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Additional Information

# **Effects of College Programme Characteristics on Graduates' Performance**

## **1. Introduction**

The extent to which study programmes affects labour market outcomes remains an open question. Based on Bigg's (1989) students' perceptions model, which conceptualised the learning process as an interacting system of three sets of variables (3P model) – the learning environment and student characteristics (presage), students' approach to learning (process) and learning outcomes (product), we seek to make a practical contribution to the literature regarding the nature of university students' perceptions of their academic environment on their learning approaches and outcomes.

In this line of thinking, on one hand, the special concern of the majority of the studies is how students' perceptions of teaching, assessment, and course content and structure within the natural setting of academic department may influence how students learn (Ramsden, 1997; Lizzio et al, 2002; Jackson, 2014); and on the other hand, the special concern of other studies is the effectiveness and efficiency of a university system to complete the educational path for students with assessments that are both quantitative and monetary using the subjective evaluation of students attending university courses (Lockheed and Hanushek, 1994; Solinas et al., 2012; Hsieh, 2014).

In this context, a range of studies has found clear positive effects of study programme on employment opportunities, occupational status and earnings (Shavit and Müller, 1998; Kerckhoff et al., 2001; Müller and Gangl, 2003; Van der Velden and Wolbers, 2007; Xu, 2013). Others studies has been developed analysing study programmes effects in relation to differences between vocational and academic programmes (Bishop, 1989), between fields of study (van de Werfhorst and

Kraaykamp, 2001; García-Aracil, 2008) and in assessments of education quality (Strayer, 2002; Marshall, 2007).

This paper aims to explore the effects of study programme characteristics on labour market outcomes, both monetary and non-monetary rewards, among school-leavers finishing tertiary education, in a group of 14 European countries. The paper is organized as follows. Section 2 provides a broad range of influential factors on graduate employment outcomes using background literature. Section 3 presents data and the methodological approach. The empirical results are discussed in Section 4 and Section 5 concludes.

## **2. Background**

In its general formulation, human capital theory treats education as an investment that can provide different types of returns (Becker, 1964). The relationship between education and earnings has become a fundamental tool in research on earnings, wages and incomes in developed and developing economies showing that the more highly educated the person, the more successful he/she will be in the labour market in terms of both income and work opportunities. However, Thurow's (1975) job competition theory challenges this view. Job competition theory assumes that labour productivity is determined by job characteristics rather than worker characteristics. Because of wage competition, different investment in education leads to differences in wage levels, but not in job opportunities. In this view, education serves as a screening device or a signal (Spence, 1973). That is, education serves as a tool for job-seekers to signal their ability to employers.

Although theoretically useful to distinguish the different mechanisms through which employers sort and select employees, in reality it is unlikely that these selection processes follow either a pure human capital model or a pure job competition model. In

many cases, there are elements of both types of selection and it is probably more fruitful to specify the conditions under which one or the other mechanism prevails than to claim that one mechanism explains all (Cai, 2013; Jackson, 2014). An element common to both theories is that they assume that employers act rationally and choose workers with the highest expected productivity on the basis of these workers' expected training costs (Glebbeck, 1988). The expected training costs of school-leavers from a certain study programme are determined by three components: (i) relative degree to which the study programme in question provides the required skills; (ii) selectivity (quality) of the study programme; (iii) the effort required of employers to bridge any skills deficiencies in individuals, either at the moment of labour market entry or in the future career.

Several studies that examine the relationship between education and the labour market are based on assignment theory (Sattinger, 1993), which explicitly accounts for the interaction between the characteristics of workers and jobs (Giesecke and Schindler, 2008; Clegg, 2010). It investigates how heterogeneous individuals are allocated to jobs that require varying levels of qualifications, on the basis of the qualifications that they present with. The productivity of a particular graduate-job match is strongly influenced by the match between job requirements and graduate characteristics (Teichler, 2009). It is assumed that the knowledge and skills an individual possesses gives comparative advantage in certain types of occupations (Barrie, 2006; Van der Velden and Wolbers, 2007). Hence, graduates from an education field have better job opportunities in occupations that are strongly related to their field of study (Hartog, 2000; Heijke and Meng, 2006).

Using an assignment theory approach, we focus on the significance of a number of higher education (HE) programmes in allocating graduates across labour market, and how these graduates perform in the jobs they obtain. Numerous studies focus on the

dimensions of the labour market and school-leavers' and graduates' performance. However, special effort is needed to analyse the impact of study programmes on labour market outcomes, both monetary and non-monetary rewards. James et al. (1989) examine the effect of student characteristics, institutional characteristics, students' HE experience and labour market variables on future earnings. Daniel et al. (1997) find that the quality of the undergraduate university attended determines future earnings. Other researchers have used earnings as a proxy for graduate ability (Link, 1975; Eide et al., 1998; Strayer, 2002); however, individual ability is difficult to quantify and a range of factors not related to ability can influence income, such as race or gender, prestige of the HE institution attended (as already mentioned), geographic area of employment, industry of employment, public or private sector, and so on (Dale and Krueger, 2002; García-Aracil, 2008; Borjas, 2009; Ro et al., 2013).

Several studies provide evidence that bias exists even under the assumption that wages are a perfect indicator of the amount of human capital possessed by an individual. Some authors show that the explanatory power of the simple human capital earnings model increases as non-wage variables are added into the earnings measure (Haveman and Wolfe, 1984; McMahon, 1998). That is, the importance of education increases when non-monetary benefits are taken into account (Duncan, 1976).

One way to consider both monetary and non-monetary benefits is by analysing job satisfaction. Locke (1976) defined job satisfaction as 'a pleasure or positive emotional state resulting from the appraisal of one's job or job experiences'. Satisfaction is proposed to depend variously on the individual's expectations, needs (physical and psychological), and values (Locke, 1976; Landry, 2000). An analysis of job satisfaction might provide some insight into the total effects of education investment on workers' well-being. Responses to surveys on job satisfaction have been used in economic

analysis to proxy for work utility with job satisfaction considered a key determinant of working individuals' overall wellbeing (Van Praag, 1991). This work spawned a strand of literature on the economics of happiness (Veenhoven, 1996; Mora et al., 2007).

In the present paper, graduates' performance in the labour market is addressed in relation to both income (monetary returns) and job satisfaction (non-monetary returns). We use those aspects of the academic environment, such as the study provision and study conditions, in order to identify which HE programme characteristics contribute to a smooth integration of graduates into the labour market (Schomburg, 2007; Teichler, 2007a). We also take modes of teaching and learning into account to investigate whether more practice-oriented curricula, which should increase interaction between classroom and labour market (Teichler, 2009), would reduce the information asymmetry in the transition from school to labour market and contribute to a smoother integration of graduates into the labour market. In the following section we describe the data and methodology used for our analysis.

## **2. Method**

### *Data*

We analysed the influence of programme characteristics on graduates' performance based on income and job satisfaction. For that purpose, we use the REFLEX (Flexible Professional in the Knowledge Society) dataset, which include information on some 2,600 graduates from each of 14 European countries: Italy, Spain, France, Austria, Germany, the Netherlands, United Kingdom, Finland, Norway, Czech Republic, Switzerland, Portugal, Belgium and Estonia (Allen and Van der Velden, 2011). Information was gathered in 2005 from those graduated in higher education in year 2000 (five years after graduation) throughout a written questionnaire.

The survey addresses information on socio-biographic background of graduates, study paths and transitions from HE to labour market, current employment situation, graduates' retrospective views of their HE experience, and so on. We selected individuals between 26 and 35 years of age who worked for at least 10 hours per week either as employees or self-employed. After deleting annual gross income variable outliers and individuals with missing values in their satisfaction scores, we were left with 19,084 micro data files, which we use for our analysis.

Some questionnaire items (6 characteristics in particular) are related to description of the study programme, which the academic literature suggests should be a close match with learners' needs, and its design, which should consider students' (as customers) perceptions of HE (Hill, 1995; Harvey, 1995). Respondents were asked to indicate on a 1 to 5 scale (1 not at all, 5 very much), the extent to which these characteristics applied to the study programme they had followed. Table 1 presents the average ratings for these items by country.

The results show that, on average, the highest scores were assigned to the demanding of the programme and whether it had a broad focus (rated 3.6). Freedom in design a personal programme was rated low by some countries' graduates.

Table 1. Description applied to the study programme by country  
(scale from 1=not at all to 5=very much)

Items	IT	ES	FR	AT	DE	NL	UK	FI	NO	CZ	SW	PT	BE	EST	Total
The programme was generally regarded as demanding	4.0	3.7	3.5	3.8	3.7	3.0	3.7	3.5	3.6	3.6	3.8	3.8	3.6	3.2	3.6
Employers are familiar with the content of the programme	2.8	3.2	2.7	3.0	3.0	3.1	2.8	3.1	3.8	3.2	3.1	3.0	3.1	2.7	3.1
There was freedom in composing your own programme	3.0	2.9	2.4	2.9	3.0	2.9	2.5	3.1	2.5	2.4	2.6	2.1	2.7	2.7	2.7
The programme has a broad focus	3.6	3.6	3.0	3.8	3.7	3.7	3.6	3.7	3.6	3.5	3.6	3.4	3.7	3.6	3.6
The programme was vocationally oriented	2.7	2.7	2.3	2.7	2.8	3.5	2.6	3.6	3.6	3.5	2.8	3.3	2.8	2.5	3.0
The programme was academically prestigious	3.5	3.0	2.6	3.1	3.0	2.6	3.4	3.1	2.9	2.9	3.3	3.6	3.4	3.2	3.1

Source: Own elaboration, REFLEX data.

In relation to country differences, Finland, Norway, the Netherlands, Czech Republic and Portugal stressed practical learning/experience items, such as vocational orientation of the study programme, compared to graduates from Italy, Spain, France, Austria, Belgium, Germany, Switzerland, the United Kingdom and Estonia who rated this item low. The item on freedom to combine different courses and choose among areas of specialization was rated high by Finland, Germany and Italy, with Portugal, Czech Republic and France giving a low score for this. Italian graduates evaluated their study programme as demanding and academically prestigious in contrast to Dutch graduates, whose study programmes were regarded as less academically prestigious and less demanding.

Another 11 items in the questionnaire were related to modes of teaching and learning emphasized in the study programme, which the academic literature suggests provide useful information on student satisfaction with the learning experience (Sadlo and Richardson, 2003; Honkimäki et al., 2004; Diseth et al., 2010). Respondents were asked to rank the extent to which particular modes of teaching and learning were stressed in their HE, on a 1 to 5 scale (1 not at all and 5 very much). Table 2 presents the average ratings for these items by country. In general, items related to teaching, such as teacher being the main source of information, regular attendance at lectures, development of socio-communicative skills through students' oral presentations in classes, and the items related to learning in groups as opposed to individual learning, were rated quite high.

Among countries, there seems to be a negative relationship between the extent to which the teacher is regarded as the main source of information and a more project and problem-based learning. Scores for project and problem-based learning as the dominant mode of teaching were generally low except for graduates from Norway, the United Kingdom and Finland.



For differences in course content, there is a negative relationship between emphasis on theories and paradigms and emphasis on facts and practical knowledge. In most of the countries analysed, HE seems to lean towards more theoretical rather than practical. In the Czech Republic, HE seems to be predominantly theoretical, but in France and the Netherlands the emphasis is practical rather than theoretical.

What students learn is determined not only by the curriculum and the mode of teaching, but also by the method of assessment. Multiple-choice question exams as opposed to examinations based on written assignments, promote different ways of learning. Although in all the countries analysed there was a stronger emphasis on written assignments than multiple choice question exams, there would seem to be a trade-off between these forms. Written assignments dominate in the United Kingdom whereas in Spain, the Netherlands and the Czech Republic although written assignments are still the majority, a large proportion of the exams are multiple choice. In Belgium neither mode seems dominant.

Table 2. Modes of teaching and learning emphasized in the study programme by country (*scale from 1=not at all to 5=very much*)

Items	IT	ES	FR	AT	DE	NL	UK	FI	NO	CZ	SW	PT	BE	EST	Total
Regular lecture attendance	3.9	3.0	4.1	3.9	4.0	3.5	4.4	3.7	4.2	4.0	4.3	4.0	4.4	4.6	3.9
Group assignments	2.5	2.9	3.2	3.1	3.0	3.7	3.0	3.4	3.3	3.0	3.0	3.5	3.0	2.9	3.1
Independent learning/participation in research projects	2.2	1.9	2.2	1.9	1.9	2.6	2.6	2.3	1.9	1.7	2.1	2.3	2.0	2.1	2.1
Internships, work placements	2.0	2.4	2.7	2.7	3.3	3.6	2.1	3.2	2.7	2.3	2.5	2.8	2.3	2.7	2.6
Facts and practical knowledge	2.4	3.0	3.2	3.1	3.2	3.5	3.4	3.4	3.2	2.8	3.1	3.1	3.3	3.4	3.1
Theories and paradigms	3.1	3.8	3.1	3.7	3.4	3.2	3.5	3.5	3.4	4.3	3.9	3.4	3.6	3.4	3.7
Teacher as main source of information	3.8	3.8	3.5	3.5	3.3	3.1	3.2	3.2	3.0	3.6	3.6	3.6	3.8	3.7	3.5
Project and/or problem-based learning	2.5	2.7	2.4	2.8	2.8	2.9	3.1	3.0	3.0	2.5	2.8	2.9	2.1	2.2	2.7
Written assignments	3.1	3.1	3.5	3.8	3.6	3.1	4.2	3.8	3.6	3.2	3.3	3.5	2.9	3.5	3.3
Oral presentation by students	3.5	2.4	3.0	3.3	3.2	3.3	3.2	3.0	2.6	3.0	3.0	3.1	2.9	2.9	3.0
Multiple choice exams	2.0	2.9	1.6	2.0	1.9	2.9	1.7	1.6	1.3	2.8	1.9	2.1	2.4	2.3	2.3

Source: Own elaboration, REFLEX data.

Based on the differences found among graduates' perceptions of their academic environment, our next step is to examine how these programme characteristics influence

graduates' performance, and if there are other individual and labour market characteristics which influence graduates' outcomes as well.

### *Methodology*

To clarify the influence of study programme characteristics on graduates' rewards, both monetary and non-monetary, we use as dependent variable gross hourly wage and graduates' self-assessment of job satisfaction, respectively. To analyse income, we use a conventional earnings regression (natural logarithm of income); to investigate job satisfaction, we use an ordered probit model to reflect its ordinal character (the REFLEX survey asked respondents: 'How satisfied are you with your current work?') They were asked to score their response on a scale of 1 (very dissatisfied) to 5 (very satisfied)) (Green, 1997). For the regressions, data from each country were weighted by the proportion of HE students and the country population.

The explanatory variables were categorized according to various elements that might influence both income levels and self-assessment scores for job satisfaction. They include individual-specific characteristics (gender, age, parents' level of education), educational and academic environment factors (field of study, study programme description, modes of teaching and learning), and labour-market status variables (private *versus* public sector, permanent *versus* temporary contract, full-time *versus* part-time job, occupational titles, etc.). Descriptive statistics for all the variables are reported in the Appendix Table 1A.

All the individuals in the sample had completed their HE, thus the educational variables considered relate to field of study and items associated with graduates' assessments of study provision and study conditions. We construct dummies for the eight study fields of Education, Humanities (including Arts), Social Science (including Business), Law, Natural Science (including Life Science and Physical Science),

Mathematics (including Computer Science), Engineering (including Agriculture) and Medical Science (including Nursing).

We account also for graduates' job characteristics and relevance of the degree qualification to their employment and work, based on responses to questions about the usefulness of their qualifications, and the application of knowledge and competencies acquired during their HE studies in their current jobs. We define an individual as overeducated (undereducated) if his/her level of education is higher (lower) than required for the job. We measure over-education/under-education with dummy variables that take the value 1 if the respondent is over/under-educated. We apply the same treatment to competencies. The survey asked graduates about their level of competence in their job, based on a list of competencies. Their responses allowed development of an indicator for degree of match between acquired and required competencies. We also define a dummy for those working in a job related directly to their HE education field. Job in own education domain is measured as occupying a position for the individual's field of study is the most appropriate prior training. We distinguish also between universities and other HE institutions to test for possible differences in the effect of institution type on graduates' careers. To enable a more detailed analysis, we use dummies for each European country included in the sample: Italy, Spain, France, Austria, Germany, the Netherlands, United Kingdom, Finland, Norway, Czech Republic, Switzerland, Portugal, Belgium and Estonia.

### *Limitations of study*

There have been several empirical and conceptual analyses of students' perceptions of their academic environments and approaches to learning (Trigwell and Prosser, 1991; Hsieh, 2014; Jackson, 2014). This paper is not concerned with testing all the elements potentially associated with university students' perceptions of their academic

environment and the influence on learning approaches and learning outcomes. Our focus is somewhat narrower and analyses recent HE graduates' perceptions of their academic environment and their effects on labour market rewards, combining both monetary and non-monetary pay-offs.

A further concern is the age of the data used in the present study. The REFLEX dataset, a major representative survey comparing the situation of young European graduates from HEIs, was collected in 2005 (Allen and Van der Velden, 2011). As Teichler (2014) point out, in analysing the available HE research literature, there is a substantial number of comparative studies undertaken in recent years addressing quite a number of countries, however, the available publications suggest that such types of projects are undertaken in time spans of two, sometimes three or exceptionally four years. In this sense, the background of REFLEX data was CHEERS (Careers after Higher Education – A European Research Survey) project collected in 1999 (Teichler, 2007b), and there should be an updating of the REFLEX dataset, but due to funding problems caused mainly for the 2008 international financial crisis, there is some comparative projects analysing few countries and comparative studies on a large number of countries concentrating on statistics' studies. Therefore, although the paper is based on data from 2005, it is still worth to take advantage of the quality of information provided for the REFLEX comparative empirical project in HE research (Teichler, 2014).

In addition, REFLEX dataset is based on a written questionnaire where graduates reported their own views directly. Despite the main disadvantages of self-report data associated to a number of potential validity problems (e.g. data are personal and idiosyncratic and thus may bear little relationship to “reality”, as seen by respondents or others because people are not always truthful) (Shedler and Westen, 2007), REFLEX

give us the respondents' own views directly on their study provision and their study conditions, their satisfaction with their HE courses and the relationship with their learning outcomes (Denson et al., 2010; Jackson, 2014), information which is not available through observational secondary data for the comparative HE topic analysed in this paper.

#### **4. Results**

We are interested in particular in the returns from different education programme characteristics in the labour market, in relation to graduates' income (monetary returns, see Table 3) and job satisfaction (non-monetary returns, see Table 4). We analyse three separate estimation models for each labour market outcome in order to assess total, indirect and direct effects of study programme characteristics on graduates' income and job satisfaction.

The first specification uses individual-specific characteristics and labour-market status variables as regressors, to estimate the indirect effect of study programme characteristics, via observable individual attributes and job characteristics, on income and job satisfaction (Model I). The second specification includes only those explanatory variables related to the study programme description and modes of teaching and learning, to estimate the total effects of these items on income and job satisfaction independent of individual and job attributes (Model II). The third specification combines all the sets of explanatory variables to estimate the direct effects of study programme characteristics on income and job satisfaction once the indirect effects are removed (Model III). Dummy variables for each European country in the sample are included in all the models as control variables. The estimations for all three specifications are presented in Tables 3 (for income) and 4 (for job satisfaction).

##### *Monetary Returns*

Table 3, Model I presents the effect of individual and job characteristics on income (natural logarithm of income), irrespective of the characteristics of academic study. In line with the literature, the results show that female graduates earn less than their male counterparts, and that age (capturing work experience) and father's education level had a positive effect (Loury, 1997; Oaxaca and Ransom, 1999; García-Aracil, 2008). In relation to segmentation of the different educational fields, we see that graduates in Education, Humanities, Natural Science, Engineering (including Agriculture) and Medical Science (including Nursing) earn less than the reference category (Social Science). In contrast to García-Aracil and Van der Velden's (2008) findings, we find a positive effect on income only for Mathematics graduates, and find that a degree in Medical Science and Engineering reduces income compared to Social Science (the reference group). This may be because the inclusion of some low-income sub-disciplines within some fields, for instance, agriculture in Engineering, increases earnings disparities within disciplines and, consequently, tends to decrease the 'true' effect of discipline on income (Wolbers, 2007; Vila et al., 2007).

On the other hand, consistent with other work in this area, we find that those working in the private sector or hired on permanent contract by a large firm, earn more compared to those working in public sector or working on temporary contracts and in small firms. We also found negative effects for full-time jobs. This last result could be explained as full-time workers tending to invest more working time than average part-time employees (Mertens and Rübken, 2012). As Brenke (2004) argues, longer working times of some employees are the result of a stronger identification with their jobs, and longer working hours seen as profitable investment in their human capital.

We found wage premiums for those graduates able to apply the knowledge and competencies acquired in their degree programmes to their current jobs. This is

confirmed by the match between job level and education level, which suggests that for each level of education there is an optimum job level, and implies that assignment to any other level is necessarily sub-optimal (Oosterbeek, 1992). Our results show wage penalties for someone whose job requires a lower level of education than was achieved in his/her HE (over-educated). Also, as expected from the predictions of assignment theory – wage premium for surplus competencies and wage penalty for deficiencies – we found that having lower levels of competencies than the job requires has a negative effect on income (deficit in competencies). In addition, working in a job in the domain of the graduate study has a positive influence on income, and obtaining a degree from a university rather than another type of HE institution yields an increase in income of around 6 per cent.

With respect to occupational title, the evidence suggests that individuals working in more demanding jobs receive higher incomes. We observe also earnings differences (size and composition) across the countries analysed in this study. Compared to graduates in Germany (the omitted category), graduates from Southern European countries earn less than graduates employed in the Nordic European countries.

Model II provides information on the total effects of study programme characteristics on graduate incomes. The results show that a well-designed degree programme, that is academically prestigious, allows flexibility to combine course and areas of specialization, is vocationally oriented and whose content and objectives are known to employers, and is seen as demanding, contributes to an increase in earnings (see the positive entry of these variables in Table 3, columns 3 and 4). This result is similar to the finding in Kucel and Vilalta-Buñi (2013).

In addition, if teaching and learning modes emphasize regular attendance at lectures, problem-based learning and written assignments positively influence access to better

paid employment. However, emphasis on the teacher as the main source of information, oral presentations from students in classes, participation in research projects and internship programmes, and orientation towards facts and practical knowledge negatively influence graduates' income. This might suggest a mismatch between the theoretical and practical content of HE programmes. Fiet's (2001) analysis of entrepreneurship shows a similar result.

The country dummies included as control variables show that if individual attributes and job characteristics are excluded from the analysis of study programme characteristics, then (with the exception of graduates from France and Estonia) graduates, on average, do not benefit from an income premium compared to the results from Model I. However, in this model, Swiss graduates earn relatively more than German graduates (the reference group).

Model III estimates the direct influence of study programme characteristics on income. When all sets of variables are included in the earning equation, the main results from Models I and II are supported for most of the key variables, although there are some differences. For example, for field of study, Law graduates tend to earn less money compared to the reference category (Social Science). Again, the freedom to combine different courses and choose among areas of specialization, and the study programme being academically prestigious and demanding, have a positive influence on earnings. However, a broad focus and vocational orientation, and employers' knowledge about study programme content and objectives lose some importance compared to the results from Model II. For modes of teaching and learning, the teacher as the main source of information and participation in research projects negatively influence income. Last, compared to graduates from Germany (the omitted category),



Italian, Spanish, French, Austrian, Dutch, British, Finnish, Norwegian, Czech, Portuguese, Belgian and Estonian graduates earn less than Swiss graduates.

Table 3. Monetary returns from education programmes for young European graduates

Explanatory variables	Model I		Model II		Model III	
	Individual & Job		Programme		Overall	
	Coef.	z-values	Coef.	z-values	Coef.	z-values
<b>Individual Characteristics</b>						
Female	-0.0864	-16.26			-0.0814	-15.28
Age	0.0135	10.32			0.0118	9.00
Father's higher education	0.0286	5.06			0.0262	4.67
Mother's higher education	0.0043	0.68			0.0019	0.31
<b>Field of study (ref. Social Science)</b>						
Education	-0.0732	-7.46			-0.0569	-5.62
Humanities	-0.0799	-8.39			-0.0798	-8.01
Law	-0.0068	-0.62			-0.0280	-2.44
Natural Sciences	-0.0991	-9.22			-0.0976	-8.84
Mathematics	0.0405	3.22			0.0276	2.16
Engineering (agriculture included)	-0.0406	-5.85			-0.0412	-5.68
Medical sciences (veterinary included))	-0.0798	-9.50			-0.0806	-8.61
<b>Study programme description</b>						
Regarded as demanding			0.0114	3.55	0.0082	2.59
Employers familiar with content			0.0087	3.64	0.0026	1.12
Freedom in composing the programme			0.0185	8.06	0.0102	4.40
Broad focus			0.0057	2.21	0.0024	0.95
Vocationally orientated			0.0088	3.42	0.0011	0.42
Academically prestigious			0.0288	10.93	0.0225	8.60
<b>Modes of teaching and learning</b>						
Lectures			0.0067	2.49	0.0039	1.49
Group assignments			-0.0005	-0.19	-0.0029	-1.10
Participation in research projects			-0.0091	-3.45	-0.0083	-3.19
Internship, work placement			-0.0120	-5.37	-0.0008	-0.35
Facts and practical knowledge			-0.0059	-2.20	-0.0036	-1.34
Theories and paradigms			0.0022	0.81	0.0029	1.08
Teacher as the main source of information			-0.0089	-3.30	-0.0102	-3.86
Project and/or problem-based learning			0.0080	3.09	0.0002	0.08
Written assignments			0.0048	1.89	-0.0022	-0.89
Oral presentation by students			-0.0149	-5.70	-0.0063	-2.43
Multiple choice exams			0.0028	1.22	0.0015	0.65

<b>Job characteristics</b>						
Private sector	0.0977	17.04			0.0951	16.61
Permanent contract	0.1341	21.26			0.1351	21.45
Full-time job	-0.2568	-36.26			-0.2614	-36.94
Size firm (<50 workers)	-0.1311	-23.10			-0.1283	-22.65
<b>Appropriateness of qualifications</b>						
Qualifications used at work	0.0317	5.59			0.0292	5.12
Under-educated	0.0197	2.78			0.0193	2.73
Over-educated	-0.1496	-18.46			-0.1484	-18.38
Deficit in competencies	-0.0176	-2.72			-0.0172	-2.66
Surplus in competencies	-0.0072	-1.28			-0.0071	-1.27
Job in own domain	0.0148	1.99			0.0086	1.16
University vs HE institution	0.0658	8.00			0.0392	4.47
<b>Occupational titles</b> (ref. Professionals)						
Legislators, senior official and managers	0.1049	11.38			0.1063	11.56
Technicians and associate professionals	-0.0657	-10.45			-0.0577	-9.16
Clerks	-0.2242	-17.95			-0.2180	-17.50
Service workers and other occupations	-0.2171	-13.76			-0.2070	-13.16
<b>Country dummies</b> (ref. Germany)						
Italy	-0.5475	-33.09	-0.6267	-39.50	-0.5456	-32.15
Spain	-0.4521	-29.24	-0.5813	-39.31	-0.4555	-27.99
France	-0.2769	-15.70	-0.2525	-15.02	-0.2514	-14.04
Austria	-0.2502	-14.29	-0.2514	-14.84	-0.2494	-14.22
The Netherlands	-0.1634	-10.71	-0.1641	-10.98	-0.1558	-9.91
United Kingdom	-0.1425	-7.85	-0.2331	-13.35	-0.1392	-7.49
Finland	-0.2629	-16.68	-0.2785	-18.07	-0.2594	-16.17
Norway	-0.0459	-2.83	-0.0898	-5.52	-0.0596	-3.56
Czech Republic	-0.7794	-53.23	-0.7882	-55.94	-0.7772	-50.13
Switzerland	0.0165	1.17	0.0410	2.95	0.0118	0.83
Portugal	-0.4456	-19.38	-0.4684	-21.12	-0.4415	-18.99
Belgium	-0.0695	-3.82	-0.1359	-7.93	-0.0811	-4.35
Estonia	-0.7740	-39.86	-0.7451	-38.45	0.7654	-39.00
Intercept	2.5447	55.49	2.6537	102.65	2.5480	49.55
Observations	19,084		19,084		19,084	
Prob> F	0.0000		0.0000		0.0000	
R-squared	0.5380		0.3873		0.5429	

### *Non-Monetary Returns*

Table 4, Model I presents the effect of individual and job characteristics on job satisfaction (non-monetary return), irrespective of the study programme characteristics.

In line with the literature, the results show that women graduates report higher levels of job satisfaction compared to men (Clark and Oswald, 1994). In a similar job context, it seems that women are more satisfied with their jobs than men because women compare their situations with those of women with worse labour conditions, lower relative income or who are unemployed (Clark and Oswald, 1996). In addition, there is a negative effect of age on job satisfaction, that is, older graduates tend to be less satisfied

with their jobs (Clark et al., 1996). However, family educational background seems to have no influence on graduates' job satisfaction scores. For differences among fields of education, we find that graduates in Education, Humanities and Natural Science are more satisfied with their jobs than graduates in the Social Science (the reference category).

Among job characteristics, as expected, income enters positively and significantly and those graduates working in the public sector are more satisfied than those in the private sector. Also, a permanent contract and full-time employment positively influence job satisfaction compared to temporary and part-time contracts. Graduates employed in small firms are more satisfied with their jobs.

Use in their job of the knowledge and skills acquired during their graduate studies and match between the level of education attained and the level of education required for the job, increase job satisfaction significantly. Being overeducated for the job was one of the most influential variables in job dissatisfaction among young graduates. Undereducated graduates expressed more job satisfaction than graduates employed at an appropriate level, probably because the former have achieved a better than expected job position. These findings were confirmed by graduates' self-reported competencies. Graduates who reported a surplus of competencies were very dissatisfied with their jobs, and those who lacked competencies were more satisfied than those with the appropriate competencies for the job. In addition, those who had graduated from a university rather than another type of HE institution expressed greater job satisfaction.

With respect to occupational title, legislators, senior officials, managers and professionals were more satisfied than their counterparts in non-professional employment; and compared to graduates from Germany (the omitted category),

graduates from the Netherlands, United Kingdom, Finland and Portugal are less satisfied than graduates from Austria and Czech Republic.

Model II provides information on the total effects of study programme characteristics on graduates' self-assessed job satisfaction scores. The results show that a well-designed degree programme, that is, a broadly focused, academically prestigious, vocationally oriented programme and the flexibility to combine courses and areas of specialization, and a programme whose content and objectives are known to employers, is associated with higher scores for job satisfaction. Also, if the teaching and learning mode emphasizes theories and paradigms, regular attendance at lectures, teacher as the main source of information, development of socio-communicative skills through oral presentations from students in classes, participation in research projects and internship programmes, this positively influences job satisfaction. However, the value of facts and practical knowledge, participation in research projects and learning in groups as opposed to individual learning assignments, do not influence job satisfaction. This might suggest that relatively less satisfaction with their practical learning environment (facts and practical learning, problem-based learning, written assignments, group assignments, etc.), influences graduates' employment experience (Van der Velden and Wolbers, 2007). In relation to country differences, if individual attributes and job-characteristics are excluded from the analysis of study programme items, Italian and Spanish graduates are relatively less satisfied with their jobs, and Norwegian and Swiss graduates are relatively more satisfied with their jobs (compared to the results from Model I).

In Model III, we estimate the direct influence of study programme attributes on job satisfaction. When all sets of variables are included in the satisfaction equation, the main results from Models I and II are supported for most of the key variables, although

there are some differences. For example, study programme description seems to increase job satisfaction only if employers are familiar with the programme content, and if the programme is broadly focused and vocationally oriented. Modes of teaching and learning related to learning in groups as opposed to individual learning assignments have a positive influence on job satisfaction. However, the value of facts and practical knowledge has a negative influence on the level of job satisfaction. Finally, compared to graduates from Germany (the omitted category), graduates from the Netherlands, United Kingdom, Finland and Portugal seem less satisfied with their jobs.

Table 4. Non-monetary returns from education programmes for young European graduates

Explanatory variables	Model I		Model II		Model III	
	Individual & Job Characteristics		Programme Characteristics		Overall Job Satisfaction	
	Coef.	z-values	Coef.	z-values	Coef.	z-values
<b><i>Individual Characteristics</i></b>						
Female	0.0660	3.71			0.0667	3.73
Age	-0.0258	-5.91			-0.0254	-5.76
Father's higher education	-0.0126	-0.67			-0.0163	-0.87
Mother's higher education	-0.0211	-1.01			-0.0249	-1.19
<b><i>Field of study</i></b> (ref. Social Science)						
Education	0.1687	5.11			0.1629	4.77
Humanities	0.1043	3.29			0.1439	4.31
Law	-0.0331	-0.90			0.0055	0.14
Natural Sciences	0.1449	4.03			0.1640	4.42
Mathematics	-0.0119	-0.29			0.0039	0.09
Engineering (agriculture included)	0.0256	1.11			0.0283	1.17
Medical sciences (veterinary included))	0.0119	0.42			-0.0071	-0.23
<b><i>Study programme description</i></b>						
Regarded as demanding			0.0135	1.61	0.0047	0.44
Employers familiar with content			0.0691	11.04	0.0337	4.27
Freedom in composing the programme			0.0182	3.02	0.0063	0.81
Broad focus			0.0134	1.96	0.0206	2.43
Vocationally orientated			0.0329	4.90	0.0171	2.00
Academically prestigious			0.0375	5.43	0.0120	1.37
<b><i>Modes of teaching and learning</i></b>						
Lectures			0.0204	2.91	0.0077	0.88
Group assignments			0.0103	1.47	0.0186	2.09
Participation in research projects			0.0165	2.40	0.0261	3.00
Internship, work placement			0.0327	5.56	0.0072	0.94
Facts and practical knowledge			0.0040	0.56	-0.0168	-1.88
Theories and paradigms			0.0252	3.60	0.0234	2.62
Teacher as the main source of information			0.0156	2.18	0.0236	2.67
Project and/or problem-based learning			-0.0098	-1.45	-0.0074	-0.86
Written assignments			0.0064	0.95	0.0027	0.32
Oral presentation by students			0.0166	2.44	0.0137	1.57
Multiple choice exams			0.0027	0.45	0.0139	1.79

<b>Job characteristics</b>						
Hourly wage (log)	0.3633	15.00			0.3589	14.73
Private sector	-0.2242	-11.65			-0.2259	-11.69
Permanent contract	0.0975	4.59			0.0943	4.43
Full-time job	0.1020	4.18			0.0962	3.92
Size firm (<50 workers)	0.0329	1.72			0.0370	1.93
<b>Appropriateness of qualifications</b>						
Qualifications used at work	0.7076	37.26			0.6894	35.96
Under-educated	0.0387	1.63			0.0393	1.65
Over-educated	-0.3965	-14.76			-0.3956	-14.70
Deficit in competencies	0.1201	5.57			0.1151	5.33
Surplus in competencies	-0.0345	-1.86			-0.0362	-1.95
Job in own domain	0.0122	0.50			-0.0033	-0.13
Universities vs HEIs	0.0747	2.73			0.0735	2.50
<b>Occupational titles</b> (ref. Professionals)						
Legislators, senior official and managers	0.1324	4.28			0.1252	4.03
Technicians and associate professionals	0.0643	3.07			0.0693	3.29
Clerks	0.0127	0.31			0.0095	0.23
Service workers and other occupations	0.0937	1.79			0.0843	1.61
<b>Country dummies</b> (ref. Germany)						
Italy	-0.0618	-1.09	-0.1964	-4.91	-0.0697	-1.20
Spain	0.0201	0.38	-0.1156	-2.97	0.0029	0.05
France	0.0372	0.63	0.0405	0.92	0.0511	0.84
Austria	0.1994	3.37	0.1921	4.27	0.1835	3.09
The Netherlands	-0.1322	-2.59	-0.1081	-2.75	-0.1678	-3.18
United Kingdom	-0.2436	-4.02	-0.0778	-1.70	-0.2447	-3.92
Finland	-0.2373	-4.50	-0.2195	-5.42	-0.2591	-4.80
Norway	-0.0053	-0.10	0.0717	1.67	-0.0068	-0.12
Czech Republic	0.2386	4.56	0.0283	0.77	0.1957	3.54
Switzerland	0.0343	0.73	0.0687	1.88	0.0111	0.23
Portugal	-0.3538	-4.61	-0.2641	-4.63	-0.3812	-4.88
Belgium	-0.0570	-0.94	0.0175	0.39	-0.0905	-1.45
Estonia	0.0338	0.50	0.0489	0.96	0.0415	0.61
<i>Observations</i>	<i>19,084</i>		<i>19,084</i>		<i>19,084</i>	
<i>Lr<math>\chi^2</math>(40); Lr<math>\chi^2</math>(30); Lr<math>\chi^2</math>(57)</i>	<i>3,489</i>		<i>869</i>		<i>3,598</i>	
<i>Prob&gt; <math>\chi^2</math></i>	<i>0.0000</i>		<i>0.0000</i>		<i>0.0000</i>	
<i>Log Likelihood</i>	<i>-23,787</i>		<i>-36,721</i>		<i>-23,733</i>	

## 5. Conclusions

The findings in this paper should contribute to a better understanding of the role of HE in allocating graduates across the labour market. The analysis focused on the significance of a number of characteristics typical of higher education programmes, for the allocation and performance of graduates from 14 European countries. Graduates' performance is analysed in terms of both monetary and non-monetary returns.

The results show that a well-designed degree programme that is broadly focused, academically prestigious, vocationally oriented, and whose content and objectives are known to employers, contributes to an increase in earnings and attracts higher scores for

job satisfaction. However, if the teaching and learning modes emphasize the teacher as the main source of information, participation in research projects and learning in groups as opposed to individual learning assignments, this positively influences job satisfaction, but negatively influences graduates' income. It seems also that practice-oriented curricula have negative effects: the value of facts and practical knowledge and participation in internship programmes negatively influences both income and job satisfaction. These results could reflect the lack of complementarity between the theoretical content of the course and the practical knowledge. Young HE graduates might be more successful in the labour market if they can achieve an appropriate balance between theoretical and practical-oriented learning in HE. Furthermore, it could be said that despite improvements of the match rate of graduate students who applied for an internship position, internships shortage is still a top priority as the American Psychological Association of Graduate Students stated in its report (APAGS, 2013).

Given the emphasis in many OECD studies on measuring graduate performance in the labour market (e.g. OECD, 2010, 2012), this study offers useful insights into how graduates might prepare for joining the workforce and how governments, universities, employers and teachers could support these efforts. The results indicate that apart from educational characteristics, structural and institutional factors shape graduates' success in the labour market. Universities should support students' preparation for entering the workforce by focusing on the relevance to labour market needs of their graduate education programmes (study programmes should be demanding, academically prestigious and vocationally oriented) through close interaction with employers (employers should be familiar with study programme content). Employers could be invited to participate in reviewing and developing curricula and to provide proper internships for students. Teachers should shape their teaching modes to facilitate

learning processes, and improve problem-based learning and teaching of facts and practical knowledge, and should be supported by their institutions and HE systems. Government needs to enhance partnerships and dialogue between HE providers and employers, and support cultural change to promote closer interaction among them that goes beyond joint research aimed at accessing university funding (García-Aracil and Fernández de Lucio, 2008).

Future research should compare the nature and extent of discipline-specific orientation of HE programmes with their generic orientation. This would help to clarify whether graduates from strongly discipline-specific oriented programmes are more likely to be matched to an occupation that in turn matches their discipline-specific orientation and thus provides them with comparative advantage in fulfilling work tasks and achieving higher income and job satisfaction.

Further analysis could be aimed at comparisons among the European countries in this study, and at identification of similarities and differences among Southern and Northern European countries. For instance, the wide variation among European countries in terms of study provision and learning environment could have an influence on the employment experience. Although the results obtained are important, we should highlight some of the limitations of this study, which we hope to remedy in further research. Corroboration of these results is needed by grouping the academic environmental attributes into different dimensions of educational experience, taking into account different teaching strategies, pedagogical content of knowledge and different conceptions of learning and of knowledge. Also, it might be useful to include ratings of various aspects of courses and programmes (e.g. the impact of curriculum, graduation rates, retention, recruitment, etc...); and other integrated learning experiences (e.g. in-class and out-of-class experiences reinforcing and supporting missions and learning



goals). Therefore, further research is needed on the effect of a dominant mode of teaching and learning and its impact on the graduate labour market.

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## Appendix

Table 1A. Descriptive statistics

Variables	Mean	Std. Dev.	Min.	Max
<b><i>Individual characteristics</i></b>				
Female	0.57	0.49	0	1
Age	29.83	2.21	26	35
Father's higher education	0.37	0.48	0	1
Mother's higher education	0.25	0.43	0	1
<b><i>Field of study</i></b> (ref. Social Science)				
Education	0.09	0.29	0	1
Humanities	0.10	0.30	0	1
Law	0.06	0.25	0	1
Natural Sciences	0.06	0.24	0	1
Mathematics	0.04	0.19	0	1
Engineering (agriculture included)	0.20	0.39	0	1
Medical sciences (veterinary included))	0.14	0.38	0	1
<b><i>Study programme description</i></b>				
Regarded as demanding	3.59	0.92	1	5
Employers familiar with content	3.10	1.15	1	5
Freedom in composing the programme	2.67	1.16	1	5
Broad focus	3.55	0.98	1	5
Vocationally orientated	3.06	1.20	1	5
Academically prestigious	3.05	1.14	1	5
<b><i>Modes of teaching and learning</i></b>				
Lectures	3.89	1.05	1	5
Group assignments	3.07	1.13	1	5
Participation in research projects	2.07	1.09	1	5
Internship, work placement	2.63	1.38	1	5
Facts and practical knowledge	3.05	1.11	1	5
Theories and paradigms	3.66	1.07	1	5
Teacher as the main source of information	3.50	0.96	1	5
Project and/or problem-based learning	2.71	1.12	1	5
Written assignments	3.34	1.09	1	5
Oral presentation by students	2.99	1.12	1	5
Multiple choice exams	2.28	1.21	1	5
<b><i>Job characteristics</i></b>				
Private sector	0.57	0.49	0	1
Permanent contract	0.77	0.42	0	1
Full-time job	0.82	0.38	0	1
Size firm (<50 workers)	0.30	0.45	0	1
<b><i>Appropriateness of qualifications</i></b>				
Qualifications used at work	0.64	0.48	0	1
Under-educated	0.13	0.33	0	1
Over-educated	0.11	0.32	0	1
Deficit in competencies	0.22	0.41	0	1
Surplus in competencies	0.40	0.49	0	1
Job in own domain	0.76	0.42	0	1
Universities vs HEIs	0.83	0.37	0	1
<b><i>Occupational titles</i></b> (ref. Professionals)				
Legislators, senior official and managers	0.07	0.26	0	1
Technicians and associate professionals	0.18	0.38	0	1
Clerks	0.04	0.19	0	1
Service workers and other occupations	0.02	0.15	0	1
<b><i>Country dummies</i></b> (ref. Germany)				
Italy	0.08	0.27	0	1
Spain	0.11	0.32	0	1
France	0.05	0.21	0	1
Austria	0.04	0.20	0	1

The Netherlands	0.09	0.29	0	1
United Kingdom	0.04	0.19	0	1
Finland	0.07	0.25	0	1
Norway	0.05	0.22	0	1
Czech Republic	0.20	0.39	0	1
Switzerland	0.13	0.33	0	1
Portugal	0.02	0.13	0	1
Belgium	0.04	0.19	0	1
Estonia	0.03	0.16	0	1

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