addition, these graduates label high innate productivity to firms, and this information is realistically what the firms need to identify employees (Spence, 1973; Arrow, 1973; Altonji and Pierret, 2001; Arcidiacono *et al.*, 2010). Indeed, studies suggest that many employers target their recruitment efforts at universities that have the highest entry standards because their graduates possess more social, cultural and human capital than other graduates (Morley and Aynsley, 2007). There is a belief that universities with the most rigorous selection criteria automatically produce the highest quality graduates and universities appear to play a part in pre-selecting students for future jobs (Morley and Aynsley, 2007). In our study, we can suggest, then, that firms might reward individuals who fulfilled the entry thresholds (UCAS tariff score) of more demanding universities because they have higher human capital investments. The first hypothesis related to university entry standards and labour returns is as follows:

H1. Higher university entry standards (UCAS tariff score) are likely to entail higher occupational access and entry-level salaries.

In addition, we suggest also that Russell Group membership can affect the firms' screening process under conditions of uncertainty (Garvin, 1980; Brewer *et al.*, 2002; Geiger, 2004; Hazelkorn, 2008). Productivity and the ability of a potential employee are not publicly observable, but the universities' quality, as captured by Russell Group membership, is publicly available through league tables[5] (see Chevalier and Conlon, 2003; Chevalier, 2009). Firms, by evaluating the universities' Russell Group membership using information coming from the league tables, among other sources (Dill and Soo, 2005; Roberts and Thompson, 2007; Hazelkorn, 2008), may believe that they can resolve information asymmetries without cost. Employee productivity is unobservable by employers at the time when individuals enter the labour market, while the cost of defining and verifying employees' performance is perceived by firms as being prohibitively high (Bac, 2000). The reputation of the institution is strategically important in a setting with incomplete information (Altonji and Pierret, 2001). Just as a certificate of completion might signal a higher level of ability to employers, resulting in higher earnings, the university Russell Group membership might also carry with it certain implications of ability. Signals are used in principal-agent relationships where asymmetries of information exist and are not easily resolved (Altonji and Pierret, 2001; Chevalier *et al.*, 2004; Bedard, 2001; Kjelland, 2008). Signalling and screening can serve to sort employees according to their unobserved abilities (Weiss, 1995). The second hypothesis is related to Russell Group membership and labour returns:

H2. University Russell Group membership is likely to positively affect access to vacancies and entry-level salaries.

Importantly, we have to underline the relationship between university entry standards (*H1*) and the university's Russell Group Membership (*H2*). Indeed, in this study the correlation (point-biserial) between the two variables is positive and statistically significant ($r=0.763$, $p=0.000$). That is, Russell Group Membership is positively correlated with higher entry standards. Note, however, that each variable captures relatively different information. Russell Group Membership classifies universities as

elite or not, which is important information to capture. Interestingly however, at the same time, there is a great variation among Russell Group universities in entry standards. For instance, in our study between two Russell Group universities, the entry standard difference is 191 UCAS points, which entails a statistically significant difference ($Z = 3.13$, $p = 0.00$). Thus, one may suggest that labour market prospects might vary among Russell Group universities[6]. In the current study, for the reason described, we suggest that it is important to consider both variables simultaneously without ignoring the positive correlation between entry standards and Russell Group membership.

Additionally, consider that Russell Group membership ($H2$), at the same time that it allows for the role of human capital investments (Becker, 1962, 1975; Hanushek and Welch, 2006; Arcidiacono *et al.*, 2010), just as university entry standards do ($H1$), focuses mostly on the ways in which these investments serve as either a signal or a filter of productivity that firms cannot identify directly (Spence, 1973; Arrow, 1973). Thus, we suggest that Russell Group membership might capture additional unobserved heterogeneity that it is important to include in the regression stage. Indeed, as Weiss (1995) suggests, signalling and screening theory extend human capital theory by allowing for productivity differences that firms cannot confirm to be correlated with the costs or benefits of education.

3. Graduates' employment

Based on the 2012 Higher Education Statistics Agency (HESA) (2013), the average rate of employment for UK economics/business graduates in general is between 44 and 60 per cent. In addition, the raw indexes that are generated as part of the UK league tables (*The Guardian*, *The Independent*, *The Sunday Times* and *The Times*) have significant variations. For instance, if we concentrate on the 2013 Independent League table, we can observe that, economics graduates from the University of Cambridge had a 94 per cent probability of being employed six months after graduation, whilst economics graduates from the University of Liverpool and the University of Essex had a 62 and a 56 per cent probability of being employed six months after graduation, respectively. For the same universities, *The Guardian* league table suggests that for economics graduates, the employment prospects after six months are 84 per cent (University of Cambridge), 53 per cent (University of Liverpool) and 43 per cent (University of Essex).

The differences between league tables and employment variations among universities are sufficiently large to make comparison difficult. Thus, a general employment pattern for UK economics graduates is difficult to assess other than the range that is provided by HESA. Apart from this issue, the league tables and the HESA tables offer raw numbers and lack econometric evaluation. No control variables are considered for the various heterogeneities, and as a result, it is not possible to draw conclusions as to whether the employment rate may be related to the characteristics of graduates, universities, firms or job openings. In addition, there is no information regarding how intensive the graduates' job search is, and whether the graduates are employed in jobs that are related or unrelated to their course of study is unclear. Meanwhile, as we previously discussed, family characteristics, parental support and unobserved motivation issues can affect graduates' employment levels and wages (Behrman *et al.*, 1996; Brewer *et al.*, 1999; Dale and Krueger, 2002; Hoekstra, 2009; Berkowitz and Hoekstra, 2011). This study aims to provide answers by adopting a field design that considers various parameters that might influence the applicants' labour market prospects.

4. Research design

4.1 Methodology

The methodology used involves sending written job applications in response to advertised vacancies to test for occupational access and entry-level salary differences based on university attained. The current research was administered as part of the Labour Market Study (LMS) conducted by the (removed – blinded review) Business School at (removed – blinded review) University. The research strategy was designed as follows. In the first stage, from the 78 Economics departments, 15 were randomly selected. The process generated many differences among these departments regarding entry standards, Russell Group membership and geographical location[7]. Universities are anonymized, and the actual UCAS tariff score per university (for the sub-discipline BSc in economics) is not revealed, following the study's ethics standards. However, in order to better understand the range of entry standards, we offer the UCAS tariff score difference between the number 1 university (highest entry standards) and the number 2 university ($\Delta\text{UCAS}(\text{Top1-Top2})$); the number 1 and number 3 universities ($\Delta\text{UCAS}(\text{Top1-Top3})$), etc. In Table III, we present the entry standards differences.

In January 2012, we contacted the Student Union and the Employment Service of each of the 15 business schools (and/or the Departments of Economics), and we informed them of the intent and purpose of the designed survey and kindly requested their cooperation. The interactive and successful collaboration between the 15 institutions led to a statement that was posted in the schools' public areas that asked the 2012 spring semester BSc in economics applicants who were interested in searching for work to voluntarily take part in the applied research starting from May 2012; the notice stated the aim of this research, as outlined in research questions in the introductory section[8].

The announcement explained that for a period of three weeks (20 days), we would provide each participant with up to 45 job openings in economics for early carrier economists and record then the correspondences from the firms, in particular, noting invitations for interviews. We mentioned that the participants would have the option to send their applications only to those job openings that were interesting to them[9]. In addition, it would be at their discretion to accept interviews or not. Employers would not have knowledge of the underlying recording of the correspondence. The announcement welcomed any potential participants to contact us, to send us their applications (cover letters and CVs) for review, to create a new university mail account for the research purpose – where by default the research team would have access – and invited any questions they may have had regarding the research purpose. The students had to include in their CVs their personal characteristics (demographic characteristics), pre-university qualifications, course studied and grade degree, workplace experience, membership in university unions and their specific role in the unions, skills, personality characteristics and hobbies. In addition, it was mentioned that the participants would receive a certification regarding their experience in research design, data gathering, database creation and estimations after the successful deliverables.

4.2 Application structure

By the end of March 2012, 522 BSc in economics students (three-year programme) had contacted the research team and forwarded their applications to the research team. The descriptive statistics of the characteristics of the applicants are in Table I. Separate descriptive statistics for each university's students are available on request. Based on the CVs' information, six students were selected from each university (three males and three females) whose pre-university qualifications were equal to their university entry

Categories	Mean	SD
Men (%)	49.28	0.43
Age (continuous variable; years)	21.21	0.56
British-white (%)	74.78	0.64
Married (%)	3.33	0.43
University entry standards; UCAS tariff score (continuous variable)	418.25	80.29
High school education in State Schools (non-fee-paying)	94.76	0.34
Grade obtained (continuous variable)	61.13	1.53
Working experience (continuous variable; months)	0.36	0.05
Subject: microeconomics	100.00	0.0
Subject: macroeconomics	100.00	0.0
Subject: quantitative methods	100.00	0.0
Knowledge of software (Office, E-views, SPSS) (%)	71.44	0.21
Percentage of applicants that include "projects delivery as part of my major modules" (i.e. pre-professional experience) in their CV (%)	70.54	0.44
Percentage of applicants that include "quantitative methods used when writing my final thesis" (i.e. pre-professional experience) in their CV (%)	62.60	0.33
Percentage of applicants that include "ability to work in team" in their CV (%)	83.67	0.57
Skills: communication skills (%)	73.65	0.43
Percentage of applicants that include "friendly" in their CV (%)	83.10	0.22
Percentage of applicants that include "likeable" in their CV (%)	70.11	0.16
Hobbies: cinema (%)	67.19	0.31
Hobbies: music (%)	64.12	0.13
Contact details of two professors to stand as referees (%)	68.56	0.08
Applicants' region:		
East Midlands (%)	6.66	0.28
East of England (%)	13.33	0.32
London (%)	20.00	0.39
North-East (%)	13.33	0.32
North-West (%)	13.33	0.32
Scotland (%)	6.66	0.28
South East (%)	13.33	0.32
Wales (%)	6.66	0.28
West Midlands (%)	6.66	0.28
Observations	522	

Table I.
Descriptive statistics;
BSc in economics
applicants'
characteristics

standards. Further information is provided in Appendix 1. In addition, all relevant characteristics of the students had to be identical so that any systematic difference in treatment could most likely be attributed to the effects of the university attended. The aim was to minimize the applicants' heterogeneities in areas such as ethnic background, age, work experience and grade obtained. As shown in Appendix 2, the applicants were matched on attributes such as gender, age, ethnicity, marital status, pre-professional experiences, subject, personality characteristics and interests.

The applicants that we worked with had the following characteristics: they were 21 years old, natives (white-British) and unmarried. They had attended State Primary and Secondary Schools (non-fee-paying). All applicants had upper second-class honors (i.e. grade obtained 61 per cent or 2:1), a similar subject (microeconomics, macroeconomics, quantitative methods), and equivalent software knowledge (Office, E-views and SPSS). In addition, although the applicants did not have any paid (or volunteer) work experience in the business sector before or during their university studies, they had acquired practical experience by delivering projects as part of their major modules, whilst they used

quantitative methods when writing their theses. The assigned mean characteristics of our UK economists applicants are consistent with those of the major UK studies. In addition, each of the applicants had a first and last UK name[10], a mobile telephone number[11], a postal address[12], and a university mail address. Moreover, the applicants had similar skills (ability to work in teams and communication skills), personality characteristics (sociable and amiable), and spare time interests (cinema and music). The contact details of two professors to stand as referees were also provided by the applicants[13]. Finally, the cover letters and CVs and were organized in the same manner (template and formatting).

We worked in the field with each student for 20 days. In Appendix 1, the timetable is presented[14]. The students applied for a job by sending out their application forms[15]. They applied to entry-level vacancies that were identified through a random sample of advertisements appearing in fifteen leading UK internet web sites that advertised job openings for a BSc in economics. The large number of job search web sites leads us to suggest that these may be a typical resource for the average job seeker. We investigated different occupations with vacancies that might demonstrate a variation in the firms' and industrial relations' evaluation. The occupations covered a large spectrum of work environments, for instance, financial intermediation, consultancies, banking, the real estate and rental business, transport, storage and communication (see Appendix 3).

4.3 *Sending out the applications*

The application submission process lasted between the 15 May 2012 and 25 July 2012. Over this period, two days during the week, we provided random job openings to the applicants. Each applicant received different job openings. In other words, only one applicant had the opportunity to apply to each firm[16]. At the end of the field work, the 90 applicants had received 4,043 job openings and applied to 2,857 of them[17] [18]. Having access to their mail, we recorded the day and hour of the application as well as the firms' correspondence and the invitation for interview or rejection. It should be emphasized that special attention was given to deception issues and research ethics. On the one hand, it was our intention that firms not lose any time screening unrealistic applications. Our scope was to record a job market process. On the other hand, at the end of the study, a reflective evaluation report suggested that none of the students felt any unpleasant emotional experience as a result of the study.

In addition, for the research purpose, we also recorded the entry-level annual salary as well as the jobs' and firms' characteristics (see Appendix 3). To collect this specific information, we adopted the following process. If the job opening or the firm's official website mentioned the jobs' and the firms' characteristics (e.g. the entry-level annual salary), the information was registered by the research team. In most cases, however, limited or no information was provided; thus, we contacted the firms and collected the relevant data, stating that we were engaged in a university project interested in the firm environment behind the advertised job opening. Notably, in all conversations, the relevant managers promptly provided a brief description of their firm, such as the existence of human resources, and trade unions.

5. Descriptive statistics

5.1 *Descriptive statistics: firms*

In Table II, we provide the jobs' and the firms' descriptive statistics for those vacancies applied to by our applicants (2,857 cases). There is a great range of jobs in financial intermediation, consultancies and banking (19.4 per cent) and public, urban and

Categories	Mean	SD
Entry-level annual salary (continuous variable)	23,220.96	3,976.12
Financial intermediation, consultancy and bank (%)	19.43	0.38
Public, urban and territorial administration (%)	8.39	0.36
Education (%)	5.20	0.30
Real estate and renting (%)	11.43	0.40
Wholesale, retail and motor sale (%)	4.30	0.35
Health industry and social support (%)	14.00	0.38
Transport, storage and communication (%)	11.11	0.33
Electricity, gas and water supply (%)	8.00	0.36
Hotels and restaurants (%)	10.39	0.32
Construction (%)	5.30	0.32
Manufacturing (%)	2.40	0.36
Public sector (%)	34.54	0.37
Fixed contract (%)	19.37	0.56
Relocation package (%)	4.27	0.26
London Allowance (%)	3.27	0.28
Workplace age (%) ^a	73.45	0.85
Workplace size (%) ^b	83.56	0.46
Multinational firm (%)	29.82	0.30
Human resources (%)	72.38	0.42
Equal opportunities (%)	59.28	0.30
Trade union (%)	65.64	0.26
Online application (%)	33.84	0.63
Firms' location and applicants' location are in the same city (%)	10.93	0.63
Distance between firms' location (city) and applicants' location (city) (%) ^c	34.39	0.37
East Midlands	9.39	0.37
East of England	11.31	0.38
London	10.49	0.42
North-East	7.03	0.39
North-West	11.48	0.27
Scotland	9.39	0.33
South-East	8.99	0.36
Wales	10.39	0.36
West Midlands	9.13	0.35
South-West	7.09	0.33
Yorkshire and Humberside	5.29	0.36
Observations	2,857	

Table II.
Descriptive statistics;
jobs' and firms'
characteristics

Notes: ^aPercentage of firms that have been established more than 20 years; ^bpercentage of firms that employ over 200 people; ^cpercentage that shows in how many cases (%) the distance between firms' location and applicants' location is over 300 kilometres

territorial administration (8.3 per cent). Regarding the job openings' characteristics, the average entry-level annual salary that firms offer is £23,220. In addition, 19.3 per cent of the firms offer fixed contracts, 34.5 per cent are in the public sector, and 4.2 per cent offer a relocation package. Furthermore, 29.8 per cent of the firms are multinational, 72.3 per cent have human resource departments, 59.2 per cent have a formal written equal opportunity policy, and 65.6 per cent have trade unions. A total of 83.5 per cent of the firms employ over 200 people, and 73.4 per cent have been established for over 20 years. As expected, there is regional variety: 8.9 per cent of the firms are located in the South-East, 11.3 per cent are located in the east of England, and 10.4 per cent are located in London. Regarding the study's controls, in 10.9 per cent of the cases, the applicants'

location and the firms' location are in the same city, and in 34.3 per cent of the cases, the distance between the applicants' location and the firms' location is over 300 kilometres.

5.2 Descriptive statistics: access to vacancies

In Table III, we observe the access to vacancies aggregate results for men. On average, in 69.19 per cent of the cases, the applicants received an invitation for an interview. The results are very interesting if we concentrate on each university. As we can observe, the applicants from the Top 1 university have the highest probabilities of receiving an invitation for an interview (91 per cent). In addition, the differences are small between some universities. For instance, the applicants from the Top 3 university and from the Top 4 university experience approximately an 80 per cent probability of receiving an invitation for an interview. In addition, the applicants from the Top 12 university and from the Top 13 university face approximately a 58 per cent probability of receiving an invitation for an interview. For completeness, in Appendix 4, we offer the 15×15 matrix with the cells representing the difference in probabilities of access to vacancies between universities. There is an indication that although the BSc in economics applicants have the same age, ethnic background, degree grade and work experience, they face differences in their access to vacancies, varying on average between 0.3 and 50 per cent, based on the university attended.

Finally, the women's aggregate results are presented in Table IV. Similar to men, there are differences in the correspondence per institution. The qualitative patterns are the same compared to males and are similarly interpreted.

5.3 Descriptive statistics: entry-level annual salaries

In Table V, we present descriptive statistics regarding the entry-level annual salaries for men and women. In the last row, it is observed that the men are invited for an

Universities in a ranked order (for the sub-discipline; BSc in economics)	UCAS differences between universities	Job no.	Not invited no.	Not invited %	Invited no.	Invited %
Top 1	–	96	8	8.3	88	91.66
Top 2	Δ UCAS (Top1-Top2) = 36	96	12	12.5	84	87.5
Top 3	Δ UCAS (Top1-Top3) = 80	103	20	19.41	83	80.58
Top 4	Δ UCAS (Top1-Top4) = 129	89	17	19.10	72	80.89
Top 5	Δ UCAS (Top1-Top5) = 151	87	20	22.98	67	77.01
Top 6	Δ UCAS (Top1-Top6) = 182	97	26	26.80	71	73.19
Top 7	Δ UCAS (Top1-Top7) = 186	95	28	29.47	67	70.52
Top 8	Δ UCAS (Top1-Top8) = 188	95	37	38.94	58	61.05
Top 9	Δ UCAS (Top1-Top9) = 191	97	35	36.08	62	63.91
Top 10	Δ UCAS (Top1-Top10) = 225	93	34	36.55	59	63.44
Top 11	Δ UCAS (Top1-Top11) = 234	89	28	31.46	61	68.53
Top 12	Δ UCAS (Top1-Top12) = 261	95	39	41.05	56	58.94
Top 13	Δ UCAS (Top1-Top13) = 292	95	40	42.10	55	57.89
Top 14	Δ UCAS (Top1-Top14) = 296	97	40	41.23	57	58.76
Top 15	Δ UCAS (Top1-Top15) = 350	101	55	54.45	46	45.54
Total		1,425	439	30.80	986	69.19

Table III. Access to vacancies; aggregate results; men

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used; UCAS index that converts school leaving qualification grades into one point system

Universities in a ranked order (for the sub-discipline; BSc in economics)	UCAS differences between universities	Job no.	Not invited no.	Not invited %	Invited no.	Invited %
Top 1	–	94	10	10.63	84	89.36
Top 2	Δ UCAS (Top1-Top2) = 36	96	16	16.66	80	83.33
Top 3	Δ UCAS (Top1-Top3) = 80	100	19	19.0	81	81.0
Top 4	Δ UCAS (Top1-Top4) = 129	87	18	20.68	69	79.31
Top 5	Δ UCAS (Top1-Top5) = 151	85	22	25.88	63	74.11
Top 6	Δ UCAS (Top1-Top6) = 182	88	25	28.40	63	71.59
Top 7	Δ UCAS (Top1-Top7) = 186	96	31	32.29	65	67.70
Top 8	Δ UCAS (Top1-Top8) = 188	102	40	39.21	62	60.78
Top 9	Δ UCAS (Top1-Top9) = 191	95	36	37.89	59	62.10
Top 10	Δ UCAS (Top1-Top10) = 225	102	39	38.23	63	61.76
Top 11	Δ UCAS (Top1-Top11) = 234	100	37	37.0	63	63.0
Top 12	Δ UCAS (Top1-Top12) = 261	98	42	42.85	56	57.14
Top 13	Δ UCAS (Top1-Top13) = 292	100	45	45.0	55	55.0
Top 14	Δ UCAS (Top1-Top14) = 296	93	37	39.78	56	60.21
Top 15	Δ UCAS (Top1-Top15) = 350	96	48	50.0	48	50.0
Total		1,432	465	32.47	967	67.52

Table IV.

Access to vacancies; aggregate results; women

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used; UCAS index that converts school leaving qualification grades into one point system

interview from firms that offer £23,423.7 on average, whilst women are invited for an interview from firms that offer £23,072.9 on average. For both genders, the applicants from the Top 2 university are invited for interviews from firms that offer the highest salaries (£25,864.2) compared to the other applicants in this sample. It appears that the university attended affects not only the applicants' access to vacancies but also their entry salaries. Moreover, it is observed that applicants from the Top 9 university and the Top 14 university are invited for interviews from firms that offer approximately the same average salary. Although occupational, sectoral and industrial differences are not taken into account at this stage, the raw patterns suggest that the university attended affects the applicants' salary prospects. The difference in the annual salary range is between £207.6 (or 0.8 per cent) and £4,329.3 (or 17.3 per cent). However, we must highlight that a multivariate analysis is required to estimate which additional variables are significant and affect the relationships under consideration.

6. Multivariate analysis

6.1 Estimation framework

The probability of an applicant receiving a job interview is estimated using a probit model (Basic equations):

$$Y_i^*(\text{callback}) = \beta_0 + \beta_1 \text{University entry standards} + \beta_2 \text{Russell Group member} \\ + \beta_3 \text{University controls} + \beta_4 \text{Occupational controls} \\ + \beta_5 \text{Job and firm controls} + \beta_6 \text{Location controls} + e$$

Universities in a ranked order (for the sub-discipline; BSc in economics)	UCAS differences between universities	Entry-level annual salary (mean) men (£)	Entry-level annual salary (standard deviation) men (£)	Entry-level annual salary (mean) women (£)	Entry-level annual salary (standard deviation) women (£)
Top 1	-	25,746.59	3,148.28	25,496.43	3,031.38
Top 2	ΔUCAS (Top1-Top2) = 36	25,864.27	3,346.74	25,651.25	3,155.06
Top 3	ΔUCAS (Top1-Top3) = 80	24,742.17	3,031.27	24,302.56	2,936.86
Top 4	ΔUCAS (Top1-Top4) = 129	24,247.22	2,953.24	23,837.68	2,793.95
Top 5	ΔUCAS (Top1-Top5) = 151	23,231.34	2,482.31	22,968.25	2,558.78
Top 6	ΔUCAS (Top1-Top6) = 182	23,992.54	2,649.34	23,663.79	2,687.50
Top 7	ΔUCAS (Top1-Top7) = 186	22,970.15	2,386.64	22,656.72	2,383.98
Top 8	ΔUCAS (Top1-Top8) = 188	23,534.48	2,835.95	22,956.61	2,582.58
Top 9	ΔUCAS (Top1-Top9) = 191	21,807.02	2,174.84	21,472.73	1,762.30
Top 10	ΔUCAS (Top1-Top10) = 225	21,966.10	2,572.84	21,555.56	1,907.35
Top 11	ΔUCAS (Top1-Top11) = 234	22,232.14	2,208.32	21,864.41	2,129.08
Top 12	ΔUCAS (Top1-Top12) = 261	22,232.14	2,572.18	22,267.86	2,618.05
Top 13	ΔUCAS (Top1-Top13) = 292	22,436.36	2,885.36	21,964.29	2,471.39
Top 14	ΔUCAS (Top1-Top14) = 296	21,822.58	2,595.86	21,285.71	1,836.14
Top 15	ΔUCAS (Top1-Top15) = 350	21,574.07	2,061.34	21,270.83	1,954.15
Average		23,423.78	3,081.21	23,072.98	2,915.80
Observations		986		967	

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used; UCAS index that converts school leaving qualification grades into one point system

Table V. Descriptive statistics; entry-level annual salaries; men and women

where Y^* is the latent ML regression explaining the probability of receiving a job interview, β_0 is a constant, β_1 measures university entry standards (UCAS tariff score), β_2 measures controls for Russell Group membership, β_3 controls for university effects (which controls for university attended), β_4 controls for occupational effects, β_5 controls for job and firm effects, β_6 controls for location effects, e is the disturbance, and i refers to the individual.

In Table VI, Models I and II, we estimate the basic equation of male applicants receiving a job interview and we present the marginal effects (Average Marginal Effects). In Models III and IV, we use the basic equation to estimate a straightforward OLS log regression on the male applicants' entry annual salaries (natural log)[19]. In all specifications, we use sandwich estimators to compute the robust standard errors. In Models I and III, we include 14 control variables to measure the effect of each university. The reference category (excluded category) is the Top 1 university. A statistically significant negative university coefficient would imply lower job-interview probabilities as compared to the reference category. Furthermore, we include ten variables to control for occupational effects (the reference category is manufacturing jobs). Finally, we control for whether the job's location and the applicant's location are in the same city, the distance between the firm and the applicant, as well as the firm's location (the reference category is Yorkshire and Humberside). In Models II and IV, we present estimates obtained when adding additional variables to account for job and firm characteristics (11 controls), whilst we estimate several interaction effects to evaluate whether Russell Group membership interacts with job and firm characteristics and affects applicants' labour market prospects. In Table VII, we adopt the same approach to estimate patterns for women[20].

6.2 Outcomes: access to vacancies

In Table VI, Model I, the estimations suggest that there is a positive relation between university entry standards (UCAS tariff system) and applicants' probability of receiving an invitation for an interview. That is, a one standard deviation increase in the UCAS tariff system increases the probability of an applicant's invitation for an interview by 0.001 percentage points. In addition, the estimations suggest that male applicants from the Top 2 university face statistically insignificant differences in the probability of receiving an invitation for an interview compared to the applicants from the Top 1 university. The same holds for applicants from the Top 3 university and the Top 4 university. However, the estimations suggest that applicants from the other 11 institutions face statistically significant lower chances of receiving an invitation for an interview compared to the applicants from the Top 1 university. The difference in access to vacancies ranges between 9.9 and 29.7 percentage points. On average, we accept the hypothesis that university coefficients are not jointly equal ($p = 0.000$). That is, the university attended can affect the applicants' access to vacancies. Importantly, the estimations in Model I, further suggest that the applicants from the Russell Group universities face a statistically significant higher chance of receiving an invitation for an interview (11.3 percentage points)[21].

In the regression presented in Model II, we include job and firm control variables. We observe that the statistical significance of the university coefficients does not change as compared to Model I. However, the coefficients' magnitude is lower than those in Model I. The access to vacancies difference ranges between 5.4 and 23.5 percentage points. Also, the applicants from the Russell Group universities face a statistically significant higher chance of receiving an invitation for an interview (7.8 percentage points). In addition, in Model II and using the Russell Group interaction

	Model I Access to vacancies	Model II Access to vacancies	Model III Entry-level annual salaries	Model IV Entry-level annual salaries
University entry standards	0.001 (0.0001)*	0.001 (0.0001)*	0.0005 (0.0000)*	0.0005 (0.0000)*
Russell group membership	0.113 (0.024)*	0.078 (0.020)*	0.037 (0.007)*	0.032 (0.010)*
<i>University dummies (Ref.: Top 1)</i>				
Top 2	-0.016 (0.083)	-0.011 (0.048)	0.015 (0.011)	0.012 (0.012)
Top 3	-0.052 (0.045)	-0.023 (0.093)	-0.023 (0.012)***	-0.023 (0.013)
Top 4	-0.062 (0.085)	-0.015 (0.076)	-0.058 (0.017)*	-0.049 (0.017)*
Top 5	-0.261 (0.078)*	-0.216 (0.067)*	-0.112 (0.019)*	-0.091 (0.019)*
Top 6	-0.190 (0.083)*	-0.132 (0.042)*	-0.064 (0.018)*	-0.053 (0.018)*
Top 7	-0.099 (0.053)**	-0.054 (0.029)***	-0.095 (0.018)*	-0.081 (0.018)*
Top 8	-0.252 (0.079)*	-0.196 (0.064)*	-0.097 (0.015)*	-0.082 (0.015)*
Top 9	-0.288 (0.078)*	-0.221 (0.072)*	-0.128 (0.019)*	-0.096 (0.019)*
Top 10	-0.227 (0.081)*	-0.175 (0.055)*	-0.126 (0.018)*	-0.096 (0.018)*
Top 11	-0.207 (0.082)*	-0.154 (0.063)*	-0.113 (0.019)*	-0.083 (0.020)*
Top 12	-0.072 (0.034)*	-0.069 (0.032)*	-0.053 (0.017)*	-0.043 (0.017)*
Top 13	-0.270 (0.077)*	-0.232 (0.089)*	-0.117 (0.019)*	-0.082 (0.019)*
Top 14	-0.224 (0.089)*	-0.172 (0.082)*	-0.136 (0.018)*	-0.106 (0.018)*
Top 15	-0.297 (0.073)*	-0.235 (0.067)*	-0.164 (0.019)*	-0.112 (0.019)*
<i>Occupations (Ref.: manufacturing)</i>				
Financial intermediation, consultancy and bank	0.071 (0.019)*	0.064 (0.017)*	0.070 (0.027)*	0.069 (0.032)*
Financial intermediation, consultancy and bank × Russell group	-	0.019 (0.005)*	-	0.089 (0.020)*
Public, urban and territorial administration	0.040 (0.022)**	0.038 (0.026)*	0.058 (0.023)*	0.056 (0.020)*
Public, urban and territorial administration × Russell group	-	0.031 (0.010)*	-	0.038 (0.008)*
Education	0.063 (0.014)*	0.057 (0.014)*	0.044 (0.022)*	0.040 (0.020)*
Education × Russell group	-	0.021 (0.003)*	-	0.037 (0.012)*
Real estate and renting	0.039 (0.017)*	0.037 (0.015)*	0.024 (0.014)***	0.022 (0.010)*
Real estate and renting × Russell group	-	0.027 (0.010)*	-	0.052 (0.021)*
Wholesale, retail and motor sale	-0.006 (0.032)	0.006 (0.018)	0.018 (0.028)	0.016 (0.020)*
Wholesale, retail and motor sale × Russell group	-	0.021 (0.006)*	-	0.024 (0.005)*

(continued)

Table VI.
Estimations: access
to vacancies and
entry-level annual
salaries; men

Table VI.

	Model I Access to vacancies	Model II Access to vacancies	Model III Entry-level annual salaries	Model IV Entry-level annual salaries
Health industry and social support	0.013 (0.003)*	0.011 (0.002)*	0.030 (0.014)*	0.027 (0.010)*
Health industry and social support × Russell group	-	0.023 (0.006)*	-	0.026 (0.006)*
Transport, storage and communication	0.029 (0.013)*	0.016 (0.007)*	0.056 (0.020)*	0.047 (0.016)*
Transport, storage and communication × Russell group	-	0.020 (0.005)*	-	0.043 (0.020)*
Electricity, gas and water supply	0.068 (0.025)*	0.042 (0.020)*	-0.007 (0.008)	-0.007 (0.012)
Electricity, gas and water supply × Russell group	-	0.023 (0.002)*	-	0.031 (0.010)*
Hotels and restaurants	0.048 (0.021)*	0.041 (0.019)*	0.025 (0.014)***	0.026 (0.019)
Hotels and restaurants × Russell group	-	0.022 (0.005)*	-	0.037 (0.016)*
Construction	0.041 (0.040)	0.032 (0.035)	-0.002 (0.012)	-0.002 (0.010)
Construction - Russell group	-	0.021 (0.006)*	-	0.021 (0.006)*
Job and firm characteristics	-	-	-	-
Public sector	-	0.075 (0.193)	-	0.058 (0.028)*
Public sector × Russell group	-	0.087 (0.040)*	-	0.040 (0.006)*
Fixed contract	-	0.171 (0.116)	-	-0.034 (0.011)*
Fixed contract × Russell group	-	0.059 (0.047)	-	0.021 (0.018)
Relocation package	-	0.016 (0.010)	-	0.041 (0.066)*
Relocation package × Russell group	-	0.020 (0.016)	-	0.012 (0.053)
London Allowance	-	0.230 (0.322)	-	0.058 (0.023)*
London allowance × Russell group	-	0.113 (0.120)	-	0.042 (0.037)*
Trade union	-	0.062 (0.019)*	-	0.062 (0.012)*
Trade union × Russell group	-	0.145 (0.170)	-	0.056 (0.087)
Workplace size	-	0.230 (0.086)*	-	0.038 (0.012)*
Workplace size × Russell group	-	0.196 (0.077)*	-	0.079 (0.060)
Workplace age	-	0.283 (0.299)	-	0.328 (0.457)
Workplace age × Russell group	-	0.122 (0.120)	-	0.210 (0.156)
Multinational	-	0.202 (0.175)	-	0.033 (0.009)*
Multinational × Russell group	-	0.115 (0.055)*	-	0.037 (0.012)*
Human resources	-	0.103 (0.042)*	-	0.117 (0.127)
Human resources × Russell group	-	0.087 (0.017)*	-	0.053 (0.016)*
Equal opportunities	-	0.043 (0.058)	-	0.052 (0.048)

(continued)

	Model I Access to vacancies	Model II Access to vacancies	Model III Entry-level annual salaries	Model IV Entry-level annual salaries
Equal opportunities × Russell group		0.031 (0.021)	–	0.041 (0.037)
Online application	0.036 (0.042)	0.036 (0.044)	0.122 (0.118)	0.117 (0.104)
<i>Firm location (Ref.: Yorkshire and Humberside)</i>				
West-Midlands	0.042 (0.032)	0.040 (0.035)	-0.023 (0.024)	-0.022 (0.027)
Wales	0.052 (0.040)	0.050 (0.043)	-0.074 (0.025)*	-0.063 (0.028)*
East of England	-0.147 (0.034)*	-0.113 (0.053)*	0.052 (0.049)	0.047 (0.043)
North-East	0.027 (0.021)	0.020 (0.024)	0.028 (0.062)	0.025 (0.059)
Scotland	-0.118 (0.032)*	-0.075 (0.032)*	0.010 (0.024)	0.010 (0.020)
North-West	0.036 (0.038)	0.042 (0.030)	0.035 (0.026)	0.033 (0.024)
East-Midlands	-0.088 (0.045)***	-0.053 (0.057)	0.027 (0.021)	0.022 (0.017)
South-East	-0.172 (0.051)*	-0.084 (0.045)***	-0.069 (0.027)*	-0.061 (0.024)*
London	0.067 (0.048)	0.043 (0.035)	-0.104 (0.025)*	-0.094 (0.037)*
South-West	-0.236 (0.039)*	-0.162 (0.059)*	0.018 (0.023)	0.011 (0.017)
The applicant and the firm located in the same city	0.124 (0.168)	0.121 (0.175)	0.038 (0.217)	0.042 (0.203)
Distance between the applicant's location (city) and the job's location (city)	-0.155 (0.112)	-0.143 (0.173)	0.124 (0.118)	0.117 (0.154)
Log Likelihood	-833.165	-836.273	–	–
Prob > χ^2	0.000	0.000	–	–
LR χ^2	92.793	93.283	–	–
Pseudo R^2	0.052	0.054	–	–
Root MSE	–	–	0.192	0.194
Prob > F	–	–	0.000	0.000
Adj R^2	–	–	0.720	0.736
R^2	–	–	0.739	0.742
Observations	1,426	1,426	975	975

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used: UCAS index that converts school leaving qualification grades into one point system. Models I and II are probit estimations and we present Average Marginal Effects. Models III and IV offer OLS log estimations. We use sandwich estimators to compute robust standard errors. Standard errors are in parenthesis. *, **, ***, Significant at the 1, 5 and 10 per cent level, respectively

Table VI.

Table VII.
Estimations: access to
entry-level annual
salaries; women

	Model I Access to vacancies	Model II Access to vacancies	Model III Entry-level annual salaries	Model IV Entry-level annual salaries
University entry standards	0.001 (0.0001)*	0.001 (0.0001)*	0.0005 (0.0000)*	0.0005 (0.0000)*
Russell group membership	0.120 (0.037)*	0.081 (0.034)*	0.033 (0.010)*	0.029 (0.010)*
<i>University dummies (Ref.: Top 1)</i>				
Top 2	-0.024 (0.021)	-0.022 (0.031)	0.011 (0.010)	0.009 (0.011)
Top 3	-0.051 (0.071)	-0.086 (0.078)	-0.025 (0.013)**	-0.022 (0.024)
Top 4	-0.059 (0.081)	-0.033 (0.040)	-0.051 (0.017)*	-0.044 (0.018)*
Top 5	-0.254 (0.074)*	-0.203 (0.071)*	-0.109 (0.018)*	-0.086 (0.011)*
Top 6	-0.077 (0.074)*	-0.046 (0.021)*	-0.058 (0.018)*	-0.039 (0.017)*
Top 7	-0.065 (0.036)**	-0.063 (0.034)**	-0.102 (0.016)*	-0.083 (0.017)*
Top 8	-0.194 (0.076)*	-0.141 (0.064)*	-0.104 (0.017)*	-0.085 (0.016)*
Top 9	-0.172 (0.076)*	-0.139 (0.042)*	-0.132 (0.017)*	-0.109 (0.015)*
Top 10	-0.194 (0.077)*	-0.157 (0.047)*	-0.131 (0.015)*	-0.106 (0.014)*
Top 11	-0.214 (0.076)*	-0.184 (0.052)*	-0.108 (0.016)*	-0.092 (0.014)*
Top 12	-0.098 (0.038)*	0.069 (0.033)*	-0.050 (0.016)*	-0.037 (0.012)*
Top 13	-0.258 (0.071)*	-0.205 (0.070)*	-0.110 (0.018)*	-0.080 (0.016)*
Top 14	-0.198 (0.078)*	-0.154 (0.070)*	-0.141 (0.018)*	-0.112 (0.017)*
Top 15	-0.284 (0.072)*	-0.243 (0.077)*	-0.153 (0.011)*	-0.117 (0.010)*
<i>Occupations (Ref.: Manufacturing)</i>				
Financial intermediation, consultancy and bank	0.053 (0.020)*	0.051 (0.018)*	0.068 (0.025)*	0.060 (0.025)*
Financial intermediation, consultancy and bank × Russell group	-	0.024 (0.002)*	-	0.061 (0.021)*
Public, urban and territorial administration	0.034 (0.012)*	0.033 (0.010)*	0.057 (0.022)*	0.051 (0.022)*
Public, urban and territorial administration × Russell group	-	0.024 (0.003)*	-	0.032 (0.012)*
Education	0.065 (0.010)*	0.053 (0.020)*	0.046 (0.020)*	0.041 (0.021)*
Education × Russell group	-	0.020 (0.005)*	-	0.052 (0.008)*
Real estate and renting	0.035 (0.018)*	0.031 (0.012)*	0.025 (0.010)*	0.019 (0.016)
Real estate and renting × Russell group	-	0.020 (0.002)*	-	0.043 (0.017)*
Wholesale, retail and motor sale	-0.005 (0.027)	0.005 (0.013)	0.018 (0.025)	0.017 (0.017)
Wholesale, retail and motor sale × Russell group	-	0.010 (0.006)**	-	0.008 (0.008)

(continued)

	Model I Access to vacancies	Model II Access to vacancies	Model III Entry-level annual salaries	Model IV Entry-level annual salaries
Health industry and social support	0.026 (0.012)*	0.012 (0.002)*	0.031 (0.012)*	0.028 (0.012)*
Health industry and social support × Russell group	–	0.012 (0.005)*	–	0.021 (0.008)*
Transport, storage and communication	0.028 (0.012)*	0.021 (0.010)*	0.054 (0.021)*	0.052 (0.014)*
Transport, storage and communication × Russell group	–	0.019 (0.005)*	–	0.039 (0.017)*
Electricity, gas and water supply	0.053 (0.020)*	0.046 (0.020)*	–0.007 (0.007)	–0.007 (0.007)
Electricity, gas and water supply × Russell group	–	0.023 (0.003)*	–	0.028 (0.003)*
Hotels and restaurants	0.046 (0.020)*	0.039 (0.019)*	0.025 (0.012)*	0.025 (0.023)
Hotels and restaurants × Russell group	–	0.021 (0.004)*	–	0.029 (0.005)*
Construction	0.005 (0.031)	0.005 (0.019)	–0.002 (0.006)	–0.002 (0.005)
Construction × Russell group	–	0.020 (0.002)*	–	0.024 (0.005)*
Job and firm characteristics				
Public sector	–	0.074 (0.148)	–	0.059 (0.021)*
Public sector × Russell group	–	0.051 (0.020)*	–	0.038 (0.013)*
Fixed contract	–	–0.177 (0.123)	–	–0.051 (0.014)*
Fixed contract × Russell group	–	0.051 (0.041)	–	0.022 (0.018)
Relocation package	–	0.016 (0.012)	–	0.044 (0.015)*
Relocation package × Russell group	–	0.006 (0.006)	–	0.013 (0.015)
London Allowance	–	0.212 (0.243)	–	0.053 (0.020)*
London Allowance × Russell group	–	0.021 (0.033)	–	0.044 (0.045)*
Trade union	–	0.063 (0.020)*	–	0.064 (0.015)*
Trade union × Russell group	–	0.134 (0.103)	–	0.051 (0.065)
Workplace size	–	0.227 (0.076)*	–	0.040 (0.019)*
Workplace size × Russell group	–	0.157 (0.086)*	–	0.041 (0.032)
Workplace age	–	0.302 (0.255)	–	0.329 (0.323)
Workplace age × Russell group	–	0.111 (0.099)	–	0.187 (0.164)
Multinational	–	0.166 (0.135)	–	0.036 (0.011)*
Multinational × Russell group	–	0.118 (0.050)*	–	0.031 (0.010)*
Human resources	–	0.106 (0.036)*	–	0.095 (0.091)
Human resources × Russell group	–	0.095 (0.049)**	–	0.048 (0.020)*

(continued)

Table VII.

Table VII.

	Model I Access to vacancies	Model II Access to vacancies	Model III Entry-level annual salaries	Model IV Entry-level annual salaries
Equal opportunities	-	0.040 (0.056)	-	0.057 (0.051)
Equal opportunities × Russell group	-	0.024 (0.019)	-	0.043 (0.035)
Online application	0.041 (0.038)	0.039 (0.036)	0.136 (0.124)	0.133 (0.119)
<i>Firm location (Ref.: Yorkshire and Humberside)</i>				
West-Midlands	0.036 (0.054)	0.032 (0.030)	-0.017 (0.022)	-0.014 (0.025)
Wales	0.040 (0.030)	0.050 (0.043)	-0.075 (0.031)*	-0.069 (0.032)*
East of England	-0.154 (0.040)*	-0.125 (0.043)*	0.044 (0.042)	0.042 (0.057)
North-East	0.030 (0.025)	0.038 (0.027)	0.025 (0.043)	0.023 (0.036)
Scotland	-0.125 (0.031)*	-0.093 (0.040)*	0.013 (0.042)	0.010 (0.047)
North-West	0.073 (0.045)	0.039 (0.032)	0.033 (0.022)	0.030 (0.027)
East-Midlands	-0.097 (0.038)*	-0.051 (0.042)	0.025 (0.024)	0.025 (0.021)
South-East	-0.168 (0.042)*	-0.124 (0.056)*	-0.065 (0.023)*	-0.058 (0.023)*
London	0.083 (0.064)	0.063 (0.031)	-0.098 (0.026)*	-0.092 (0.026)*
South-West	-0.242 (0.087)*	-0.201 (0.057)*	0.016 (0.023)	0.013 (0.027)
The applicant and the firm located in the same city	0.118 (0.113)	0.128 (0.108)	0.038 (0.217)	0.042 (0.203)
Distance between the applicant's location (city) and the job's location (city)	-0.152 (0.123)	-0.107 (0.140)	0.124 (0.118)	0.117 (0.154)
Log Likelihood	-833.165	-837.055	-	-
Prob > χ^2	0.000	0.000	-	-
LR χ^2	89.652	89.846	-	-
Pseudo R^2	0.052	0.057	-	-
Root MSE	-	-	0.104	0.105
Prob > F	-	-	0.000	0.000
Adj R^2	-	-	0.718	0.729
R^2	-	-	0.727	0.741
Observations	1,416	1,416	942	942

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used; UCAS index that converts school leaving qualification grades into one point system. Models I and II are probit estimations and we present Average Marginal Effects. Models III and IV offer OLS log estimations. We use sandwich estimators to compute robust standard errors. Standard errors are in parenthesis. *, **, ***: Significant at the 1, 5 and 10 per cent level, respectively

effects, we estimate various statistically significant outcomes. Applicants holding degrees from Russell Group universities face a higher likelihood of receiving an invitation for an interview from public sector jobs (8.7 percentage points), from large firms (19.6 percentage points), from firms that have human resource departments (8.7 percentage points) and from multinational firms (11.5 percentage points). Moreover, the estimations suggest that Russell Group university applicants face a greater chance of receiving an invitation for an interview in all occupations. The highest differential relates to the jobs in financial intermediation, consultancy and banking. In Appendix 4, we offer an analysis of the remainder of the secondary controls, based on this study.

The estimations presented suggest that both entry standards and Russell Group membership can affect access to vacancies. Thus, *H1* and *H2* are accepted. In Table VII, we present estimations for female applicants. As can be observed in Models I and II, the patterns assigned are comparable to those of male applicants and are similarly interpreted. To potentially identify a gender effect, we jointly regressed the males' and females' access to vacancies. The process does not yield any statistically significant gender effect on the invitation to interview. The latter estimations are available on request.

6.3 Outcomes: entry-level annual salaries

In Table VI, Model III, we present the entry-level annual salaries for men. The estimations suggest that the entry-level standards affect applicants' salary prospects. Indeed, there is a statistically significant relationship between students' UCAS tariff scores and their entry salaries. That is, a one standard deviation increase in the UCAS tariff system increases the entry-level annual salaries by 0.05 percentage points. Also as it is observed, apart from the Top 2 university, there are statistically significant differences in the entry salaries based on the applicants' institutions. The salary difference ranges between 5.3 and 16.4 percentage points. Thus, we accept the hypothesis that the university coefficients are not jointly equal ($p = 0.000$). Moreover, the estimations suggest that the applicants from Russell Group universities face statistically significant higher salary prospects (3.7 percentage points)[22]. These patterns are in line with UK (Broecke, 2012; Hussain *et al.*, 2009) and US studies (Brewer *et al.*, 1999; Hoekstra, 2009; Long, 2010; Dale and Krueger, 2002).

In Model IV, we add more job and firm variables. Although we control for key heterogeneities, the university entry standard coefficients' statistical significance does not change. The same pattern holds for Russell Group membership coefficients' statistical significance. Whilst, the new salary difference ranges between 4.3 and 11.2 percentage points. Moreover, the interactions between occupations and the Russell Group institutions suggest that the applicants who hold degrees from the Russell Group universities are invited to interview at firms that offer statistically significant higher entry salaries. The greatest differential relates to jobs in financial intermediation, consultancies and banking (8.9 percentage points). In addition, the Russell Group salary premiums are observed from jobs in the public sector (4.0 percentage points), from multinational firms (3.7 percentage points), and from firms having human resource departments (5.3 percentage points). In Appendix 5, we offer an analysis of the remainder of the secondary controls, based on this study.

The patterns assigned suggest that university entry standards and Russell Group membership can positively affect salary prospects. So, *H1* and *H2* are accepted. Finally, in Table VII, we present the estimations for female applicants regarding entry-level salaries. The outcomes are consistent with the male applicants' salary results, which verify the general patterns assigned. When regressing a single equation considering

both male and female entry salaries, a statistically significant gender salary premium is not estimated. The tables are available on request.

6.4 Adding more reputation indexes: Generalized Method of Moments (GMM) estimates

In Tables VI and VII, apart from the university entry standards and Russell Group membership, we can also consider two additional variables as reputation indexes: the departmental economics research outcomes score (RAE[23]) and the departmental economics students' satisfaction score (NSS[24]). Unfortunately, however, the regressions become blurred when all four reputation measures are included together (estimations are available on request). This pattern highlights the collinearity among the quality variables. Following the strategy of Black and Smith (2006), we can turn to the GMM estimator, in which we use one quality measure in the structural equation and the remaining three measures as instruments. In Table VIII, we observe that all reputation variables produce statistically significant effects on applicants' access to vacancies and entry-level salaries for both genders at the 1 per cent level. These outcomes are in line with the results of UK studies (Hussain *et al.*, 2009) and US studies (Black and Smith, 2006). We observe that the Russell Group membership variable has the highest effect on applicants' labour market prospects. As we previously discussed, this variable accounts for universities' highest research outcomes and scholarly activity, which significantly label a university's reputation.

7. Discussion

The current study is in line with those UK studies that find that university reputation can affect graduates' subsequent wages (Power and Whitty, 2008; Norton, 2008; Hussain *et al.*, 2009; Broecke, 2012). In addition, the results of the current study verify the raw statistics offered by the UK league tables that suggest that graduates of high-ranked universities have higher employment rates. However, in our study, because firms do not see more information than do econometricians, such as information on ability and motivation, our results are more informative and provide clearer patterns on the relationship between university reputation and labour market prospects compared with the cited studies, which fail to control for the potential impact of graduates' ability

	Model I ^a	Model II ^b
<i>Men</i>		
University entry standards (UCAS tariff score)	0.001 (0.0001)*	0.0006 (0.0000)*
Russell Group Membership	0.086 (0.016)*	0.047 (0.008)*
Research Assessment Exercise (RAE)	0.013 (0.005)*	0.015 (0.006)*
National Student Survey (NSS)	0.015 (0.004)*	0.012 (0.004)*
<i>Women</i>		
University entry standards (UCAS tariff score)	0.001 (0.0001)*	0.0006 (0.0000)*
Russell Group Membership	0.091 (0.013)*	0.036 (0.005)*
Research Assessment Exercise (RAE)	0.012 (0.003)*	0.014 (0.006)*
National Student Survey (NSS)	0.017 (0.005)*	0.013 (0.005)*

Table VIII.
Generalized method
of moment estimates
of the effect of
university reputation

Notes: Each specification is a separate regression. Each reputation measure is instrumented using all other reputation measures. ^aWe include the same controls as in Model I/Model III in Tables VI and VII. ^bWe include the same controls as in Model II/IV in Tables VI and VII. *Significant at the 1% level

and motivation. In the same vein, the current study's estimations cannot be affected by parental support or networks' unobserved heterogeneities. Meanwhile, the current study took into account multiple job and firm heterogeneities as well. Most of the previous literature did not consider the aforementioned core parameters whose omission from the econometric specification may have affected the interpretation of the results.

In the current study, although several demographic variables, and job/firm heterogeneities were taken into account, as well as, core unobserved heterogeneities were controlled, the estimations suggested that university entry standards and universities reputation can affect the applicants' access to vacancies and their entry salary. This study should be of interest to those who work with human capital theories and to those providing and receiving higher education. Human capital provides insights about the supply-side of the story and the nature of access to vacancies and salary differentials. Human capital theory specifies a particular mechanism, through which education increases skills, higher skills in turn increase productivity, and higher productivity is then rewarded through higher salaries. It could be suggested that higher university entry standards and a degree obtained from certain highly ranked and reputable institutions increase an individual's human capital investment, which is considered by firms. However, the demand-side of the story, namely, the screening actions of employers, is also operative in the labour market. As we previously analysed, in a labour market with private information, an "applicant package" may work as a screening device for firms. If a specific package is correlated with educational excellence, the employers will screen their applicants based on these credentials. Because firms do not directly observe the attributes that affect the applicants' productivity, it appears that they use filters to draw inferences about unobserved attributes.

The current patterns suggested that entry standards and Russell Group membership correspond to different amount of time, effort, and resources that an applicant must spend (invest) to receive an invitation for an interview. Also, the firms that offered higher salaries favored the applicants coming from institutions that have higher entry standards and are highly reputable. In addition, Russell Group membership was found to interact with most of the control variables and was estimated to positively affect the applicants' labour market outcomes. Minimizing critical unobserved heterogeneities we suggest that the applicants coming from more reputable institutions are more likely to be employed than the applicants coming from institutions with lower ranks if we assume that an applicant receives an interview only if she/he has a substantial chance of getting the job. Indeed, the UK league tables offer information regarding the graduates' employment prospects six months after their graduation, and while only raw data are provided, it is clearly observable that there are employment differences among institutions (Gormley and Weimer, 1999).

In this study, what is important is that although the firms cannot evaluate by themselves whether a reputable university is better than a less reputable university, it appears that the university attended affects their recruitment policy. Scientists addressing education and labour economics should be interested in evaluating how the main conceptual ideas of screening theory and credentials positioned to shape students' future labour outcomes are utilized to enhance a graduate's employment opportunities. Therefore, if a university attended can affect the employers' evaluations, institutions should consider the factors that affect their reputation. One of the leading determinants of a good university is the quality of its incoming students. Indeed, in the current study, we estimated that university entrance standards partially affect the applicants' labour

prospects. Therefore, we suggest that the quality of graduates tends to be highly correlated with their ability to gain admittance, and because a university is able to attract good students, it is evaluated by firms as a good university. In other words, students with high academic ability are attracted to the universities with the best reputations. Human capital and screening theories can be employed to offer evaluations between the applicants' skills and employment outcomes.

However, keep in mind that the current findings are strictly applicable only to the time, the place, and the applicant and firm characteristics from which the sample was drawn. Without further research, we cannot generalize the results of this study to other types of graduates, applicants, vacancies, employers or cultures. Thus, many questions are left unanswered. In reality, job offers are also obtained via informal searches and networks. This omission could qualitatively affect the results. Moreover, the cultural and social capital of different types of applicants may play a role in determining how they approach the job search process. While, how graduates' performance may affect their labour market prospects is an open question. One may suggest that students from Russell Group universities show higher performance than students from other institutions. The link between the real performance of the graduates and university reputation remains unknown. Also, consider that the adopted methodology can be effective only in demonstrating the differences at the initial stage of a recruitment process as well as in measuring the results of the recruitment process. In this context, however, it is important to know whether an applicant will eventually get a job as well as the applicant's salary upon getting the job. Thus, the results of this study are simply an indication of the relationship between the university attended and the employment outcome; they are by no means the final word.

8. Conclusion

In the current study, we proposed an approach to measure whether university entry standards (UCAS tariff score), as well as Russell Group membership (reputation index) of 15 randomly selected UK universities, affect the access to job vacancies and the level of entry-level annual salaries of applicants who have obtained a BSc in economics. The strength of this study was that it applied a design to a real-world setting, thus allowing for an evaluation of how firms treated applicants in the recruiting process by a single job search plan (submitting applications) when unobserved heterogeneities such as motivation, abilities, family support and networks cannot affect the relations under consideration. Unfortunately, most of the previous literature did not manage to simultaneously control for the aforementioned biases. Working in the field between May and July 2012 with 90 applicants and recording the correspondence of 2,857 firms, we yield several statistically significant results. Controlling several characteristics from the beginning such as gender, age, ethnicity, marital status, subject of degree, subject mix, grade obtained, pre-professional experience, skills, personal characteristics, as well as, minimizing unobserved characteristics (motivation, abilities, family support and networks) the estimations suggested that we can accept the hypothesis that university entry standards (UCAS tariff score) affect applicants' access to vacancies and their entry-level salaries. In addition, we accept the hypothesis that applicants from Russell Group universities face statistically significant greater chances of receiving an invitation for an interview and statistically significant higher salary prospects. Conceptualizing Russell Group membership as a reputation indicator, we did find that there are associations between university attended and labour market outcomes. The outcomes suggested that the applicants holding degrees from Russell Group

universities have a greater likelihood of receiving an invitation for an interview for all of the occupational categories used in this study as well as from public sector jobs, from large firms, from firms that have human resource departments, and from multinational firms. Moreover, the estimations suggested that the applicants who hold degrees from the Russell Group universities were invited for interviews from occupations that offered statistically significant higher entry salaries. Additionally, the Russell Group salary premiums were estimated from jobs in the public sector, from multinational firms, and from firms with human resource departments.

The results of this study suggest that firms might equate quality with university entry standards, and reputation. We conclude that it is necessary to monitor the performance of universities when unobserved heterogeneities are minimized because the expectations for higher education have become more complex and because social planners and employers have come to expect higher educational institutions to contribute to the development of a variety of skills, enhancing the stock of human capital and promoting national economic well-being.

Notes

1. Universities' entry standards act more as a guide for students. Students know that they are unlikely to receive an offer from a university with higher standardised grade levels than they have obtained. Students apply to universities that they believe will accept them for admission based on the standardized grade levels they have earned. Universities then choose those students that they believe are the best. There is no guarantee of admittance even if the student's standardized grades are greater than or equal to the university's entry threshold. For an analysis, see Broecke (2012).
2. The UCAS tariff score is school graduation qualification converted into a one point system. The score establishes an agreed-upon comparability between different types of qualification grades and allows comparisons between students with different types and levels of achievement. The UCAS tariff score is used by universities to set entry standards for various courses, and it is quite common for graduate recruiters to also take it into account an applicant's pre-university education score when considering them for a job.
3. The Russell Group represents universities that describe themselves as institutions that are committed to maintaining the very best research, an outstanding teaching and learning experience and unrivalled links with business and the public sector. Russell Group Universities are the most highly ranked institutions based on all UK league tables. Russell Group Universities have the highest research outcomes, as measured by the Research Assessment Exercise (RAE) score, and the most satisfied students, as measured by the National Student Survey score (NSS).
4. Consider that socioeconomic background (social class) plays a significant role in students' pre-university academic achievements, which affect their likelihood of participating in higher education and their choice of institution (Mangan *et al.*, 2010; Reay *et al.*, 2001). Family income, attending an independent school, and geographic area can affect both examination grades and the university attended (Chowdry *et al.*, 2008). Additionally, working-class students are more likely to apply to lower- than higher-status universities. The main reason for their choice is a desire to "fit in" (Chowdry *et al.*, 2008).
5. The league tables are considered to be a type of organizational report card that provides explicit organizational rankings based on the universities' entry standards, the scientific achievements realized at the university, and their students' satisfaction evaluations (Gormley and Weimer, 1999).
6. A suggestion that will be proven to be correct in the regression stage.

7. In all, 20 per cent of the universities are located in London, 13.3 per cent in the East of England, and 13.3 per cent in the Southeast. Moreover, 8 out of 15 universities (53.3 per cent) are Russell Group members, one university is a Million+ Group member, three are 1994 Group members, and the rest are unclassified. The 1994 Group members describe themselves as institutions that promote excellence in research and teaching, and they enhance student and staff experience within the universities and set the agenda for higher education. The Million+ Group members describe themselves as institutions that are committed to creating opportunities and delivering world-class teaching, research and knowledge exchange programmes.
8. The great majority of the universities' employment agencies that collaborated in this study suggested that the undergraduate students start to send job applications in May, because in that period, they are unsure of the date of their graduation (as well as being unsure of their final grade) and they are identified in their CVs as graduates.
9. The students therefore had the option to make a choice and to follow their tastes. Adopting this strategy, the applicants engaged themselves in a job market search.
10. To minimize biases, the applicants' photos were not provided with their CVs.
11. The firms communicated with the applicants via e-mail. Communication through the telephone was not observed. In addition, the applicants did not receive formal written responses.
12. In all cases, the students declared the place of their studies as their city of residence. The students, however, did not receive written replies.
13. The professors (the references) were aware of the study. The evaluation showed that they did not provide references before formal job interview invitations.
14. Having discussed with the 15 universities how many days each student would have to actively collaborate with the research committee, we concluded that 20 days was an acceptable period. Most important, the human resource managers suggested that the intervening period between sending an application and firm correspondence is, on average, four weeks. In this study, by choosing three weeks as the sending period per student, we successfully minimized the situation in which a student would have to submit additional applications although she/he may have already been called for an interview. If that was the case, the students may have chosen to stop the sending process and biased the research design.
15. Apart from sending their CVs and cover letters, in 33.8 per cent of the cases, the applicants completed forms provided by the firms. Typical answers to the online application questionnaires were standardised. For completeness, however, the online application feature was included in the regression.
16. One feature of the experiment is that there are no matched sets, meaning no employer receives two resumes from two different students from different universities. In the current study, we want to consider applicants coming from 15 universities. The experiment would have been revealed if we had sent 15 applications to the same job opening. However, it is a most interesting extension one to send two applications to the same vacancy because she/he can be conditioned on vacancy fixed effects.
17. After the data gathering period, the evaluation showed that applicants had applied to 70.6 per cent of the job openings that we had sent them. Discussing this issue with the university employment agencies informed us that the graduates, due to a long-lasting recession and a high unemployment rate, sent their applications to the majority of the new job openings that were appropriate for their course of study. In the case of a job interview, the firms are used to covering the graduates' transportation costs to increase their attendance rate. Indeed, in the current study, in the case of an interview invitation, 64.5 per cent of the firms mentioned that they were likely to cover the applicants' costs. For this reason, these firms often receive applications coming from every geographical region in the UK as well as from overseas.

18. A post-estimation regression revealed that the entry salary coefficients of the job openings forwarded to students are jointly equal ($p = 0.253$). This specification suggests that applicants from lower- vs higher-ranked universities did not receive high- vs low-quality job openings, resulting in methodological biases.
19. Note that sample selection is not an issue. Salaries are observed from the beginning (the information is provided in the job advertisement), before an applicant receives the invitation for an interview or a job offer.
20. Because we included a number of independent variables in the regression stage to check whether multicollinearity was an issue, we randomly divided our sample in two. In all specifications, we did not find the coefficients to differ in magnitude or significance. We may suggest, then, that multicollinearity was not a problem. Similarly, we examined the effects of dropping and adding variables. The magnitude and significance of the estimations did not exhibit large shifts.
21. The probit model has relatively low pseudo R^2 values, which is rather common for binary regressions (Hosmer and Lemeshow, 2000).
22. The OLS model has a relatively high Adj R^2 , which is an expected outcome because we included multiple independent variables in the regression stage (Wooldridge, 2010).
23. The RAE is undertaken approximately every six years by the four UK higher education funding councils to evaluate the quality of research undertaken by the British higher education institutions. These rankings are used to inform the allocation of quality-weighted research funding that each higher education institution receives from their national council.
24. The NSS is a survey of all final-year degree students. The survey is designed to assess students' opinions of the quality of their degree programmes with seven different scores, including an overall satisfaction mark.

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Universities in a ranked order (for the sub-discipline; BSc in economics) and timetable	Men	Women
<i>Top 1 university</i>		
Between the 15th of May and the 5th of June	Warren (30)	Barbara (31)
Between the 6th of June and the 26th of June	Gordon (32)	Diana (28)
Between the 27th of June and the 15th of July	James (34)	Louise (35)
<i>Top 2 university</i> ($\Delta UCAS (Top1-Top2) = 36$)		
Between the 15th of May and the 5th of June	Charles (25)	Lyn (29)
Between the 6th of June and the 26th of June	William (27)	Ester (35)
Between the 27th of June and the 15th of July	Ian (44)	Judy (32)
<i>Top 3 university</i> ($\Delta UCAS (Top1-Top3) = 80$)		
Between the 15th of May and the 5th of June	Eric (35)	Linda (31)
Between the 6th of June and the 26th of June	David (34)	Daphne (37)
Between the 27th of June and the 15th of July	Mark (34)	Gwen (32)
<i>Top 4 university</i> ($\Delta UCAS (Top1-Top4) = 129$)		
Between the 15th of May and the 5th of June	Warren (30)	Elizabeth (30)
Between the 6th of June and the 26th of June	Peter (32)	Mary (35)
Between the 27th of June and the 15th of July	Victor (34)	Charlotte (22)
<i>Top 5 university</i> ($\Delta UCAS (Top1-Top5) = 151$)		
Between the 15th of May and the 5th of June	Simon (30)	Annie (32)
Between the 6th of June and the 26th of June	Colin (30)	Joan (27)
Between the 27th of June and the 15th of July	Philip (29)	Fiona (26)
<i>Top 6 university</i> ($\Delta UCAS (Top1-Top6) = 182$)		
Between the 15th of May and the 5th of June	Jonathan (31)	Mary (28)
Between the 6th of June and the 26th of June	Ian (30)	Ann (36)
Between the 27th of June and the 15th of July	Philip (34)	Karen (24)
<i>Top 7 university</i> ($\Delta UCAS (Top1-Top7) = 186$)		
Between the 15th of May and the 5th of June	Mark (41)	Margaret (30)
Between the 6th of June and the 26th of June	Paul (31)	Beatrice (31)
Between the 27th of June and the 15th of July	Edward (25)	Rebecca (35)
<i>Top 8 university</i> ($\Delta UCAS (Top1-Top8) = 188$)		
Between the 15th of May and the 5th of June	Gordon (26)	Jane (35)
Between the 6th of June and the 26th of June	Nick (37)	Rosalie (25)
Between the 27th of June and the 15th of July	Andrew (32)	Caroline (22)
<i>Top 9 university</i> ($\Delta UCAS (Top1-Top9) = 191$)		
Between the 15th of May and the 5th of June	Robert (36)	Diana (37)
Between the 6th of June and the 26th of June	Paul (28)	Joan (30)
Between the 27th of June and the 15th of July	David (33)	Patricia (28)
<i>Top 10 university</i> ($\Delta UCAS (Top1-Top10) = 225$)		
Between the 15th of May and the 5th of June	Alan (28)	Esther (30)
Between the 6th of June and the 26th of June	Edmund (36)	Josie (41)
Between the 27th of June and the 15th of July	Patrick (29)	Mary (31)

(continued)

Table AI.
Timetable per
university and
numbers of job
applications per
applicant

Universities in a ranked order (for the sub-discipline; BSc in economics) and timetable	Men	Women
<i>Top 11 university</i> ($\Delta UCAS (Top1-Top11) = 234$)		
Between the 15th of May and the 5th of June	James (31)	Belinda (31)
Between the 6th of June and the 26th of June	Malcolm (30)	Linda (40)
Between the 27th of June and the 15th of July	Warren (28)	Janis (29)
<i>Top 12 university</i> ($\Delta UCAS (Top1-Top12) = 261$)		
Between the 15th of May and the 5th of June	Jeff (31)	Jane (36)
Between the 6th of June and the 26th of June	Andrew (30)	Karen (29)
Between the 27th of June and the 15th of July	Stuart (34)	Lyn (33)
<i>Top 13 university</i> ($\Delta UCAS (Top1-Top13) = 292$)		
Between the 15th of May and the 5th of June	Trevor (30)	Hilda (26)
Between the 6th of June and the 26th of June	Graig (38)	Natalie (38)
Between the 27th of June and the 15th of July	Andrew (37)	Louise (36)
<i>Top 14 university</i> ($\Delta UCAS (Top1-Top14) = 296$)		
Between the 15th of May and the 5th of June	James (33)	Rebecca (31)
Between the 6th of June and the 26th of June	Peter (30)	Margaret (27)
Between the 27th of June and the 15th of July	Ralph (34)	Elizabeth (35)
<i>Top 15 university</i> ($\Delta UCAS (Top1-Top15) = 350$)		
Between the 15th of May and the 5th of June	Simon (35)	Annie (37)
Between the 6th of June and the 26th of June	Derek (40)	Jane (27)
Between the 27th of June and the 15th of July	Howard (26)	Zoe (35)

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used; UCAS index (sub-discipline; BSc in economics) that converts school leaving qualification grades into one point system. Job applications per student are in parentheses

Table AI.

Appendix 2. Cover letter and curriculum vitae**Cover Letter** May/June 2012

Dear Sir/Madam,

Please find attached my Curriculum Vitae for your kind consideration for the vacancy as was advertised in... I am 21 years old and in July, I will be awarded a BSc in Economics (2:1) from the University of ... I am very interested for the advertised job, and I would appreciate the opportunity to speak with you in person to further discuss my qualifications, your business objectives, and the talents I can bring to your organization. During my studies, I acquired strong academic skills, and I have ability to work in teams and to communicate well with others. The job you are offering matches both my personal and professional interests.

I look forward to hearing from you soon. In the meantime, please do not hesitate to contact me if you require further information.

Yours sincerely,

Name and surname

Curriculum Vitae

First Name:

Last Name:

Sex:

Ethnicity: White-British

Marital Status: Unmarried

Date of Birth: .../.../1991

Current Address: Location (university's city)

Telephone: Mobile

E-mail: University e-mail

Higher education

Level and subject of degree: BSc in Economics, University of ...

Grade obtained: 61% (2:1)

Main courses of study: Microeconomics, Macroeconomics and Quantitative Methods for Economists

Duration of studies: 2009-2012 (3 year programme)

High school education (State Schools; non fee-paying)

Names and addresses

Period of study and UCAS tariff score

Knowledge of software

Microsoft Office, E-Views, and SPSS

Pre-professional experience

Practical experiences gained by delivering projects as a part of major modules (microeconomics, macroeconomics, and quantitative methods).

Quantitative methods used during the thesis period.

Skills: Ability to work in teams and to communicate well with others.

Personal characteristics: Sociable and amiable.

Spare time interests: Cinema, music

Academic referees (contact details of two professors were provided)

Name	Definition
<i>I. Dependent variables</i>	
Call for interview (access to vacancies)	1 if the applicant receives an invitation for interview; 0 otherwise
Entry-level annual salary	Entry-level annual salary before taxes
<i>II. University entry standards (UCAS tariff score)</i>	
<i>III. University dummies</i>	
Top 1	Reference category
Top 2	1 if the university is ranked second in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 3	1 if the university is ranked third in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 4	1 if the university is ranked fourth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 5	1 if the university is ranked fifth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 6	1 if the university is ranked sixth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 7	1 if the university is ranked seventh in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 8	1 if the university is ranked eighth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 9	1 if the university is ranked ninth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 10	1 if the university is ranked tenth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 11	1 if the university is ranked eleventh in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 12	1 if the university is ranked twelfth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 13	1 if the university is ranked thirteenth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
Top 14	1 if the university is ranked fourteenth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise

Table AII.
Variables coding

(continued)

Name	Definition
Top 15	1 if the university is ranked fifteenth in this sample based on the UCAS tariff score for the sub-discipline BSc in economics; 0 otherwise
<i>IV. Russell Group membership</i>	1 if a university is Russell Group member; 0 otherwise
<i>V. Research Assessment Exercise score</i>	Natural log of Research Assessment Exercise score (for the sub-discipline; BSc in economics)
<i>VI. National Student Survey score</i>	Natural log of National Student Survey score (for the sub-discipline; BSc in economics)
<i>VII. Applicant's characteristics</i>	
Male	1 if the applicant is male; 0 otherwise
Age	Years of age
British-White	1 if the applicant is British-White; 0 otherwise
Married	1 if the applicant is married; 0 otherwise
Grade obtained	BSc grade
Working experience	Months of working experience
Knowledge of software	1 if the applicant has knowledge of software (Office, E-views, and SPSS); 0 otherwise
Skills: ability to work in teams	1 if the applicant includes 'ability to work in teams' in her/his CV; 0 otherwise
Skills: communication skills	1 if the applicant includes 'communication skills' in her/his CV; 0 otherwise
Pre-professional experience: projects delivery as part of major modules	1 if the applicant delivered projects as part of her/his major modules (microeconomics, macroeconomics, quantitative methods); 0 otherwise
Pre-professional experience: quantitative methods used when writing the thesis	1 if the applicant used quantitative methods when writing her/his thesis; 0 otherwise
Personality: sociable	1 if the applicant includes "sociable" in her/his CV; 0 otherwise
Personality: amiable	1 if the applicant includes "amiable" in her/his CV; 0 otherwise
Spare time interest: cinema	1 if the applicant includes "cinema as a hobby" in her/his CV; 0 otherwise
Spare time interest: music	1 if the applicant includes "music as a hobby" in her/his CV; 0 otherwise
Letters of references	1 if the applicant provides contact details of at least 2 professors; 0 otherwise
Applicant location	Applicant location is university region
<i>VIII. Occupations</i>	
Financial intermediation, consultancy and bank	1 if the job opening is for financial intermediation, consultancy and bank; 0 otherwise
Public, urban and territorial administration	1 if the job opening is for public, urban and territorial administration; 0 otherwise
Education	1 if the job opening is for education; 0 otherwise
Real estate and renting	1 if the job opening is for real estate and renting; 0 otherwise
Wholesale, retail and motor sale	1 if the job opening is for wholesale, retail and motor sale; 0 otherwise
Health industry and social support	1 if the job opening is for health industry and social support; 0 otherwise

(continued)

Table AII.

Name	Definition
Transport, storage and communication	1 if the job opening is for transport, storage and communication; 0 otherwise
Electricity, gas and water supply	1 if the job opening is for electricity, gas and water supply; 0 otherwise
Hotels and restaurants	1 if the job opening is for hotels and restaurants; 0 otherwise
Construction	1 if the job opening in economics is for construction; 0 otherwise
Manufacturing	Reference category
<i>IX. Sector</i>	
Public	1 if the job is in the public sector; 0 otherwise
<i>X. Job's and firm's characteristics</i>	
Fixed contract	1 if the vacancy is on a fixed term contract; 0 otherwise
Relocation package	1 if the firm offers relocation package; 0 otherwise
London Allowance	1 if the firm offers London allowance; 0 otherwise
Workplace age	1 if the firm has been established more than 20 years; 0 otherwise
Workplace size	1 if the firm employs over 200 people; 0 otherwise
Multinational firm	1 if the firm is multinational; 0 otherwise
Human resources	1 if there exists human resource department; 0 otherwise
Equal opportunities	1 if the firm has a formal written equal opportunity policy ; 0 otherwise
Trade union	1 if there exists employees' trade union; 0 otherwise
Online application	1 if the firm requires online job application; 0 otherwise
The applicant and the firm located in the same city	1 if the applicant and the firm located in the same city; 0 otherwise
Distance between the job's location (city) and the applicant's location (city)	1 if the distance between the job's location (city) and the applicant's location (city) is over 300 kilometres
<i>XI. Firm region</i>	
East Midlands	1 if firm is located in East Midlands; 0 otherwise
East of England	1 if firm is located in East of England; 0 otherwise
North-East	1 if firm is located in North-East; 0 otherwise
North-West	1 if firm is located in North-West; 0 otherwise
Scotland	1 if firm is located in Scotland; 0 otherwise
South East	1 if firm is located in South East; 0 otherwise
Wales	1 if firm is located in Wales; 0 otherwise
West Midlands	1 if firm is located in West Midlands; 0 otherwise
London	1 if firm is located in London; 0 otherwise
South-West	1 if firm is located in South-West; 0 otherwise
Yorkshire and Humberside	Reference category

Table AII.

X	Top 1 ^a	Top 2 ^a	Top 3 ^a	Top 4 ^a	Top 5 ^a	Top 6 ^a	Top 7 ^a	Top 8 ^a	Top 9 ^a	Top 10 ^a	Top 11 ^a	Top 12 ^a	Top 13 ^a	Top 14 ^a	Top 15 ^a
Y	-	-0.045* (0.021)	-0.137* (0.046)	-0.133* (0.036)	-0.190* (0.024)	-0.252* (0.038)	-0.299* (0.027)	-0.501* (0.017)	-0.434* (0.026)	-0.444* (0.027)	-0.337* (0.033)	-0.555* (0.037)	-0.583* (0.035)	-0.559* (0.036)	-0.729* (0.036)
	0.045* (0.013)	-	-0.085* (0.026)	-0.081* (0.025)	-0.136* (0.029)	-0.195* (0.026)	-0.240* (0.036)	-0.433* (0.027)	-0.369* (0.028)	-0.379* (0.035)	-0.276* (0.025)	-0.484* (0.036)	-0.511* (0.026)	-0.489* (0.025)	-0.650* (0.025)
	0.120* (0.035)	0.079* (0.025)	-	0.003 (0.011)	-0.046 (0.036)	-0.100* (0.038)	-0.142* (0.045)	-0.319* (0.015)	-0.260* (0.037)	-0.270* (0.025)	-0.175* (0.023)	-0.367* (0.027)	-0.391* (0.028)	-0.371* (0.035)	-0.520* (0.036)
	0.117* (0.024)	0.075* (0.025)	-0.003 (0.004)	-	-0.050* (0.027)	-0.104* (0.036)	-0.147* (0.025)	-0.324* (0.024)	-0.265* (0.027)	-0.275* (0.034)	-0.180* (0.035)	-0.372* (0.026)	-0.397* (0.039)	-0.376* (0.037)	-0.526* (0.025)
	0.159* (0.016)	0.119* (0.037)	0.044* (0.018)	0.046* (0.017)	-	-0.052* (0.021)	-0.092* (0.027)	-0.261* (0.052)	-0.204* (0.047)	-0.213* (0.025)	-0.123* (0.038)	-0.306* (0.032)	-0.330* (0.037)	-0.310* (0.024)	-0.453* (0.021)
	0.201* (0.025)	0.163* (0.036)	0.091* (0.032)	0.095* (0.031)	0.049* (0.021)	-	-0.147* (0.052)	-0.198* (0.025)	-0.145* (0.026)	-0.153* (0.032)	-0.067* (0.028)	-0.241* (0.026)	-0.264* (0.025)	-0.245* (0.032)	-0.380* (0.022)
	0.230* (0.024)	0.194* (0.037)	0.124* (0.036)	0.128* (0.032)	0.084* (0.035)	0.036* (0.014)	-	-0.155* (0.034)	-0.103* (0.028)	-0.111* (0.027)	-0.029 (0.024)	-0.195* (0.037)	-0.218* (0.045)	-0.200* (0.019)	-0.330* (0.037)
	0.333* (0.034)	0.302* (0.026)	0.242* (0.032)	0.245* (0.025)	0.207* (0.063)	0.165* (0.034)	0.134* (0.037)	-	0.044* (0.014)	-0.037* (0.014)	-0.109* (0.023)	-0.035 (0.034)	-0.054* (0.023)	-0.038* (0.011)	-0.151* (0.045)
	0.302* (0.027)	0.269* (0.036)	0.206* (0.024)	0.209* (0.025)	0.170* (0.031)	0.126* (0.026)	-0.046* (0.027)	-	-	-0.007 (0.016)	-0.067* (0.028)	-0.076* (0.038)	-0.103* (0.028)	-0.087* (0.023)	-0.205* (0.026)
	0.307* (0.015)	0.276* (0.042)	0.212* (0.026)	0.215* (0.023)	0.176* (0.054)	0.133* (0.024)	0.100* (0.027)	0.007 (0.013)	0.007 (0.013)	-	-0.074* (0.032)	-0.162* (0.034)	-0.095* (0.025)	-0.082* (0.023)	-0.196* (0.035)
	0.252* (0.028)	0.216* (0.032)	0.149* (0.035)	0.152* (0.027)	0.110* (0.034)	0.063* (0.025)	0.028 (0.036)	0.122* (0.024)	0.072* (0.023)	-0.080* (0.026)	-	-0.162* (0.025)	-0.183* (0.037)	-0.166* (0.023)	-0.293* (0.035)
	0.356* (0.033)	0.326* (0.034)	0.268* (0.025)	0.271* (0.073)	0.234* (0.022)	0.194* (0.027)	0.164* (0.063)	0.034* (0.015)	0.077* (0.032)	0.070* (0.037)	0.139* (0.038)	-	-0.018 (0.016)	-0.003 (0.006)	-0.112* (0.025)
	0.368* (0.032)	0.338* (0.037)	0.281* (0.035)	0.230* (0.047)	0.248* (0.025)	0.209* (0.027)	0.179* (0.037)	0.051* (0.020)	0.094* (0.030)	0.086* (0.035)	0.155* (0.025)	0.017 (0.014)	-	-0.014 (0.012)	-0.092* (0.026)
	0.358* (0.032)	0.328* (0.031)	0.270* (0.027)	0.273* (0.026)	0.236* (0.038)	0.197* (0.053)	0.166* (0.035)	0.037* (0.015)	0.080* (0.023)	0.073* (0.025)	0.142* (0.026)	0.003 (0.005)	-0.015 (0.020)	-	-0.108* (0.034)
	0.509* (0.025)	0.485* (0.022)	0.441* (0.036)	0.443* (0.043)	0.415* (0.035)	0.385* (0.047)	0.361* (0.027)	0.262* (0.037)	0.295* (0.037)	0.290* (0.037)	0.343* (0.045)	0.236* (0.028)	0.222* (0.021)	0.234* (0.035)	-

Notes: Universities are presented in a ranked order (for the sub-discipline; BSc in economics). One indicator of university ranking is used; UCAS index that converts school leaving qualification grades into one point system. ^aCompare base university. The cells indicate the difference in probabilities of receiving a request for an interview, when comparing X and Y. *Significant at the 1 per cent level.

Table AIII.
Difference in probabilities of access to vacancies between universities (men)

Appendix 5. Table's VI control variables analysis (Models I and II)

In Model I, the estimations suggest that having the applicant and the firm located in the same city does not influence the applicants' probability of receiving an invitation for an interview. The same holds regarding the distance between the job's location and the applicant's location. However, a firm's region does affect the applicants' probability of receiving an invitation for an interview. As we can observe in the east of England, Scotland, the East-Midlands, the South-East and South-West, applicants have a higher chance of receiving an invitation for an interview (as compared to the reference category; Yorkshire and Humberside). A plausible explanation for this result may be that because there is lower level of unemployment in these regions, the applicants face less competition for job interviews and therefore more chance of an invitation (Office for National Statistics, 2012b). Regarding the occupation categories, the estimations suggest that there are significant variations as compared to the reference category, manufacturing. The highest differences are seen in the jobs within financial intermediation, consultancies and banking. In these occupations, the applicants have the highest chances of receiving an invitation for an interview as compared to the reference category. In this sample, most of the job openings in economics were from the financial intermediation, consultancy and banking sectors. The greater recruitment need in these sectors may affect the applicants' access to these vacancies.

In Model II, the estimations suggest that the higher the workplace size is, the higher the probability that the applicants will receive an invitation for an interview. Moreover, the existence of a trade union or a human resource department increases the probability that applicants will receive an invitation for an interview. The general pattern assigned is that the recruitment process is more prompt when the firms are larger (which, by default, entails a larger role for trade unions and human resource departments). Indeed, studies suggest that the recruiting process varies given the firms' size; UK graduates tend to find jobs in larger enterprises, and there is a steady increase in the proportion of applicants as the firm size increases (Hart and Barratt, 2009; Belfield, 1999; Carroll *et al.*, 1999; Williams and Owen, 1997). In Table VII, we present estimations for female applicants. The patterns assigned are comparable to those of male applicants and can be similarly interpreted.

Appendix 6. Table's VI control variables analysis (Models III and IV)

In Model III, the estimations suggest that whether the applicant and the firm are located in the same city and the distance between the job's location and the applicant's location do not influence the applicants' entry-level salaries. However, the estimations suggest that the firm's region does affect entry salaries. The firms that are located in London, Wales and in the South-East offer statistically significant higher entry salaries. This pattern is also observed in the UK national statistics (Office for National Statistics, 2012c, d). Furthermore, regarding occupational differences, the outcomes suggest that salaries in manufacturing are statistically significant lower salaries than those in financial intermediation, consultancies and banking and public, urban and territorial administration. We observe, however, statistically insignificant differences between manufacturing, wholesale, electric utilities and construction. The UK national statistics suggest significant variations by occupation and mention the difficulty of making robust comparisons by occupation because of heterogeneities in the type of job characteristics (Office for National Statistics, 2012c).

In Model IV, the outcomes suggest that public jobs offer statistically significantly higher salaries. This pattern is known in the UK (Office for National Statistics, 2012d). In addition, fixed contract jobs correspond to statistically significantly lower salaries. This characteristic is also observed in the UK labour market (McCann, 2008). As expected, relocation packages and a London allowance positively and statistically significantly affect entry salaries. In addition, the existence of a trade union has a positive and statistically significant effect on the entry salaries. The current UK studies confirm this pattern (Blanchflower and Bryson, 2010). Moreover, the estimations suggest that there

is a statistically significant relationship between workplace size and entry salaries. In the literature, this is a common result; larger UK firms pay higher wages (Belfield and Wei, 2004). Multinational firms also offer statistically significantly higher salaries. Indeed, the multinational wage premium is widely accepted in the UK (Girma and Gorg, 2007). In Table VII, we present patterns for females. The estimations are comparable to those of males and are similarly interpreted.

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