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## Job-major match and job satisfaction in Italy

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## 1. Introduction

Individuals matriculate in and graduate from university studies in order to improve their abilities in the labour market. Their jobs after graduation may or may not fit their expectations, but in principle that job should conform to their attended study programme.

The extent to which graduates acquire qualifications that exceed those required to perform their job is called *overeducation* (Büchel and Pollmann-Schult, 2004). The published literature shows a wide focus on the relevance of overeducation among graduates (Allen and Van der Velden, 2001; Battu *et al.*, 1999; Caroleo and Pastore, 2013; Chevalier and Lindley, 2009; Green and Zhu, 2010; Robert, 2014; Wolniak and Pascarella, 2005). Results from the Reflex project, a large-scale European survey among higher education graduates, show that over 25% of European graduates report their competences as not fully exploited, and this percentage is even higher (30%) in Italy (Allen and Van der Velden, 2007).

Overeducation may have important effects on several employment outcomes. On the one hand, overeducated workers are more likely to take home low earnings (Battu *et al.*, 1999; Caroleo and Pastore, 2013), or the return in earnings of surplus education is lower than the return to the required education (Dolton and Vignoles, 2000). On the other hand, overeducation strongly negatively affects job satisfaction (Allen and Van der Velden, 2001, 2007; Green and Zhu, 2010). As a consequence of both effects, workers are more likely to change jobs (Maynard *et al.*, 2006).

From the entrepreneurial point of view, lower job satisfaction results in lower individual productivity (Verhaest and Omey, 2009). Moreover, workers satisfied with their job have a significantly decreased absenteeism (Farrell and Stamm, 1988), work late (Koslowsky *et al.*, 1997), and improper behaviour at work (Dalal, 2005).

Job satisfaction is a complex and multifaceted concept that depends on earnings but also other factors. In several European countries, the type of work is the main determinant of job satisfaction, not earnings (Skalli *et al.*, 2008; Sousa-Poza and Sousa-Poza, 2000), and this is true with regard to recent graduates in Italy (Bocuzzo and Gianecchini, 2014).

Job satisfaction also depends on individual expectations so that people with a higher level of education show lower levels of job satisfaction as a consequence of higher expectations from their job (Ganzach, 2003; Poggi, 2010).

To fully understand and analyse the overeducation issue and its relationship with job satisfaction, researchers have to take into account that any academic degree is the result

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of a sequential process starting just after the end of compulsory education. According to the country-specific characteristics of the educational system, any individual career comprises first the choice of a high school (and its successful completion), then the choice of a University faculty. However, any educational decision is necessarily affected by the cultural and socio-economic context in which the student lives (Flint, 1992; Hearn, 1984). This means that parental and socio-economic backgrounds play an important role in determining educational and employment outcomes during the individual's life. The extent to which individuals move (up or down) the social ladder relative to one's parents is known as intergenerational social mobility. In a relatively immobile society, individual outcomes, such as education, occupation, or income, tend to be strongly related to those of their parents (Corak, 2004). On the one hand, in less mobile societies human skills may be wasted or misallocated. On the other hand, motivations, effort, and individual productivity may be affected by the lack of equal economic opportunities. These in turn may affect the overall efficiency and growth potential of a country. An interesting discussion on the different channels through which educational attainments of future generations may be affected by educational choices of previous generations is provided by Checchi (2006).

The influence of parental socio-economic status on the descendants' education, incomes, and occupation has been widely investigated (Dustmann, 2004; Solon, 1999). Thus, mothers and fathers play a different role in shaping the educational achievements of their children (Dustmann, 2004; Ermisch and Francesconi, 2001). Mediterranean countries show low intergenerational social mobility, and this phenomenon is particularly noticeable in Italy (Checchi, 2006). However, in Italy, the educational background of parents does not directly affect the probability of being overeducated but indirectly affects this probability through the choice of the type of high school (Caroleo and Pastore, 2012). Moreover, risk of overeducation is mainly determined by the type of school diploma and to a less extent, the high school diploma grade (Büchel and Pollmann-Schult, 2004).

Several studies have analysed the relationships between overeducation and the level and type of degree. Having a second-level degree does have a positive effect on attaining a job in which the acquired knowledge and skills are fully utilised (Allen and De Weert, 2007; Caroleo and Pastore, 2013), whereas discordant results appear with respect to the disciplinary area of the degree (Cutillo and Di Pietro, 2006; Wolniak and Pascarella, 2005).

Caroleo and Pastore (2013) showed that Italian graduates from Law, Medicine, and technical disciplines are less likely to experience overeducation. These authors also

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9 provide an interesting interpretation of the educational mismatch in Italy: overeducation  
10 is the result of the inefficiencies of the tertiary educational and training system and  
11 particularly of the difficulties in enhancing job-related competences. This interpretation  
12 is consistent with recent theories of educational mismatch that trace it back to the low  
13 supply of human capital rather than to an excess of it; despite the growing level of  
14 youth education, job competences continue to be insufficient (Leuven and Oosterbeek,  
15 2011). There is a potential demand for skills in the production system which remains  
16 unexploited because of the youth experience gap and their educational mismatch. With  
17 this perspective, overeducation could be a result of wrong abilities provided by  
18 universities.  
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21 In the following, we analyse data gathered from a sample of University of Padua  
22 graduates. Data refer to graduates' perceived match between the competencies implied  
23 by their job and those achieved at university. Our data were collected during the three  
24 years after graduation, which is a sufficient amount of time for the majority of  
25 graduates to settle down professionally. Our analyses respond to the following research  
26 questions:  
27

- 28 (i) Is there an observed mismatch between education characteristics and job  
29 profiles in the sample of Italian graduates?  
30 (ii) Does major job consistence affect the level of job satisfaction?  
31 (iii) Do consistence and satisfaction depend on graduates' characteristics?  
32

33 The remainder of the paper is organised as follows: Section 2 describes the research and  
34 provides some information on the Italian educational system, while Section 3 describes  
35 the theoretical background and the methodology adopted in this manuscript. Section 4  
36 reports the results of the analysis, and Section 5 draws some conclusions and policy  
37 implications.  
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## 39 40 **2. Italian context, data and model**

### 41 42 *2.1 The Italian educational system*

43 The Italian educational and training system has been characterised by several reforms  
44 during the last century (see Garrouste [2010] for a comprehensive overview of the  
45 entire educational reform process in Italy). However, the system that describes the  
46 educational career of the cohort of graduates involved in this analysis can be  
47 summarised as follows:  
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- 49 a) A primary (compulsory) education, divided in two cycles lasting 8 years in total.  
50 Primary education usually begins at age 6.  
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- b) An upper secondary (high) school, comprising a generalist (classical, scientific, linguistic, artistic) gymnasium (in Italian *liceo*) and a professional (*istituto tecnico*) and a vocational (*istituto professionale*) training system. High schools usually consist of 5 years of schooling.
  - c) The university system, divided into two cycles: the bachelor's degree is awarded at completion of the first cycle, which lasts 3 years; the entrance age to this level is typically 19-years old. The master's degree is awarded at completion of the second cycle, which lasts 2 years; to continue to the master's degree, a bachelor's degree is required.
  - d) Post-graduate education.

## 22 2.2 The survey

23 Data analysed in this study come from a longitudinal survey (called *Agorà*) that  
24 investigated the professional outcomes of 2007 and 2008 graduates (Fabbris, 2012)  
25 from the University of Padua, one of the most important universities in Italy. The  
26 graduate number is usually larger than 10,000; specifically, there were 12,167 graduates  
27 in 2007 and 11,757 in 2008.  
28

29 A representative sample of graduates of all faculties except Medicine was  
30 interviewed 6, 12, and 36 months after graduation, using a computer-assisted telephone  
31 interview technique (CATI). Graduates were asked to provide a wide range of  
32 information about their current jobs (e.g. duties and tasks, working hours, salary,  
33 characteristics of the firm), the search activities they performed to obtain their jobs, any  
34 skill or educational mismatches, and a general assessment of their academic and  
35 professional careers. The survey also collected information about the respondents'  
36 demographic and educational backgrounds and work experience.  
37

38 A question on global job satisfaction is present in the survey: '*On a 1 to 10 scale,*  
39 *how satisfied are you with your job?*'. The satisfaction levels for several specific job  
40 aspects were also measured.  
41

42 The following questions were posed to specifically collect the feelings of graduates  
43 about their job-education consistency:  
44

- 45 a) Necessity of degree: 'For serving your current job, (i) the university degree  
46 you hold is specifically required; (ii) a graduate from any major could obtain  
47 similar results; (iii) a university degree is not necessary, a high school degree  
48 could suffice; (iv) a qualification lower than high school could suffice.'  
49 b) Skill exploitation: 'To what degree can you exploit your professional skills at  
50 work? (i) Not at all; (ii) Not much; (iii) Quite; and (iv) Very much.'  
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- c) Adequacy of professional background: 'All in all, on a 1 to 10 scale, how adequate for your job is the professional background you achieved at university?'
  - d) Coherence with studies: 'All in all, on a 1 to 10 scale, to what degree does your job cohere with the education you achieved at university?'
  - e) Forma mentis: 'To what degree can you exploit at work the 'forma mentis', that is the comprehensive discipline knowledge deriving from education in a specific major? (i) Not at all; (ii) Not much; (iii) Quite; and (iv) Very much.'

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The response rate was 94.3% 6 months after graduation, 91.4% after 12 months, and 83% after 36 months (Table 1); 2,436 graduates answered the survey and were employed 36 months after graduation. To our purposes, we refer only to the employed graduates at their first job or at a different job if they already worked during their studies. In total, the analysed sample size was  $n = 2,046$ .

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[Table 1 here]

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The final sample was mainly composed by women (57.4%). The study programmes in Engineering and in Humanities were the most represented faculties (17.6% and 17.2%, respectively). The third most- represented faculty in terms of graduates was Science (12.8%), and the remaining faculties each accounted for about 5-7% of graduates; people from the Law (3.3%) and Veterinary (2.6%) programmes represented the smallest proportions of graduates.

### 38 39

#### 2.3. Structural equation modelling

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Structural Equation Modelling (SEM) is the statistical approach we adopted for data analysis. It is a general technique aimed at evaluating the consistency of the collected data with a substantive theory. It is particularly useful for studying the relationships among latent constructs, to be specified a priori and usually measured through a multiplicity of indicators (Bollen, 1989).

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A general SEM is specified as:

$$\begin{aligned}
 \eta &= B \eta + \Gamma \zeta + \varsigma \\
 y &= A_y \eta + \varepsilon \\
 x &= A_x \zeta + \delta,
 \end{aligned}
 \tag{1}$$

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9 where  $\eta$  is the vector of latent endogenous variables,  $\zeta$  is the vector of latent exogenous variables, and  $y$  and  $x$  are vectors of observed variables;  $B$  (where the elements in the main diagonal are set to 0) and  $\Gamma$  are the matrices of parameters to be estimated in the 'structural equation', and  $A_y$  and  $A_x$  are the matrices of factor loadings in the 'measurement equations' of model (1);  $\zeta$  is the vector of errors in the structural equation, and  $\varepsilon$  and  $\delta$  are the vectors of errors in the measurement equations.

16 Such a model allows the separation of the total effect of a causal variable into direct and indirect effects in order to better understand the mechanism through which that variable affects the outcomes. *Direct* is the effect of a variable not mediated in the model by any other variables, *indirect* is its effect mediated by other variables, and *total* is the overall causal relationship between that variable and other (latent or manifest) variables.

23 The usual approach to estimate model parameters in SEM is the maximum likelihood (ML) solution even though other estimation procedures can be adopted. Among them, the Full Information Maximum Likelihood (FIML) algorithm, performed using SAS software (SAS Institute Inc., 2011), was used to estimate our final model. We opt for an FIML solution because the information on parents' level of education was not collected for students who graduated in 2007. FIML is a model-based method for estimating parameters in the presence of missing data. Strictly speaking, it is not an imputation method since it does not impute missing values into newly created data sets but provides parameter estimates derived from the available data as well as implied values of the missing data (Arbuckle, 1996). This estimation procedure provides roughly unbiased estimates, particularly with small sample sizes.

36 The traditional measure for evaluating the overall model fit in SEM is provided by chi-square statistics. Since severe shortcomings are associated with its use (Kline, 2005), a variety of alternative goodness-of-fit indices have been proposed. There is still disagreement among researchers about the application of these alternative statistics, but a good practice is to report a variety of indices (Boomsma, 2000): one should always be the Standardized Root Mean Square Residual (SRMR; Hu and Bentler, 1999); another could be the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI) or the Goodness of Fit index (GFI).

46 The SRMR is a measure of the mean absolute correlation residual; it computes the overall difference between the observed and the predicted correlations. Its main advantage is the lack of any distributional assumption of the outcome variables. SRMR ranges from 0 to 1, where 0 means a perfect model fit. According to Hu and Bentler (1999), SRMR values lower or equal to 0.08 can be considered acceptable.

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9 RMSEA is a popular fit statistic because of its sensitivity to the number of estimated  
10 parameters in the model. This index basically follows a non-central chi-square  
11 distribution; a value of 0 indicates the *best fit* even though this does not necessarily  
12 mean the *perfect fit*. Most SEM researchers agree on a cut-off value close to 0.06 (Hu  
13 and Bentler, 1999) or 0.07 (Steiger, 2007). Moreover, a confidence interval around the  
14 value can be specified; in a well-fitting model the lower bound of the 90% confidence  
15 interval should be close to 0, while the upper bound should be lower than 0.10 (Browne  
16 and Cudeck, 1993).

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18 In SEM applications, some fit indices (i.e. GFI) are undefined under the FIML  
19 procedure even though several other popular fit statistics can still be computed (Enders,  
20 2001).  
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#### 22 23 24 2.4. *The analytic model*

25 To measure the educational outcomes that are the focus of our analyses, two latent  
26 variables were defined through confirmatory factor analysis: job-major match and job  
27 satisfaction. The indicators to measure job-major match are necessity of the achieved  
28 degree (its standardized factor score [*sfs*] equals 0.589), coherence with studies (*sfs* =  
29 0.811), *forma mentis* (0.560), and adequacy of professional background (0.586). Job  
30 satisfaction is measured by overall job satisfaction (0.751), satisfaction for  
31 professionalism (0.710), satisfaction for cultural interests (0.807) and skill exploitation  
32 (0.563). Job-major match and job satisfaction are then affected by individual and social  
33 characteristics of graduates, as well as their educational paths. .  
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36 The theoretical model behind our analysis is based on the literature reviewed in the  
37 Introduction and follows a logical and temporal structure that is summarised in Figure  
38 1.  
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40 Social capital is set at the beginning of the individual educational pathway. The  
41 parental level of education (both father and mother) and their professional activities are  
42 assumed as measures of social capital as a latent variable. Since Italy shows a low  
43 intergenerational social mobility, we might expect a positive relationship between  
44 parental socio-economic status and high school choice (gymnasium versus all other  
45 types of schools) as well as social capital and final high school grade. Therefore, gender  
46 and social capital are assumed to affect high school choices, while gender, social  
47 capital, and high school type are the main determinants of the final high school grade.  
48 Since gymnasium is an academic-oriented high school type in Italy, its educational  
49 standards are expected to be higher than those of the other high schools; as a result, the  
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gymnasium final grade is expected to be lower than the grade obtained by students who attended a professional or training system.

The next step of the educational path is the faculty choice, which is assumed to depend on gender, social capital, high school type, and final high school grade; the same variables, together with the attended university course of study, affect in turn the final degree grade. As a consequence of the low intergenerational social mobility trait that characterises Italy, a higher the social capital results in students most likely attending elitist and historical faculties (such as Law, Medicine, Humanities), whilst these students are less likely to choose other less traditional university schools.

Although we might expect that a higher high school grade will result in a higher university grade, because of the university-oriented training provided by the gymnasium, a positive relationship between gymnasium attendance and university degree grade is also expected.

For graduates who found a job, the job-major match may depend on gender, high school and its final grade, major and level (bachelor or master) of the attended university programme, and degree final grade. As highlighted in the Introduction, social capital is assumed to affect the job-major match only indirectly.

We therefore hypothesise that job satisfaction may be affected by the same variables defined as explanatory variables investigating the consistency between job and major plus the latent variable 'job-major match' itself. We also assume a direct effect of social capital on job satisfaction. Social capital may be a measure of the networking capabilities of a graduate and his or her family by leveraging social relations, which are generally supposed to be richer and more extensive for parents with higher education and better occupations, graduates are more likely to find more satisfactory jobs.

The model is identified according to the recursive rule with no correlated errors in the endogenous variables (Bollen, 1989). The notation and specification of the SEM model are shown in Appendix 1.

[Figure 1 here]

### 3. Results

#### 3.1. Job-education match

According to 44.2% of graduates, the degrees they hold are necessary for performing their current job, whilst 38.1% of graduates believe that any university degree could suffice for their activity (Table 2).

A high variability among disciplines characterises these data; necessity of the awarded degree ranges from 30.5% for graduates in the humanities area [1] to 57.2% for workers in technical or scientific areas. The interval is even higher if faculties (not shown) are considered. At one extreme, only 12.7% of graduates in Political Science and 18.6% in Humanities stated that the gained degree was necessary; at the other extreme, 94.0% of graduates in Law and 69.3% in Pharmacy stated that the degree they had was required for their jobs. A remarkable one out of every four graduates in the Humanities area declared that a high school degree would have sufficed for their current job.

The slight disadvantage of female graduates with respect to males in job-education consistency is mainly attributable to the higher percentage of women graduating with concentrations in the Humanities. The analysis stratified by faculty (not shown) often reveals no clear pattern of mismatch between male and female graduates. Sometimes women seem advantaged over men with regard to consistency (study programmes in Pharmacy or Education), in other cases (in particular, Agriculture and Economics), men possess this advantage.

Job-education mismatch is higher for graduates who achieved a bachelor's degree; only 30.2% of them gained a job where the achieved degree was necessary, while 28.5% could be considered over-educated. Conversely, more than half of those with master's degrees held a degree appropriate for the job they were in, and only one out of ten accepted a job for which the possession of a high school degree would have sufficed.

Graduates with better high school and academic performance seem to have jobs that match their educational levels. Final grades for both high school and university were significantly higher ( $p < 0.0001$ ) for people who found a job that matched their higher studies.

Given the large heterogeneity in grading practice among the faculties (the lowest average grade was 96.3 for Statistics and the highest was 108.3 for Psychology), the final university grade is in better agreement with the level of job-major consistency

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9 when the analysis is stratified by faculty (not shown). Graduates in Economics showed  
10 a mean grade of 91.3 if a high school diploma was sufficient for their job and a mean of  
11 100.7 if their degree was strictly necessary for their chosen work. Similar results can be  
12 observed for Pharmacy (mean values were 90.0 and 100.2, respectively), Humanities  
13 (101.0 and 106.4), Engineering (97.3 and 103.2), Statistics (90.7 and 98.8), and  
14 Political Science (95.0 and 103.8).

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16 From Table 2 it is also worth noting that graduates having the right degree for the  
17 job, or having a job that required a university degree, feel more satisfied with their jobs.  
18 Work positions matching the major of the achieved degree involve higher incomes and,  
19 for more than 40% of graduates, job guarantee.

20  
21 Parents' education is weakly related to job-education consistency. For jobs that  
22 require specific university titles, a clear tendency exists for parents to be more educated,  
23 whilst job mismatches are associated mainly with lower parental educational status. It  
24 can be hypothesized that, when choosing a university course, highly educated parents  
25 are able to direct descendants towards a proper discipline and, after their graduation,  
26 activate their own social networks to help their descendants get better jobs.  
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29 [Table 2 here]  
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32 The necessity of a certain degree at work is highly correlated with coherence between  
33 completed studies: the Goodman and Kruskal co-graduation index  $\gamma = 0.671$  is large  
34 and significant (95% confidence interval: 0.639-0.702). It is less correlated with  
35 indicators of the skills' use: the co-graduation with adequacy of professional  
36 background is  $\gamma = 0.467$  (0.423-0.511) and with skill exploitation is  $\gamma = 0.463$  (0.405-  
37 0.520). Indeed, skill exploitation could depend on other aspects in addition to job-  
38 education match, such as the organisational structure, the number and role of  
39 colleagues, the type and level of tasks (the higher the level and the more diversified the  
40 tasks, the more restrained the use of strictly technical skills and the wider that of cross-  
41 occupational skills for managing and solving problems).  
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44 University studies are generally relevant for work; 24.8% of graduates very  
45 frequently use and another 60.6% quite frequently use the skills acquired at university  
46 (Table 3).

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48 The use of superior skills is highly associated with job satisfaction. On a ten-point  
49 scale, satisfaction ranged from 5.5 of 10 if skills are not used to 8.1 if they are  
50 repeatedly used. From Tables 2 and 3 we can deduce that 'over-educated' graduates are  
51 less satisfied with their jobs, in concordance with the current literature.  
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[Table 3 here]

### 3.2. Pathways from social and educational capital to job satisfaction

We now investigate the pathways from graduates' social capital to job satisfaction, moving through high school and university performance. Results are reported in Tables 4 to 10.

The null hypothesis of the chi-square test for evaluating the model fit is rejected. However, model residuals are far from normality. Thus, the SRMR index, which is equal to 0.06, seems to be more apt to evaluate the model's goodness of fit; it has a lower value than the cut-off reported by Hu and Bentler (1999). In addition, the RMSEA statistic is 0.099, a value somewhat larger than the cut-off suggested by Steiger (2007). However, the upper bound of the 90% confidence interval for RMSEA is equal to 0.101, a value just beyond the upper bound proposed by Browne and Cudeck (1993). Therefore, taking into account the complexity of the estimated model, its fit to the data seems good.

Our analysis begins with family social capital. In this paper, the parental socio-economic background is evaluated by means of the parents' education and employment activity (Table 4). *Ceteris paribus*, parents' education contributes to descendants' social capital to a greater degree than does parents' occupational status. The role played by fathers is stronger compared to the mothers' contribution. Regardless of the indicators, children acquire stronger social capital according to the strength of the position or condition of their parents (Table 4).

[Table 4 here]

Any higher educational career starts with the choice of the type of high school to attend (Table 5). As expected, family social capital is crucial in choosing high school type; individuals living in better off and better-educated contexts are significantly inclined to choose a gymnasium ( $p < 0.010$ ). A significant positive direct effect ( $p = 0.013$ ) may be observed for young females.

[Table 5 here]

The final high school grade is negatively correlated ( $p < 0.010$ ) with gymnasium attendance (Table 6). This is likely, because in general, educational standards and

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9 learning diligence required by the gymnasium are higher than those by other high  
10 schools. So, the direct effect of social capital on the final grade is no longer significant.  
11 Social capital affects the high school grade through the attended school type ( $p < 0.010$ )  
12 and it is negative because of lower grades achieved by students at gymnasium. Other  
13 things being equal, women get better marks at the end of high school than men  
14 ( $p < 0.010$ ).  
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16  
17 [Table 6 here]  
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20 The next step in a high school graduate's career is the choice of the study programme  
21 and the university to attend (Table 7). The high school final grade plays a significant  
22 ( $p < 0.010$ ) role in the study programme choice—positive for Economics, Engineering,  
23 and Law, negative for the remaining faculties but the Humanities and Statistics (for  
24 which it is neutral).  
25

26 Moreover, having attended a gymnasium affects directly and positively the choice  
27 of a study programme at the faculties of Engineering, Law, Pharmacy and Sciences  
28 ( $p < 0.010$ ) and negatively the choice of enrolment in all other faculties but Humanities,  
29 Psychology and Statistics. Indirect effects are often in the opposite direction than direct  
30 ones (because the indirect effect passes through the high school final grade, which is  
31 lower for gymnasium).  
32

33 Women are inclined to choose programmes in Education, Pharmacy, Psychology, or  
34 Humanities (the total effects are significant,  $p < 0.010$ ). This is a new demonstration  
35 that, in comparison to men, young women tend to choose liberal arts and health  
36 programmes in larger numbers (the faculty of Medicine did not contribute to the survey,  
37 but two-thirds of its students are women).  
38

39 The role of social capital on the choice of the study programme is noteworthy; the  
40 more substantial the social capital, the larger the tendency to choose Engineering or  
41 Law programmes. The opposite applies to the Education and Agriculture programmes,  
42 which means that the higher the parents' status the less likely students are to enrol in  
43 these faculties after graduating from high school.  
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46 [Table 7 here]  
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48 A further step in one's higher educational career is graduation (Table 8). Other  
49 factors being equal, the final grade of women is higher than that of men (analogously to  
50 high school). Social capital still shows important effects that are stronger ( $p < 0.010$ )  
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9 when indirect and weaker ( $p=0.043$ ) when direct. The sum of these two effects is  
10 positive and significant with stronger family social capital resulting in a higher final  
11 university grade ( $p<0.010$ ). Both variables representing high school attendance (type of  
12 school and final grade) mutually agree; a positive and significant direct effect is  
13 opposed to a negative and significant indirect effect. Merging the two effects, we obtain  
14 a positive and significant overall effect of the basic high school descriptors on marks at  
15 graduation.  
16

17 Apart from Pharmacy (which is not statistically different with respect to Veterinary  
18 Medicine), faculties show significant direct effects on the final mark; students in  
19 Economics or Statistics get the lowest grades at graduation, whilst the highest are in  
20 Education, Humanities and Psychology. Hence, in interpreting the effectiveness of the  
21 study programme on graduates' external outcomes, it will be necessary to mentally  
22 stratify the final marks by faculty.  
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25 [Table 8 here]  
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29 The last stage of our analysis is to investigate if and how the human (that is, the  
30 merge of social and educational) capital accumulated by these graduates affects job  
31 quality as measured by job-major match and job satisfaction.  
32

33 We sketched in Figure 1 that social capital indirectly affects the gap between major  
34 and skills used by graduates at work, but according to the estimated model, this  
35 relationship is not significant (Table 9). The high school final grade shows as a good  
36 predictor of a student's ability rather than the graduation final grade; both the direct and  
37 the indirect effects of the high school grade on job-major consistency are significant  
38 ( $p<0.010$ ), whilst the effects of the final grade are not. This is not a surprise as evidence  
39 exists of a wide heterogeneity across faculties as well as homogeneity within faculties  
40 in terms of the final grade. As anticipated in Section 3.1, large proportions of students  
41 in liberal arts, or in education or psychology programmes attain top grades, whilst in  
42 other programmes (in particular, in economics or statistics) the average grades are low.  
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45 The gymnasium attendance together with the high school final mark remains a  
46 good predictor of a graduate's use of major-specific skills. To support this view, Table  
47 9 shows that the effects of gymnasium attendance and those of the attended faculty  
48 work in different directions with respect to job-major consistency; the effects of the  
49 former attendance are positive and indirect ( $p=0.044$ ) and no direct effects are  
50 significant, whilst the indirect effects of the attended faculty are not. Other aspects  
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9 being the same, the attendance of a programme in Agriculture, Political Science,  
10 Humanities, or Psychology has a negative direct effect on the consistency between  
11 university major and the achieved skills use, while a positive effect applies for  
12 programmes in the faculties of Economics, Pharmacy, Education, Law, and  
13 Engineering.  
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16 [Table 9 here]  
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18 Hence, the choice of the faculty is the crucial step in one's educational pathway because  
19 it may affect in a positive or a negative manner the education that graduates can use to  
20 their advantage in the labour market. The match between education and work activity is  
21 also lower with lower degree levels (bachelor versus master degree).  
22

23 As expected, if job skills match the university major, even job satisfaction will be  
24 high ( $p < 0.01$ ; Table 10). The relationship between expectations from and satisfaction  
25 with a job can explain why the direct effect of the bachelor's degree on job satisfaction  
26 is positive and significant ( $p < 0.010$ ), signalling that graduates with bachelor's degrees  
27 are more satisfied with their job than those with master's degrees. This inverse of what  
28 is expected is likely due to the lower expectations of lower titled graduates.  
29

30 On the other hand, if mediated by job-major matching, the job satisfaction of a  
31 bachelor graduate is lower than that of a master graduate. Bachelors are less satisfied  
32 because of lower job-major matching (indirect effect) but more satisfied because of  
33 lower expectations (direct effect). The merge of the direct and indirect effects results in  
34 a lack of total effects of the degree level on job satisfaction. This finding can be  
35 considered a valuable example of the advantages provided by our approach in  
36 disentangling direct from indirect effects.  
37

38 In relation to job satisfaction, the university final grade is not significant, whilst the  
39 high school final grade still presents a positive and significant indirect effect ( $p < 0.010$ ).  
40 No faculty shows a negative and significant direct relationship with job satisfaction.  
41 Only programmes in Agriculture, Education, Political Sciences, Psychology, and  
42 Humanities show significant direct effects and other than programmes in Education, all  
43 of these also have a negative indirect effect. In order to understand such results, it is to  
44 be noted that the labour expectations of graduates from the liberal arts or social  
45 programmes are low, and often these graduates might feel that just finding a job was  
46 amazing, regardless of the low consistency between their job activities and their past  
47 studies. After controlling for the different stages of the educational career, social capital  
48 vanishes as a covariate of job satisfaction.  
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Even if women perform better than men with respect to both school and university outcomes, their job-major consistency is lower than that of males, both directly ( $p=0.026$ ) and indirectly ( $p=0.017$ ). This may mean that jobs gained by women are less qualified than those of equally educated men. Women are also less satisfied than men with their jobs ( $p=0.019$ ), *ceteris paribus*.

[Table 10 here]

#### 4. Conclusions and discussion

A major conclusion of our analyses is that the proportion of graduates from Padua University with more skills than required by their job is lower than the percentages usually detected in Italy and Europe. Padua is located in northeastern Italy, a geographical region whose economic system, unlike that of the rest of Italy, is affected by the presence of 'local production systems'. These areas are characterised by high concentrations of small and medium-sized firms in manufacturing and service activities, high levels of innovation, and a strong relationship with universities and research centres.

There is evidence that graduates' occupational destiny is strongly affected by the choice of the type of high school and university study programme. The reason is strictly social. For any individual, there is a common thread from family social status to high school and performance, from high school's distinctive features to a higher educational programme and performance, and from that on to work. Our results clearly show that in Italy the type of high school is a crucial step in the individual educational pathway and might shape the future professional career. The counselling and orientation activities provided by both teachers and the family environment assume a key role in the educational career of each youth. These activities have to be carried out at early stages of any educational path, probably earlier than expected. The choice of the high school is likely driven by parents, relatives, and sometimes youths' friends. This means that social capital strongly determines one's outcomes until the end of high school. Policies should be devoted to enhance both the mentoring support of the 'educators', according to the skills, abilities, and expectations of their students, and the conscious parental involvement in their children's high school choices. This finding strongly supports other conclusions for the Italian case. Checchi (2000) argued that 'the educational career is significantly predetermined by the choice of the secondary school undertaken at the age of 14, mainly by the family'; Checchi and Jappelli (2004) claimed that 'since parents make decisions on the basis of their perception of school quality, it would be important

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9 to improve parents' information about school characteristics and students' performance  
10 in later schooling'.

11 Regarding university studying, it is evident that the match between education and  
12 work activity is lower with the lowest degree level, and this could signal a failure of the  
13 bachelor programme in Italy. Bachelor studies are supposed to have a more  
14 occupational-oriented character than the master ones; hence, bachelor graduates should  
15 be more likely to find a job qualified as matched. It is likely that the current  
16 characteristics of the Italian bachelor degree do not achieve the purposes behind this  
17 branch of university reform. Policy should be devoted to fill in the current gap in order  
18 to really improve training provided by this low degree level.

19 Our mismatch rate ranged between 17.7% (overt irrelevance of the university title)  
20 and 55.8% (included 38.1% of cases for which any university degree would be equally  
21 valid). We are tempted to state that overeducation is an inappropriate term and, as  
22 claimed by Caroleo and Pastore (2013), there is a skill mismatch due to 'wrong'  
23 abilities. In effect, skills mismatch and low job satisfaction are greater for majors of a  
24 nontechnical nature (Political Science, Humanities, and Psychology). Thus, the  
25 university major is pivotal in determining the graduates' perception of being over- or  
26 undereducated and of being satisfied with the job they are in. The different degrees are  
27 relevant signals of the skills held by graduates, possibly affecting an individual's  
28 chance of finding a qualified job.

29 We conclude that it would be beneficial for a higher educational institution to both  
30 appraise which jobs are the 'graduate jobs' (the job market share for graduates) and to  
31 inform students of this appraisal at any stage of their lives—before they choose a higher  
32 educational programme, when they are in it, and at its end. On the other hand, students  
33 should and can change such a rather deterministic social chain between social capital,  
34 high school choice and results, higher educational choices and final grade, and  
35 occupation. A student might be able to design his/her own investments in higher  
36 education and long-term labour strategies. This calls for strategic counselling at the  
37 very early stages of choosing a path through higher education. This type of counselling,  
38 which should involve a forecast of the occupational opportunities in a plausible future,  
39 is likely to enhance students' positive attitudes towards choosing a university path that  
40 is labour-oriented, even if this purpose may be weakened if labour markets are poor.

#### 41 42 43 44 45 46 47 48 **Notes**

49 [1] Disciplinary areas are: Humanities (Humanities Psychology, Education), Social Science  
50 (Economics, law, Political Science, Statistics), Life Sciences (Veterinary Medicine,  
51 Pharmacy, Agriculture), Technical and Scientific (Engineering, Science).  
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## 1. Introduction

Individuals matriculate in and graduate from university studies in order to improve their abilities in the labour market. Their jobs after graduation may or may not fit their expectations, but in principle that job should conform to their attended study programme.

The extent to which graduates acquire qualifications that exceed those required to perform their job is called *overeducation* (Büchel and Pollmann-Schult, 2004). The published literature shows a wide focus on the relevance of overeducation among graduates (Allen and Van der Velden, 2001; Battu *et al.*, 1999; Caroleo and Pastore, 2013; Chevalier and Lindley, 2009; Green and Zhu, 2010; Robert, 2014; Wolniak and Pascarella, 2005). Results from the Reflex project, a large-scale European survey among higher education graduates, show that over 25% of European graduates report their competences as not fully exploited, and this percentage is even higher (30%) in Italy (Allen and Van der Velden, 2007).

Overeducation may have important effects on several employment outcomes. On the one hand, overeducated workers are more likely to take home low earnings (Battu *et al.*, 1999; Caroleo and Pastore, 2013), or the return in earnings of surplus education is lower than the return to the required education (Dolton and Vignoles, 2000). On the other hand, overeducation strongly negatively affects job satisfaction (Allen and Van der Velden, 2001, 2007; Green and Zhu, 2010). As a consequence of both effects, workers are more likely to change jobs (Maynard *et al.*, 2006).

From the entrepreneurial point of view, lower job satisfaction results in lower individual productivity (Verhaest and Omey, 2009). Moreover, workers satisfied with their job have a significantly decreased absenteeism (Farrell and Stamm, 1988), work late (Koslowsky *et al.*, 1997), and improper behaviour at work (Dalal, 2005).

Job satisfaction is a complex and multifaceted concept that depends on earnings but also other factors. In several European countries, the type of work is the main determinant of job satisfaction, not earnings (Skalli *et al.*, 2008; Sousa-Poza and Sousa-Poza, 2000), and this is true with regard to recent graduates in Italy (Bocuzzo and Gianecchini, 2014).

Job satisfaction also depends on individual expectations so that people with a higher level of education show lower levels of job satisfaction as a consequence of higher expectations from their job (Ganzach, 2003; Poggi, 2010).

To fully understand and analyse the overeducation issue and its relationship with job satisfaction, researchers have to take into account that any academic degree is the result

of a sequential process starting just after the end of compulsory education. According to the country-specific characteristics of the educational system, any individual career comprises first the choice of a high school (and its successful completion), then the choice of a University faculty. However, any educational decision is necessarily affected by the cultural and socio-economic context in which the student lives (Flint, 1992; Hearn, 1984). This means that parental and socio-economic backgrounds play an important role in determining educational and employment outcomes during the individual's life. The extent to which individuals move (up or down) the social ladder relative to one's parents is known as intergenerational social mobility. In a relatively immobile society, individual outcomes, such as education, occupation, or income, tend to be strongly related to those of their parents (Corak, 2004). On the one hand, in less mobile societies human skills may be wasted or misallocated. On the other hand, motivations, effort, and individual productivity may be affected by the lack of equal economic opportunities. These in turn may affect the overall efficiency and growth potential of a country. An interesting discussion on the different channels through which educational attainments of future generations may be affected by educational choices of previous generations is provided by Checchi (2006).

The influence of parental socio-economic status on the descendants' education, incomes, and occupation has been widely investigated (Dustmann, 2004; Solon, 1999). Thus, mothers and fathers play a different role in shaping the educational achievements of their children (Dustmann, 2004; Ermisch and Francesconi, 2001). Mediterranean countries show low intergenerational social mobility, and this phenomenon is particularly noticeable in Italy (Checchi, 2006). However, in Italy, the educational background of parents does not directly affect the probability of being overeducated but indirectly affects this probability through the choice of the type of high school (Caroleo and Pastore, 2012). Moreover, risk of overeducation is mainly determined by the type of school diploma and to a less extent, the high school diploma grade (Büchel and Pollmann-Schult, 2004).

Several studies have analysed the relationships between overeducation and the level and type of degree. Having a second-level degree does have a positive effect on attaining a job in which the acquired knowledge and skills are fully utilised (Allen and De Weert, 2007; Caroleo and Pastore, 2013), whereas discordant results appear with respect to the disciplinary area of the degree (Cutillo and Di Pietro, 2006; Wolniak and Pascarella, 2005).

Caroleo and Pastore (2013) showed that Italian graduates from Law, Medicine, and technical disciplines are less likely to experience overeducation. These authors also



provide an interesting interpretation of the educational mismatch in Italy: overeducation is the result of the inefficiencies of the tertiary educational and training system and particularly of the difficulties in enhancing job-related competences. This interpretation is consistent with recent theories of educational mismatch that trace it back to the low supply of human capital rather than to an excess of it; despite the growing level of youth education, job competences continue to be insufficient (Leuven and Oosterbeek, 2011). There is a potential demand for skills in the production system which remains unexploited because of the youth experience gap and their educational mismatch. With this perspective, overeducation could be a result of wrong abilities provided by universities.

In the following, we analyse data gathered from a sample of University of Padua graduates. Data refer to graduates' perceived match between the competencies implied by their job and those achieved at university. Our data were collected during the three years after graduation, which is a sufficient amount of time for the majority of graduates to settle down professionally. Our analyses respond to the following research questions:

- (i) Is there an observed mismatch between education characteristics and job profiles in the sample of Italian graduates?
- (ii) Does major job consistence affect the level of job satisfaction?
- (iii) Do consistence and satisfaction depend on graduates' characteristics?

The remainder of the paper is organised as follows: Section 2 describes the research and provides some information on the Italian educational system, while Section 3 describes the theoretical background and the methodology adopted in this manuscript. Section 4 reports the results of the analysis, and Section 5 draws some conclusions and policy implications.

## **2. Italian context, data and model**

### **2.1 The Italian educational system**

The Italian educational and training system has been characterised by several reforms during the last century (see Garrouste [2010] for a comprehensive overview of the entire educational reform process in Italy). However, the system that describes the educational career of the cohort of graduates involved in this analysis can be summarised as follows:

- a) A primary (compulsory) education, divided in two cycles lasting 8 years in total. Primary education usually begins at age 6.



- b) An upper secondary (high) school, comprising a generalist (classical, scientific, linguistic, artistic) gymnasium (in Italian *liceo*) and a professional (*istituto tecnico*) and a vocational (*istituto professionale*) training system. High schools usually consist of 5 years of schooling.
- c) The university system, divided into two cycles: the bachelor's degree is awarded at completion of the first cycle, which lasts 3 years; the entrance age to this level is typically 19-years old. The master's degree is awarded at completion of the second cycle, which lasts 2 years; to continue to the master's degree, a bachelor's degree is required.
- d) Post-graduate education.

## 2.2 The survey

Data analysed in this study come from a longitudinal survey (called *Agorà*) that investigated the professional outcomes of 2007 and 2008 graduates (Fabbris, 2012) from the University of Padua, one of the most important universities in Italy. The graduate number is usually larger than 10,000; specifically, there were 12,167 graduates in 2007 and 11,757 in 2008.

A representative sample of graduates of all faculties except Medicine was interviewed 6, 12, and 36 months after graduation, using a computer-assisted telephone interview technique (CATI). Graduates were asked to provide a wide range of information about their current jobs (e.g. duties and tasks, working hours, salary, characteristics of the firm), the search activities they performed to obtain their jobs, any skill or educational mismatches, and a general assessment of their academic and professional careers. The survey also collected information about the respondents' demographic and educational backgrounds and work experience.

A question on global job satisfaction is present in the survey: 'On a 1 to 10 scale, how satisfied are you with your job?'. The satisfaction levels for several specific job aspects were also measured.

The following questions were posed to specifically collect the feelings of graduates about their job-education consistency:

- a) Necessity of degree: 'For serving your current job, (i) the university degree you hold is specifically required; (ii) a graduate from any major could obtain similar results; (iii) a university degree is not necessary, a high school degree could suffice; (iv) a qualification lower than high school could suffice.'
- b) Skill exploitation: 'To what degree can you exploit your professional skills at work? (i) Not at all; (ii) Not much; (iii) Quite; and (iv) Very much.'

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- c) Adequacy of professional background: 'All in all, on a 1 to 10 scale, how adequate for your job is the professional background you achieved at university?'
- d) Coherence with studies: 'All in all, on a 1 to 10 scale, to what degree does your job cohere with the education you achieved at university?'
- e) Forma mentis: 'To what degree can you exploit at work the 'forma mentis', that is the comprehensive discipline knowledge deriving from education in a specific major? (i) Not at all; (ii) Not much; (iii) Quite; and (iv) Very much.'

The response rate was 94.3% 6 months after graduation, 91.4% after 12 months, and 83% after 36 months (Table 1); 2,436 graduates answered the survey and were employed 36 months after graduation. To our purposes, we refer only to the employed graduates at their first job or at a different job if they already worked during their studies. In total, the analysed sample size was  $n = 2,046$ .

[Table 1 here]

The final sample was mainly composed by women (57.4%). The study programmes in Engineering and in Humanities are-were the most represented faculties (17.6% and 17.2%, respectively). The third most-represented faculty in terms of graduates is-was Science (12.8%), and the remaining faculties each accounted for about 5-7% of graduates; people from the Law (3.3%) and Veterinary (2.6%) programmes represented the smallest proportions of graduates.

### 2.23. Structural equation modelling

Structural Equation Modelling (SEM) is the statistical approach we adopted for data analysis. It is a general technique aimed at evaluating the consistency of the collected data with a substantive theory. It is particularly useful for studying the relationships among latent constructs, to be specified a priori and, usually measured through a multiplicity of indicators (Bollen, 1989).

A general SEM is specified as:

$$\begin{aligned} \eta &= B \eta + \Gamma \zeta + \varsigma \\ y &= A_y \eta + \varepsilon \\ x &= A_x \zeta + \delta, \end{aligned} \quad (1)$$

where  $\eta$  is the vector of latent endogenous variables,  $\zeta$  is the vector of latent exogenous variables, and  $y$  and  $x$  are vectors of observed variables;  $B$  (where the elements in the main diagonal are set to 0) and  $\Gamma$  are the matrices of parameters to be estimated in the so-called 'structural equation', and  $A_y$  and  $A_x$  are the matrices of factor loadings in the 'measurement equations' of model (1);  $\zeta$  is the vector of errors in the structural equation, and  $\varepsilon$  and  $\delta$  are the vectors of errors in the measurement equations.

Such a model allows the separation of the total effect of a causal variable into direct and indirect effects in order to better understand the mechanism through which that variable affects the outcomes. *direct-Direct* is the effect of a variable not mediated in the model by any other variables, *indirect* is its effect mediated by other variables, and *total* is the overall causal relationship between that variable and other (latent or manifest) variables.

The usual approach to estimate model parameters in SEM is the maximum likelihood (ML) solution, even though other estimation procedures can be adopted. Among them, the Full Information Maximum Likelihood (FIML) algorithm, performed using SAS software (SAS Institute Inc., 2011), was used to estimate our final model. We opt for an FIML solution because the information on parents' level of education was not collected for students who graduated in 2007. ~~Indeed~~, FIML is a model-based method for estimating parameters in the presence of missing data. Strictly speaking, it is not an imputation method, since it does not impute missing values into newly created data sets, but provides parameter estimates derived from the available data as well as implied values of the missing data (Arbuckle, 1996). This estimation procedure provides roughly unbiased estimates, particularly with small sample sizes.

The traditional measure for evaluating the overall model fit in SEM is provided by the chi-square statistics. Since severe shortcomings are associated with its use (Kline, 2005), a variety of alternative goodness-of-fit indices have been proposed. There is still disagreement among researchers about the application of these alternative statistics, but a good practice is to reporting a variety of indices (Boomsma, 2000): one should always be the Standardized Root Mean Square Residual (SRMR; Hu and Bentler, 1999); another could be one among the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI) or the Goodness of Fit index (GFI).

The SRMR is a measure of the mean absolute correlation residual; it computes the overall difference between the observed and the predicted correlations. Its main advantage is the lack of any distributional assumption of the outcome variables. SRMR ranges from 0 to 1, where 0 means a perfect model fit. According to Hu and Bentler

(1999)'s ~~rule of thumb~~, SRMR values lower or equal to 0.08 can be considered acceptable.

RMSEA is a popular fit statistic because of its sensitivity to the number of estimated parameters in the model. This index basically follows a non-central chi-square distribution; a value of 0 indicates the *best fit*, even though this does not necessarily mean the *perfect fit*. Most SEM researchers agree on a cut-off value close to 0.06 (Hu and Bentler, 1999) or 0.07 (Steiger, 2007). Moreover, a confidence interval around the value can be specified; in a well-fitting model the lower bound of the 90% confidence interval should be close to 0, while the upper bound should be lower than 0.10 (Browne and Cudeck, 1993).

In SEM applications, some fit indices (i.e. GFI) are undefined under the FIML procedure; even though several other popular fit statistics can ~~be still~~ be computed (Enders, 2001).

#### 2.4. The analytic model

To measure the educational outcomes that are the focus of our analyses, two latent variables were defined through confirmatory factor analysis: job-major match and job satisfaction. The indicators to measure job-major match are: necessity of the achieved degree (its standardized factor score, [ $sfs$ ], equals 0.589), coherence with studies ( $sfs = 0.811$ ), *forma mentis* (0.560), and adequacy of professional background (0.586). Job satisfaction is measured by: overall job satisfaction (0.751), satisfaction for professionalism (0.710), satisfaction for cultural interests (0.807) and skill exploitation (0.563). Job-major match and job satisfaction are then affected by individual and social characteristics of graduates, as well as their educational paths. Individual and social characteristics of graduates and their university paths are inserted in the model as explanatory variables of job-major match and job satisfaction

~~Figure 1 represents both the structural and measurement equations of the SEM model. The structural model follows a logical and temporal structure: it starts with the choice of high school programme (*liceo* [4] vs. other school types), which may depend on gender and social capital. Parental level of education (both father and mother) and professional activity are assumed as measures of social capital as a latent variable.~~

~~The second step of the model is given by the final grade in high school, which may depend on gender, social capital and high school programme. After high school, young people interested in university studies proceed to choose a course of study (faculty), which in turn also could depend on gender, social capital, high school programme and~~

final grade. The final grade for the university degree may depend again on gender, social capital, high school programme and final grade, and the faculty (school within the university) attended.

~~According to the literature reviewed in the Introduction,~~ The theoretical model behind our analysis is based on the literature reviewed in the Introduction and follows a logical and temporal structure, that is summarised in Figure 1.

Social capital is set at the beginning of the individual educational pathway. ~~The~~ Parental level of education (both father and mother) and their professional activities are assumed as measures of social capital as a latent variable. Since Italy shows a low intergenerational social mobility, we might expect a positive relationship between parental socio-economic status and high school choice (~~gymnasium versus all other types of schools~~), as well as social capital and final high school grade. Therefore, gender and social capital are assumed to affect high school choices, while gender, social capital, and high school type are the main determinants of the final high school grade. Since gymnasium is an academic-oriented high school type in Italy, its educational standards are expected to be higher than those of the other high schools; as a result, ~~the~~ gymnasium final grade is expected to be lower than the grade obtained by ~~the~~ students who attended a professional or training system.

The next step of the educational path is the faculty choice, ~~that~~ which is assumed to depend on gender, social capital, high school type, and final high school grade ~~and~~; the same variables, together with the attended university course of study, affect in turn the final degree grade. As a consequence of the low intergenerational social mobility trait that characterises Italy, ~~the~~ higher the social capital ~~the most likely~~ results in students most likely attending elitist and historical faculties (such as Law, Medicine, Humanities), ~~whilst these students are less likely~~ ~~they~~ choose other ~~and~~ less traditional university schools.

~~On the one hand,~~ Although we might ~~think~~ ~~the~~ expect that a higher ~~the~~ high school grade will result in a ~~the~~ higher ~~the~~ university grade. ~~On the other hand,~~ because of the university-oriented training provided by the gymnasium, a positive relationship between gymnasium attendance and university degree grade is also expected.

For graduates who found a job, the job-major match may depend on gender, high school programme and its final grade, major and level (bachelor or master) of the attended study-university programme, and university-degree final grade. ~~In this last equation,~~ social capital does not have a direct effect on job-major match. ~~As highlighted in the Introduction,~~ social capital is assumed to affect the job-major match only indirectly ~~job-major match~~.

Finally, we hypothesize that job satisfaction may be directly affected by the same variables affecting the consistency between job and major, and also by the social capital and by ~~In the end, we~~ therefore hypothesize that job satisfaction may be affected by the same variables defined as explanatory variables investigating the consistency between job and major, plus the latent variable 'job-major match' itself. ~~We assume that social capital may have also direct effects on job satisfaction, because we hypothesize that graduates could find more satisfactory jobs by leveraging social relations, which are generally supposed to be richer and more extensive for parents with higher education and better occupations.~~ We also assume a direct effect of social capital on job satisfaction. ~~Indeed, s~~ Social capital may be a measure of the networking capabilities of a graduate and his or her family by leveraging social relations, which are generally supposed to be richer and more extensive for parents with higher education and better occupations, graduates are more likely to find more satisfactory jobs.

The model is identified according to the recursive rule with no correlated errors in the endogenous variables (Bollen, 1989). The notation and specification of the SEM model are shown in Appendix 1.

[Figure 1 here]

### 3. Results

#### 3.1. Job-education match

According to 44.2% of graduates, the degrees they hold are necessary for performing their current job, while 38.1% of graduates believe that any university degree could suffice for their activity (Table 42).

A high variability among disciplines characterizes these data: necessity of the ~~owned-awarded~~ degree ranges from 30.5% for graduates in the humanities area [51] to 57.2% for workers in technical or scientific areas. The interval is even higher if faculties (not shown) are considered. ~~at~~ At one extreme, only 12.7% of graduates in Political Science and 18.6% in Humanities stated that the gained degree was necessary; at the other extreme, 94.0% of graduates in Law and 69.3% in Pharmacy stated that the degree they ~~have had~~ was required for their jobs. A remarkable one out of every four graduates in the Humanities area declared that a high school degree would ~~have~~ sufficed for their current job.

The slight disadvantage of female graduates with respect to males in job-education consistency is mainly attributable to the higher percentage of women graduating with concentrations in the Humanities. The analysis stratified by faculty (not shown) often reveals no clear pattern of mismatch between male and female graduates: ~~sometimes~~ Sometimes women seem advantaged over men ~~as for~~ with regard to consistency (study programmes in Pharmacy or Education), in other cases (in particular, Agriculture and Economics), men possess this advantage.

~~As expected, the job~~ Job-education mismatch is higher for graduates who achieved a bachelor's degree: ~~only~~ only 30.2% of them gained a job where the achieved degree ~~was~~ is necessary, ~~and, on the opposite side, while~~ and 28.5% ~~can~~ could be considered over-educated. Conversely, more than half of those with master's degrees held a degree appropriate for the job they ~~are~~ were in, and only one out of ten accepted a job for which the possession of a high school degree would have sufficed.

Graduates with better high school and academic performance seem to have jobs that match ~~with~~ their educational levels. Final grades for both high school and university were significantly higher ( $p < 0.0001$ ) for people who found a job that matched ~~up with~~ their higher studies.

~~Given the large heterogeneity in grading practice among the faculties (the lowest average grade was 96.3 for Statistics and the highest was 108.3 for Psychology), The the final university grade seems not to is in better agreement better agree with the level of job-major consistency when the analysis is stratified by faculty (not shown:). Graduates in Economics showed a mean grade of 91.3 if a high school diploma was sufficient for their job and a mean of 100.7 if their degree was strictly necessary for their chosen work. Similar results can be observed for Pharmacy (mean values were 90.0 and 100.2, respectively), Humanities (101.0 and 106.4), Engineering (97.3 and 103.2), Statistics (90.7 and 98.8), and Political Science (95.0 and 103.8). final grades vary from 100.2 (for no consistency at all) to 102.9 (for full match), but the analysis of grades suffers from a large heterogeneity in grading practice among the faculties (not shown): the lowest average grade is 96.3 for Statistics and the highest is 108.3 for Psychology. Graduates in Economics show a mean grade of 91.3 if a high school diploma would suffice for their job, and a mean of 100.7 if their degree is strictly necessary for their chosen work. Similar results can be observed for Pharmacy (mean values are 90.0 and 100.2, respectively), Humanities (101.0 and 106.4, respectively), Engineering (97.3 and 103.2), Statistics (90.7 and 98.8) and Political Science (95.0 and 103.8).~~

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From Table 42 it is also worth noting that graduates having the right degree for the job ~~they are in~~, or having a job ~~for which~~that required a university degree ~~is required anyway~~, feel more satisfied with their jobs. Work positions matching ~~with~~ the major of the achieved degree involve higher incomes and, for ~~about half the graduates~~more than 40% of graduates, ~~also a~~ job guarantee.

Parents' education is ~~mildly-weakly~~ related to job-education consistency: ~~for~~For jobs that require specific university titles, a clear tendency exists for parents to be more educated, whilst job mismatches are associated mainly with lower parental educational status. It can be hypothesized that, when choosing a university course, highly educated parents are able to direct descendants towards a proper discipline and, after their graduation, activate their own social networks to help their descendants get better jobs.

[Table 42 here]

The necessity of a certain degree at work is highly correlated with coherence between completed studies: the Goodman and Kruskal co-graduation index  $\gamma = 0.671$  is large and significant (95% confidence interval: 0.639-0.702). It is less correlated with indicators of the skills' use: the co-graduation with adequacy of professional background is  $\gamma = 0.467$  (0.423-0.511) and with skill exploitation is  $\gamma = 0.463$  (0.405-0.520). Indeed, skill exploitation could depend on other aspects in addition to job-education match, such as the organisational structure, the number and role of colleagues, the type and level of tasks (the higher the level and the more diversified the tasks, the more restrained the use of strictly technical skills and the wider that of cross-occupational skills for managing and solving problems).

University studies are generally relevant for ~~labour work~~: 24.8% of graduates very frequently use and another 60.6% quite frequently use the skills acquired at university (Table 23).

The use of superior skills is highly associated with job satisfaction: ~~in~~On a ten-point scale, satisfaction ranged ~~s~~ from 5.5 of 10 if skills are not used to 8.1 if they are repeatedly used. From Tables 42 and 23 we can deduce that 'over-educated' graduates are less satisfied with their jobs, in concordance with the current literature.

[Table 3 here]



### 3.2. Pathways from social and educational capital to job satisfaction

We now investigate the pathways from graduates' social capital to job satisfaction, moving through high school and university performance. Results are reported in Tables 34 to 40.

The null hypothesis of the chi-square test for evaluating the model fit is rejected. However, model residuals are far from normality. Thus, the SRMR index, which is equal to 0.06, seems to be more apt to evaluate the model's goodness of fit; it is equal to 0.06, has a lower value than the cut-off reported by Hu and Bentler (1999). In addition, the RMSEA statistic is 0.099, a value somewhat larger than the cut-off suggested by Steiger (2007). However, the upper bound of the 90% confidence interval for RMSEA is equal to 0.101, a value right just beyond the upper bound proposed by Browne and Cudeck (1993). Therefore, taking into account the complexity of the estimated model, its fit to the data seems quite good.

[Table 23 here]

Our analysis begins with family social capital. In this paper, the parental socioeconomic background is evaluated by means of the parents' education and employment activity (Table 34). *Ceteris paribus*, parents' education contributes to descendants' social capital to a greater degree than does parents' occupational status. The role played by fathers is stronger compared to the mothers' contribution. Regardless of the indicators, children acquire stronger social capital according to the strength of the position or condition of their parents (Table 34).

[Table 34 here]

Any higher educational career starts with the choice of what the type of high school to attend (Table 45). As expected, family social capital is crucial in choosing high school type; individuals living in better off and better-educated contexts are significantly inclined to choose a *liceo-high-school-programme-gymnasium* ( $p < 0.010$ ). A significant positive direct effect ( $p = 0.013$ ) may be observed for young females.

[Table 45 here]

The final high school grade is negatively correlated ( $p < 0.010$ ) with *liceo-gymnasium* attendance (Table 56). This is likely, due to the fact that, because in general, educational standards and learning diligence required by the *liceo-school-gymnasium* are

higher than those by other high schools. So, the direct effect of ~~the~~ social capital on the final grade is no longer significant. Social capital affects the high school grade through the attended school type ( $p < 0.010$ ) and it is negative because of lower grades achieved by students at ~~liceo schools~~ gymnasium. Other things being equal, women get better marks at the end of high school than men ( $p < 0.010$ ).

[Table ~~56~~ here]

The next step in a high school graduate's career is the choice of the study programme and the university to attend (Table ~~67~~). ~~Other things being equal,~~ The high school final grade plays a significant ( $p < 0.010$ ) role in the study programme choice—positive for Economics, Engineering, and Law, negative for the remaining faculties but the Humanities and Statistics (for which it is neutral).

Moreover, having attended a ~~liceo programme~~ gymnasium affects directly and positively the choice of a study programme at the faculties of Engineering, Law, Pharmacy and Sciences ( $p < 0.010$ ), and negatively the choice of enrolment in all other faculties but Humanities, Psychology and Statistics. Indirect effects are always often in the opposite direction than direct ones (because the indirect effect passes through the high school final grade, ~~that which is lower for liceo gymnasium) with the exception of attendance of the Pharmacy and Economics programmes (for which indirect effects of the high school type follow the same direction of the direct effect—positive for the former faculty and negative for the latter one) and Humanities and Statistics programmes (both direct and indirect effects are not significant).~~

Women are inclined to choose programmes in Education, Pharmacy, Psychology, or Humanities (the total effects are significant:  $p < 0.010$ ), ~~even though indirect effects are negative (Education and Psychology) or not significant (Pharmacy and Humanities).~~ This is a new demonstration that, in comparison to men, young women tend to choose liberal arts and health programmes in larger numbers (the faculty of Medicine did not contribute to the survey, but two-thirds of its students are women).

The role of ~~family~~ social capital on the choice of the study programme is noteworthy: the more substantial the social capital, the larger the tendency to choose Engineering or Law programmes. The opposite applies to the Education and Agriculture programmes, which means that the higher the parents' status the less likely students are to enrol in these faculties after graduating from high school.

[Table ~~67~~ here]

A further step in one's higher educational career is graduation (Table 78). Other factors being equal, the final grade of women is higher than that of men (analogously to high school). Social capital still shows important effects, that are stronger ( $p < 0.010$ ) ~~from when~~ indirect ~~slants~~ and weaker ( $p = 0.043$ ) when direct ~~directly~~. The sum of these two effects is positive and significant with ~~the~~ stronger ~~the~~ family social capital resulting in a ~~the~~ higher ~~the~~ final university grade ( $p < 0.010$ ). Both variables representing high school attendance (type of school and final grade) mutually agree: a positive and significant direct effect is opposed to a negative and significant indirect effect. Merging the two effects, we obtain a positive and significant overall effect of the basic high school descriptors on marks at graduation.

Apart from Pharmacy (which is not statistically different with respect to Veterinary Medicine), faculties show significant direct effects on the final mark: students in Economics or Statistics get the lowest grades at graduation, while the highest are in Education, Humanities and Psychology. Hence, in interpreting the effectiveness of the study programme on graduates' external outcomes, it will be necessary to mentally stratify the final marks by faculty.

[Table 78 here]

~~The effect of gender on the graduation grade is positive and significant, all other variables kept constant. Our findings about the effects of gender, faculty and high school attendance are consistent with the international literature (Hossler and Stage, 1992; Trusty, 2004).~~

The last stage of our analysis is to investigate if and how the human (that is, the merge of social and educational) capital accumulated by these graduates affects job quality, as measured by job-major match and job satisfaction.

We sketched in Figure 1 that ~~the~~ social capital indirectly affects ~~indirectly~~ the gap between major and skills used by graduates at work, but, according to the estimated model, this relationship is not significant (Table 89). The high school final grade comes outshines as a good predictor of a student's ability, rather than the graduation final grade: both the direct and the indirect effects of the high school grade on job-major consistency are significant ( $p < 0.010$ ), while the effects of the final grade are not, ~~once the former is in~~. This is not a surprise ~~and sheds light on the debate about when the destiny of graduates was written. In particular, is the university graduation mark alone able to effectively discriminate graduates who can use their major-specific skills at~~

work from others who cannot? Probably not, as evidence exists of a wide heterogeneity across faculties as well as homogeneity within faculties in terms of the final grade. As anticipated in Section 3.1, large proportions of students in liberal arts, or in education or psychology programmes, attain top grades, whilest in other programmes (in particular, in economics or statistics) the average grades are rather low.

Thus, the 'filter' of the grading styles of university programmes downgrades the predictive capacity of university performance as measured by the final mark; it is the The ~~hee~~-gymnasium attendance together with the high school final mark that remains a good predictor of a graduate's use of major-specific skills. To support this view, we can observe from Table 89 shows that the effects of hee-gymnasium attendance and those of the attended faculty work in different directions with respect to job-major consistency; the effects of the former attendance are positive and indirect ( $p=0.044$ ), and no direct effects are significant, whilest the indirect effects of the latter-attended faculty are not significant (for Engineering, Sciences and Statistics programmes even the direct and total effects are not significant). Other aspects being the same, and with respect to Veterinary Medicine as a measurement baseline, the attendance of a programme in Agriculture, Political Science, Sociology-Humanities, or Psychology has a negative direct effect on the consistency between university major and the achieved skills use, while a the opposite relationship positive effect applies for programmes in the faculties of Economics, Pharmacy, Education, Law, and Engineering.

[Table 89 here]

Hence, the choice of the faculty is the crucial step in one's educational pathway because it may affect in a positive or a negative manner the education that graduates can use to their advantage in the labour market. The match between education and work activity is also lower with lower degree levels (bachelor versus master degree).

As expected, if job skills match with the university major, even job satisfaction will be large-high ( $p<0.01$ ), all other things being the same (Table 910). However, for some majors or for graduates entering a sluggish labour market, finding any job could be cause for satisfaction. Nevertheless, job satisfaction has a multidimensional nature and job-major match represents just one of the facets: earning, occupational position, worked hours, contract terms, physical and social work context, and task autonomy are other relevant aspects of this complex concept. In this work we do not control for most of these personal and contextual aspects, because our goal is not to investigate job satisfaction causes or educational returns on job satisfaction. The relationship between

expectations from and satisfaction with a job can explain why the direct effect of the bachelor's degree on job satisfaction is positive and significant ( $p < 0.010$ ), signalling that bachelor-graduates with bachelor's degrees are more satisfied with their job than those with master's degrees-ones. This inverse -than-of what is expected relationship is likely due to the lower expectations of lower titled graduates.

On the other hand, if mediated by job-major matching, the job satisfaction of a bachelors graduate is lower than that of a master's graduates; bachelors-Bachelors are less satisfied because of lower job-major matching (indirect effect); but more satisfied because of lower expectations (direct effect). The merge of the direct and indirect effects results in ~~the~~ lack of total effects of the degree level on job satisfaction. This finding can be considered a valuable example of the advantages provided by our approach in disentangling direct from indirect effects.

In relation to job satisfaction, the university final grade is not significant, while the high school final grade still presents a positive and significant indirect effect ( $p < 0.010$ ). No faculty shows a negative and significant direct relationship with job satisfaction; Only programmes in Agriculture, Education, Political Sciences, Psychology, and Humanities show significant direct effects and; other than programmes in Education, all of these also have a negative indirect effect. In order to understand such results, it is to be noted that the labour expectations of graduates from the liberal arts or social programmes are low, and often ~~they~~ these graduates might feel that ~~even~~ just finding a job was amazing, regardless of the low consistency between their job activities and their past studies. After controlling for the different stages of the educational career, social capital vanishes as a covariate of job satisfaction.

~~In the end, e~~ Even if women perform better than men with respect to both ~~to~~ school and university outcomes, their job-major consistency is lower than that of males, both directly ( $p = 0.026$ ) and indirectly ( $p = 0.017$ ). This may mean that jobs gained by women are less qualified than those of equally educated men. Women are also less satisfied than men with their jobs ( $p = 0.019$ ), ceteris paribus.

[Table 910 here]

#### 4. Conclusions and discussion

A major conclusion of our analyses is that the proportion of graduates from Padua University with more skills than required by their job is lower than the percentages usually detected in Italy and Europe. Padua is located in northeastern Italy, a geographical region whose economic system, unlike that of the rest of Italy, is affected

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by the presence of 'local production systems'. These areas are characterised by high concentrations of small and medium-sized firms in manufacturing and service activities, high levels of innovation, and a strong relationship with universities and research centres.

There is evidence that graduates' occupational destiny is strongly affected by the choice of the type of high school and university study programme. The reason is strictly social. For any individual, there is a common thread from family social status to high school and performance, from high school's distinctive features to a higher educational programme and performance, and from that on to work. Our results clearly show that in Italy the type of high school is a crucial step in the individual educational pathway and might shape the future professional career. The counselling and orientation activities provided by both teachers and the family environment assume a key role in the educational career of each youth. These activities have to be carried out at early stages of any educational path, probably earlier than expected. The choice of the high school is likely driven by parents, relatives, and sometimes youths' friends. This means that social capital strongly determines one's outcomes until the end of high school. Policies should be devoted to enhance both the mentoring support of the 'educators', according to the skills, abilities, and expectations of their students, and the conscious parental involvement in their children's high school choices. This finding strongly supports other conclusions for the Italian case. Checchi (2000) argued that 'the educational career is significantly predetermined by the choice of the secondary school undertaken at the age of 14, mainly by the family'; Checchi and Jappelli (2004) claimed that 'since parents make decisions on the basis of their perception of school quality, it would be important to improve parents' information about school characteristics and students' performance in later schooling'.

Regarding university studying, it is evident that the match between education and work activity is lower with the lowest degree level, and this could signal a failure of the bachelor programme in Italy. Bachelor studies are supposed to have a more occupational-oriented character than the master ones; hence, bachelor graduates should be more likely to find a job qualified as matched. It is likely that the current characteristics of the Italian bachelor degree do not achieve the purposes behind this branch of university reform. Policy should be devoted to fill in the current gap in order to really improve training provided by this low degree level.

Our mismatch rate ranged between 17.7% (overt irrelevance of the university title) and 55.8% (included 38.1% of cases for which any university degree would be equally valid). We are tempted to state that overeducation is an inappropriate term and, as

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claimed by Caroleo and Pastore (2013), there is a skill mismatch due to ‘wrong’ abilities. In effect, skills mismatch and low job satisfaction are greater for majors of a nontechnical nature (Political Science, Humanities, and Psychology). Thus, the university major is pivotal in determining the graduates’ perception of being over- or undereducated and of being satisfied with the job they are in. The different degrees are relevant signals of the skills held by graduates, possibly affecting an individual’s chance of finding a qualified job.

We conclude that it would be beneficial for a higher educational institution to both appraise which jobs are the ‘graduate jobs’ (the job market share for graduates) and to inform students of this appraisal at any stage of their lives—before they choose a higher educational programme, when they are in it, and at its end. On the other hand, students should and can change such a rather deterministic social chain between social capital, high school choice and results, higher educational choices and final grade, and occupation. A student might be able to design his/her own investments in higher education and long-term labour strategies. This calls for strategic counselling at the very early stages of choosing a path through higher education. This type of counselling, which should involve a forecast of the occupational opportunities in a plausible future, is likely to enhance students’ positive attitudes towards choosing a university path that is labour-oriented, even if this purpose may be weakened if labour markets are poor.

#### Notes

[1] Disciplinary areas are: Humanities (Humanities Psychology, Education), Social Science (Economics, law, Political Science, Statistics), Life Sciences (Veterinary Medicine, Pharmacy, Agriculture), Technical and Scientific (Engineering, Science).

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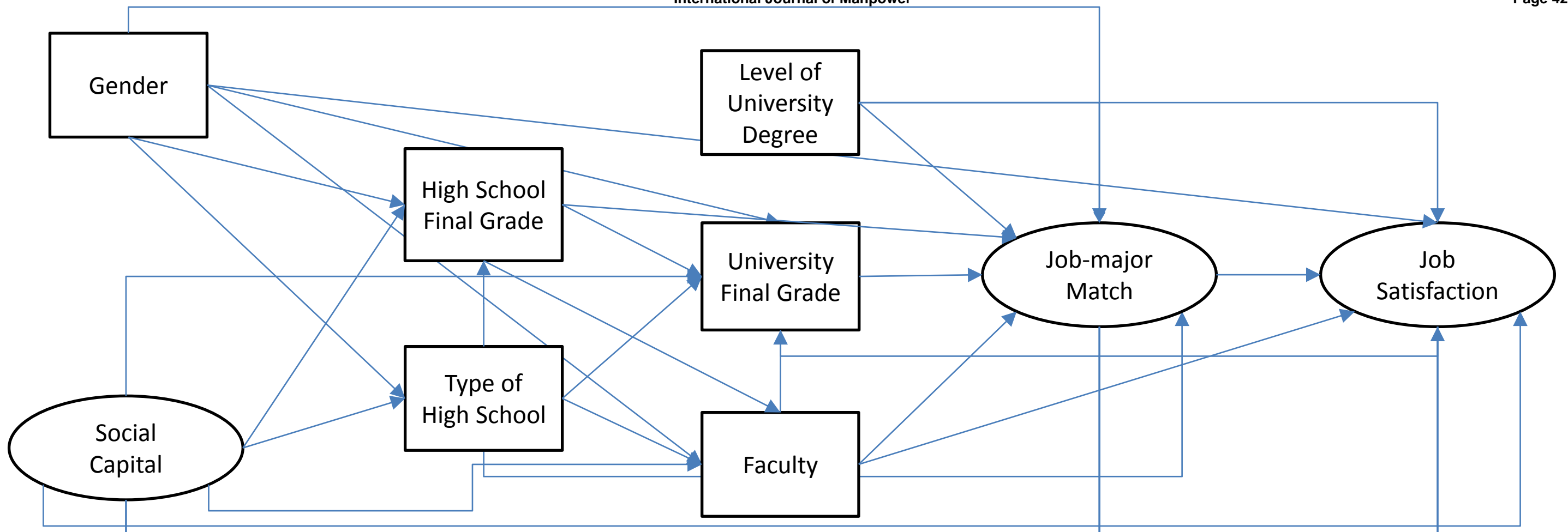
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Figure 1: Structural Equation Model analysing education effectiveness

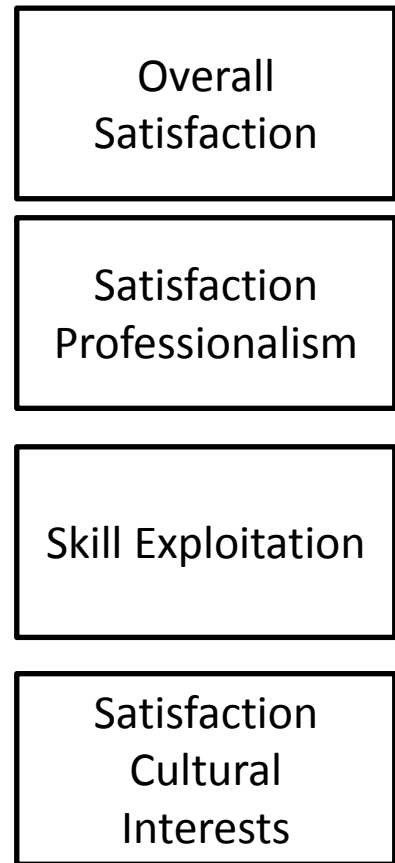
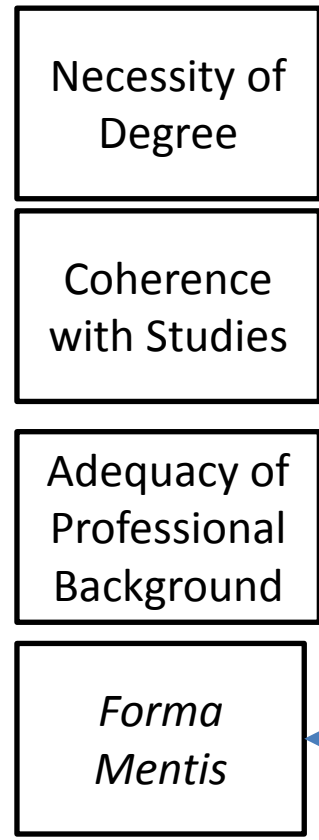
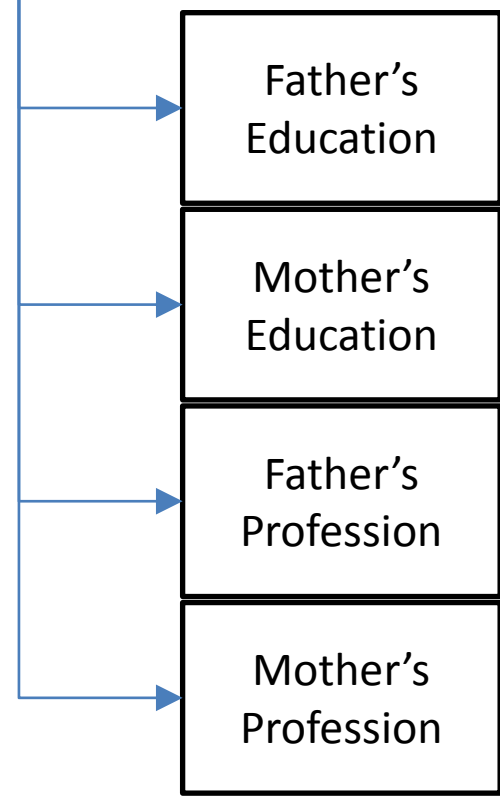
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Structural Model

Measurement Model



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**Table 1** Sample size and response rate at every wave of the survey.

	Initial sample size	Enrolled again <sup>a</sup>	Actual sample size	Non respondents	Interviewed	Response rate <sup>b</sup>	Employed
6 months	4,769	802	3,967	225	3,742	94.3%	2,443 (65.3%)
1 year	3,742	274	3,468	299	3,169	91.4%	2,426 (76.6%)
3 years	3,443	151	3,292	558	2,734	83.0%	2,436 (89.1%)

<sup>a</sup> People excluded from the initial sample because, after the graduation, they enrolled again into a University course longer than one year.

<sup>b</sup> Interviewed/actual sample size

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**Table 2** Distribution of employed graduates according to the necessity of their degrees for their job functions and other characteristics

	<i>The degree is necessary (%)</i>	<i>Any degree suffices (%)</i>	<i>High school suffices (%)</i>	<i>Even lower education (%)</i>	<i>Total (%)</i>	<i>Sign.</i>
<b>All graduates (n=2,042)</b>	<b>44.2</b>	<b>38.1</b>	<b>16.7</b>	<b>1.0</b>	<b>100</b>	
<b>Graduates' characteristics</b>						
<i>Male (n=870)</i>	47.6	38.1	13.9	0.5	100	0.0017
<i>Female (n=1,172)</i>	41.7	38.1	18.8	1.4	100	
<i>Father's level of education:</i>						
<i>Low (n=538)</i>	41.1	35.9	21.6	1.5	100	0.0041
<i>Medium (n=541)</i>	42.9	39.7	16.1	1.3	100	
<i>High (n=231)</i>	51.1	37.7	11.3	0	100	
<i>Mother's level of education:</i>						
<i>Low (n=597)</i>	42.9	33.8	21.8	1.5	100	0.0035
<i>Medium (n=554)</i>	43.9	40.6	14.4	1.1	100	
<i>High (n=166)</i>	45.8	42.2	12.1	0	100	
<i>Bachelor degree (n=779)</i>	30.2	41.3	27.1	1.4	100	<0.0001
<i>Master degree (n=1,263)</i>	52.9	36.1	10.3	0.7	100	
<i>Humanities (n=649)</i>	30.5	42.1	25.7	1.7	100	<0.0001
<i>Social sciences (n=434)</i>	38.2	47.0	14.5	0.2	100	
<i>Life sciences (n=338)</i>	54.4	28.4	15.4	1.8	100	
<i>Technical scientific (n=621)</i>	57.2	33.0	9.5	0.3	100	
<i>Years for getting degree – Bachelor's (mean)</i>	4.8	4.8	4.9	4.5	4.8	0.648
<i>Years for getting degree – Master's (mean)</i>	3.4	2.9	3.0	2.6	3.2	<0.0001
<i>Final grade (mean)</i>	102.9	102.3	100.5	100.2	102.2	<0.0001
<i>High school grade (mean)</i>	84.9	82.3	81.2	78.9	83.3	<0.0001
<b>Job characteristics</b>						
<i>Hourly income (Euros, mean)</i>	7.8	7.6	6.7	6.3	7.5	<0.0001
<i>Overall job satisfaction (mean)</i>	7.6	7.5	6.8	6.4	7.4	<0.0001
<i>% permanently employed</i>	41.2	44.9	39.0	25.0	42.1	0.091
<i>% self-employed</i>	9.6	5.8	6.2	5.0	7.5	0.017

Notes: Parents' educational data have been collected only for 64% of graduates.

**Table 3** Characteristics of employed graduates and their jobs according to skills' exploitation

	Skills' exploitation				Total (%)	Sign.
	<i>A lot (%)</i>	<i>Quite well (%)</i>	<i>Not much (%)</i>	<i>Not at all (%)</i>		
<b>All graduates (n=2,046)</b>	<b>24.8</b>	<b>60.6</b>	<b>12.6</b>	<b>2.0</b>	<b>100</b>	
<b>Graduates' characteristics</b>						
<i>Male (n=872)</i>	27.4	61.3	10.6	0.7	100	<0.0001
<i>Female (n=1,174)</i>	22.9	60.1	14.0	3.0	100	
<i>Father's level of education:</i>						
<i>Low (n=539)</i>	24.3	58.6	14.7	2.4	100	0.037
<i>Medium (n=543)</i>	25.1	62.2	11.2	1.5	100	
<i>High (n=232)</i>	31.5	58.6	7.3	2.6	100	
<i>Mother's level of education:</i>						
<i>Low (n=597)</i>	23.9	60.0	13.7	2.3	100	0.055
<i>Medium (n=557)</i>	25.1	62.1	11.1	1.6	100	
<i>High (n=167)</i>	34.7	55.1	7.8	2.4	100	
<i>Bachelor degree (n=782)</i>	22.6	60.1	14.8	2.4	100	0.031
<i>Master degree (n=1264)</i>	26.2	60.9	11.2	1.7	100	
<i>Humanities (n=651)</i>	23.8	58.1	15.4	2.8	100	0.027
<i>Social sciences (n=434)</i>	24.2	61.3	12.7	1.8	100	
<i>Life sciences (n=340)</i>	25.6	58.2	13.8	2.3	100	
<i>Technical scientific (n=621)</i>	25.9	64.1	8.9	1.1	100	
<i>Years for getting degree – Bachelor's (mean)</i>	4.7	4.9	4.8	4.7	4.8	0.726
<i>Years for getting degree – Master's (mean)</i>	3.2	3.2	3.2	3.3	3.2	0.974
<i>Degree grade (mean)</i>	102.6	102.1	102.0	102.5	102.2	0.642
<i>High school grade (mean)</i>	83.8	83.7	81.2	76.9	83.2	0.0002
<b>Job characteristics</b>						
<i>Hourly income (Euros, mean)</i>	7.9	7.5	7.1	6.6	7.5	<0.0001
<i>Overall job satisfaction (mean)</i>	8.1	7.5	6.2	5.5	7.4	<0.0001
<i>% permanently employed</i>	42.3	42.9	39.3	34.1	42.1	0.526
<i>% self-employed</i>	10.0	7.5	3.9	0.0	7.5	0.005

**Table 4** Factor loadings of the latent variable 'social capital'

Indicator	Estimate
Father's occupation: high qualification	2.329*** (0.306)
Father's occupation: low qualification	-3.762*** (0.411)
Mother's occupation: high qualification	0.758*** (0.132)
Mother's occupation: low qualification	-1.914*** (0.240)
Mother's occupation: housewife	-2.018*** (0.311)
Father's educational level: high	4.268*** (0.465)
Father's educational level: low	-6.044*** (0.645)
Mother's educational level: high	3.281*** (0.369)
Mother's educational level: low	-6.284*** (0.667)

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1.  
Standard errors in parentheses.

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**Table 5** Total, direct and indirect standardised effects on the choice of high school

Variable	Total	Direct	Indirect
Female	0.054** (0.021)	0.054** (0.021)	--
Social capital	0.384*** (0.024)	0.384*** (0.024)	--

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1.  
Standard errors in parentheses

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**Table 6** Total, direct and indirect standardised effects on high school final grade

Variable	Total	Direct	Indirect
Female	0.091*** (0.022)	0.095*** (0.022)	-0.004* (0.002)
Social capital	0.008 (0.028)	0.037 (0.031)	-0.028*** (0.010)
Gymnasium attendance	-0.074*** (0.025)	-0.074*** (0.025)	--

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1.  
Standard errors in parentheses

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**Table 7** Direct, indirect and total standardised effects of graduates' characteristics  
on the choice of the study programme, by faculty

	Variable	Total	Direct	Indirect
Agriculture	Female	-0.1677*** (0.0215)	-0.1573*** (0.0216)	-0.0105 (0.0032)***
	Social capital	-0.0847*** (0.0270)	-0.0610** (0.0300)	-0.0238** (0.0097)
	<i>Gymnasium</i> attendance	-0.0544** (0.0246)	-0.0602** (0.0246)	0.0058** (0.0025)
	High school final grade	-0.0792*** (0.0218)	-0.0792*** (0.0218)	--
Economics	Female	0.0334 (0.0221)	0.0266 (0.0222)	0.0068* (0.0035)
	Social capital	0.0396 (0.0274)	0.0558* (0.0304)	-0.0162 (0.0101)
	<i>Gymnasium</i> attendance	-0.0520** (0.0250)	-0.0445* (0.0249)	-0.0075** (0.0030)
	High school final grade	0.1019*** (0.0220)	0.1019*** (0.0220)	--
Education	Female	0.1752*** (0.0213)	0.1938*** (0.0210)	-0.0186*** (0.0045)
	Social capital	-0.1712*** (0.0264)	-0.1255*** (0.0292)	-0.0456*** (0.0101)
	<i>Gymnasium</i> attendance	-0.1059*** (0.0242)	-0.1159*** (0.0240)	0.0100*** (0.0037)
	High school final grade	-0.1357*** (0.0212)	-0.1357*** (0.0212)	--
Engineering	Female	-0.03352*** (0.0196)	-0.3585*** (0.0191)	0.0233*** (0.0545)
	Social capital	0.0994*** (0.0257)	0.0725*** (0.0279)	0.0270** (0.0106)
	<i>Gymnasium</i> attendance	0.0494** (0.0234)	0.0655*** (0.0228)	-0.0160*** (0.0056)
	High school final grade	0.2181*** (0.0199)	0.2181*** (0.0199)	--
Law	Female	0.0312 (0.0221)	0.0171 (0.0220)	0.0140*** (0.0038)
	Social capital	0.1127*** (0.0272)	0.0790*** (0.0302)	0.0337*** (0.0100)
	<i>Gymnasium</i> attendance	0.0779*** (0.0248)	0.0855*** (0.0247)	-0.0076** (0.0030)
	High school final grade	0.1035*** (0.0219)	0.1035*** (0.0219)	--
Humanities	Female	0.2165*** (0.0211)	0.2200*** (0.0212)	-0.0035 (0.0026)
	Social capital	-0.0172 (0.0268)	-0.0056 (0.0299)	-0.0116 (0.0095)
	<i>Gymnasium</i> attendance	-0.0281 (0.0244)	-0.0297 (0.0245)	0.0015 (0.0017)
	High school final grade	-0.0210 (0.0217)	-0.0021 (0.0217)	--
Pharmacy	Female	0.0691*** (0.0220)	0.0700*** (0.0219)	-0.0009 (0.0043)
	Social capital	0.0299 (0.0274)	-0.0192 (0.0302)	0.0491*** (0.0104)
	<i>Gymnasium</i> attendance	0.1361*** (0.0246)	0.1297*** (0.0246)	0.0064** (0.0027)
	High school final grade	-0.0873*** (0.0219)	-0.0873*** (0.0219)	--
Political Sciences	Female	0.0104 (0.0222)	0.0258 (0.0221)	-0.0154*** (0.0040)
	Social capital	-0.0078 (0.0275)	0.0223 (0.0304)	-0.0301*** (0.0103)
	<i>Gymnasium</i> attendance	-0.0664*** (0.0250)	-0.0756*** (0.0248)	0.0092*** (0.0035)

	High school final grade	-0.1247*** (0.0219)	-0.1247*** (0.0219)	---
Psychology	Female	0.1632*** (0.0216)	0.1715*** (0.0216)	-0.0083*** (0.0030)
	Social capital	0.0668** (0.0271)	0.0811*** (0.0301)	-0.0143 (0.0098)
	<i>Gymnasium</i> attendance	-0.0305 (0.0247)	-0.0357 (0.0247)	0.0052** (0.0024)
	High school final grade	-0.0703*** (0.0219)	-0.0703*** (0.0219)	--
Science	Female	-0.0092*** (0.0220)	-0.0997*** (0.0220)	0.0077** (0.0031)
	Social capital	0.0134 (0.0274)	-0.0165 (0.0304)	0.0299*** (0.0098)
	<i>Gymnasium</i> attendance	0.0743*** (0.0248)	0.0771*** (0.0249)	-0.0028 (0.0019)
	High school final grade	0.0384* (0.0221)	0.0384* (0.0221)	--
Statistics	Female	-0.0096 (0.0221)	-0.0048 (0.0223)	-0.0048* (0.0027)
	Social capital	-0.0781*** (0.0274)	-0.0653** (0.0305)	-0.0128 (0.0097)
	<i>Gymnasium</i> attendance	-0.0303 (0.0250)	-0.0328 (0.0250)	0.0024 (0.0019)
	High school final grade	-0.0330 (0.0222)	-0.0330 (0.0222)	--

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1. Standard errors in parentheses.  
Reference: Veterinary medicine.

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**Table 8** Direct, indirect and total standardised effects of graduates' characteristics on university final grade

Variable	Total	Direct	Indirect
<b>Female</b>	0.198*** (0.021)	0.081*** (0.020)	0.117*** (0.016)
<b>Social capital</b>	0.125*** (0.027)	0.051** (0.025)	0.075*** (0.018)
<b>Gymnasium attendance</b>	0.125*** (0.024)	0.172*** (0.020)	-0.047*** (0.015)
<b>High school final grade</b>	0.363*** (0.019)	0.400*** (0.018)	-0.037*** (0.012)
<b>Faculty (Ref: Veterinary Medicine)</b>			
<b>Agriculture</b>	0.081*** (0.018)	0.081*** (0.018)	–
<b>Economics</b>	-0.080*** (0.018)	-0.080*** (0.018)	–
<b>Education</b>	0.126*** (0.018)	0.126*** (0.018)	–
<b>Engineering</b>	0.083*** (0.019)	0.083*** (0.019)	–
<b>Law</b>	0.067*** (0.018)	0.067*** (0.018)	–
<b>Humanities</b>	0.226*** (0.018)	0.226*** (0.018)	–
<b>Pharmacy</b>	-0.001 (0.018)	-0.001 (0.018)	–
<b>Political Science</b>	0.081*** (0.018)	0.081*** (0.018)	–
<b>Psychology</b>	0.285*** (0.018)	0.285*** (0.018)	–
<b>Science</b>	0.064*** (0.018)	0.064*** (0.018)	–
<b>Statistics</b>	-0.072*** (0.018)	-0.072*** (0.018)	–

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1. Standard errors in parentheses

**Table 9** Direct, indirect and total standardised effects of graduates' characteristics on job-major match

Variable	Total	Direct	Indirect
Female	-0.115*** (0.025)	-0.051* (0.026)	-0.064*** (0.017)
Social capital	0.012 (0.016)	–	0.012 (0.016)
<i>Gymnasium</i> attendance	0.060** (0.025)	0.033 (0.024)	0.027** (0.014)
High school final grade	0.157*** (0.024)	0.091*** (0.026)	0.066*** (0.017)
Faculty (Ref: Veterinary Medicine)			
Agriculture	-0.073*** (0.023)	-0.076*** (0.023)	0.003 (0.002)
Economics	0.069*** (0.023)	0.072*** (0.023)	-0.003 (0.002)
Education	0.084*** (0.023)	0.079*** (0.024)	0.004 (0.004)
Engineering	0.035 (0.025)	0.032 (0.025)	0.003 (0.002)
Law	0.047** (0.023)	0.044* (0.023)	0.002 (0.002)
Humanities	-0.258*** (0.023)	-0.266*** (0.023)	0.008 (0.006)
Pharmacy	0.052** (0.023)	0.052** (0.023)	-0.0001 (0.001)
Political Sciences	-0.143*** (0.023)	-0.146*** (0.023)	0.003 (0.002)
Psychology	-0.272*** (0.022)	-0.282*** (0.024)	0.010 (0.008)
Science	-0.009 (0.023)	-0.011 (0.023)	0.002 (0.002)
Statistics	-0.028 (0.023)	-0.025 (0.023)	-0.002 (0.002)
Bachelor degree	-0.186*** (0.022)	-0.186*** (0.022)	–
University final grade	0.034 (0.028)	0.034 (0.028)	–

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1. Standard errors in parentheses

**Table 10** Direct, indirect and total standardised effects of graduates' characteristics on job satisfaction

Variable	Total	Direct	Indirect
Female	-0.057** (0.024)	-0.028 (0.025)	-0.029 (0.021)
Social capital	0.042 (0.028)	0.048 (0.029)*	-0.006 (0.010)
<i>Gymnasium</i> attendance	0.018 (0.018)	–	0.018 (0.018)
High school final grade	0.070*** (0.019)	–	0.070*** (0.019)
Faculty (Ref: Veterinary Medicine)			
Agriculture	-0.017 (0.025)	0.039* (0.022)	-0.055*** (0.017)
Economics	0.038 (0.024)	-0.014 (0.022)	0.052*** (0.017)
Education	0.110*** (0.025)	0.052** (0.022)	0.058*** (0.017)
Engineering	-0.007 (0.026)	-0.031 (0.023)	0.024 (0.018)
Law	0.015 (0.024)	-0.018 (0.022)	0.033* (0.017)
Humanities	-0.083*** (0.025)	0.110*** (0.024)	-0.193*** (0.019)
Pharmacy	0.023 (0.024)	-0.015 (0.022)	0.038** (0.017)
Political Science	-0.060** (0.024)	0.046** (0.022)	-0.106*** (0.017)
Psychology	-0.068*** (0.024)	0.136*** (0.024)	-0.204*** (0.020)
Science	-0.024 (0.024)	-0.016 (0.022)	-0.008 (0.017)
Statistics	-0.007 (0.024)	0.012 (0.022)	-0.019 (0.017)
Bachelor degree	-0.032 (0.025)	0.104*** (0.023)	-0.136*** (0.017)
University final grade	0.004 (0.029)	-0.021 (0.024)	0.025 (0.021)
Job-major match	0.730*** (0.025)	0.730*** (0.025)	–

Notes: \*\*\* p-value<0.01, \*\* p-value<0.05, \* p-value<0.1. Standard errors in parentheses

## Appendix 1. Variables used in SEM model

Symbol	Variable	Description
$\eta_5$	Job-major match	Latent endogenous variable
$\eta_6$	Job satisfaction	Latent endogenous variable
$\zeta_1$	Social capital	Latent exogenous variable
$y_1=\eta_1$	High school	Dichotomous (1: <i>liceo</i> / 0: other)
$y_2=\eta_2$	High school final grade	60-100 scale
$y_{31}=\eta_{31}$	Faculty: Agriculture	Eleven dichotomous variables referred to faculties (Reference: Faculty of Veterinary Medicine)
...		
$y_{3\ 11}=\eta_{3\ 11}$	Faculty: Statistics	
$y_4=\eta_4$	University degree final grade	66-110 scale
$y_{51}$	Necessity of degree	Dichotomous (1: yes / 0: no)
$y_{52}$	Job-major coherence	1-10 scale
$y_{53}$	<i>Forma mentis</i>	Dichotomous (1: very much+quite / 0: not at all+not much)
$y_{54}$	Adequacy of professional background	1-10 scale
$y_{61}$	Overall job satisfaction	1-10 scale
$y_{62}$	Satisfaction with professionalism	1-10 scale
$y_{63}$	Satisfaction with cultural interests	1-10 scale
$y_{64}$	Skill exploitation	Dichotomous (1: very much+quite / 0: not at all+not much)
$x_{11}$	Father's education: high	Dichotomous (1: at least degree / 0: other)
$x_{12}$	Father's education: low	Dichotomous (1: junior high school or lower / 0: other)
$x_{13}$	Mother's education: high	Dichotomous (1: at least degree / 0: other)
$x_{14}$	Mother's education: low	Dichotomous (1: junior high school or lower/0: other)
$x_{15}$	Father's occupation: high	Dichotomous (1: manager, entrepreneur and similar / 0: other)
$x_{16}$	Father's occupation: low	Dichotomous (salaried worker or similar)
$x_{17}$	Mother's occupation: high	Dichotomous (manager, entrepreneur and similar)
$x_{18}$	Mother's occupation: low	Dichotomous (1: salaried worker or similar / 0: other)
$x_{19}$	Mother's occupation: housewife	Dichotomous (1: yes / 0: no)
$x_2=\zeta_2$	Gender	Dichotomous (1: Female / 0: Male)
$x_3=\zeta_3$	Type of degree	Dichotomous (1: Bachelor / 0: Master degree)



## Appendix 2. Specification of SEM model.

$$x_{11} = \lambda_{111}\xi_1 + \delta_{11}$$

$$x_{12} = \lambda_{121}\xi_1 + \delta_{12}$$

...

$$x_{19} = \lambda_{191}\xi_1 + \delta_{19}$$

$$x_2 = \lambda_{22}\xi_2 + \delta_2 \quad (\lambda_{22} = 1 \text{ and } \text{Var}(\delta_2) = 0)$$

$$x_3 = \lambda_{33}\xi_3 + \delta_3 \quad (\lambda_{33} = 1 \text{ and } \text{Var}(\delta_3) = 0)$$

$$y_1 = \lambda_{11}\eta_1 + \varepsilon_1 \quad (\lambda_{11} = 1 \text{ and } \text{Var}(\varepsilon_1) = 0)$$

$$y_2 = \lambda_{22}\eta_2 + \varepsilon_2 \quad (\lambda_{22} = 1 \text{ and } \text{Var}(\varepsilon_2) = 0)$$

$$y_3 = \lambda_{33}\eta_3 + \varepsilon_3 \quad (\lambda_{33} = 1 \text{ and } \text{Var}(\varepsilon_3) = 0)$$

$$y_{51} = \lambda_{515}\eta_5 + \varepsilon_{51}$$

....

$$y_{54} = \lambda_{545}\eta_5 + \varepsilon_{54}$$

$$y_{61} = \lambda_{616}\eta_6 + \varepsilon_{61}$$

....

$$y_{64} = \lambda_{646}\eta_6 + \varepsilon_{64}$$

$$\eta_1 = \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \zeta_1$$

$$\eta_2 = \beta_{21}\eta_1 + \gamma_{21}\xi_1 + \gamma_{22}\xi_2 + \zeta_2$$

$$\eta_{31} = \beta_{311}\eta_1 + \beta_{312}\eta_2 + \gamma_{311}\xi_1 + \gamma_{312}\xi_2 + \zeta_{31}, \dots,$$

$$\eta_{311} = \beta_{3111}\eta_1 + \beta_{3112}\eta_2 + \gamma_{3111}\xi_1 + \gamma_{3112}\xi_2 + \zeta_{311}$$

$$\eta_4 = \beta_{41}\eta_1 + \beta_{42}\eta_2 + \beta_{431}\eta_{31} + \dots + \beta_{4311}\eta_{311} + \gamma_{41}\xi_1 + \gamma_{42}\xi_2 + \zeta_4$$

$$\eta_5 = \beta_{51}\eta_1 + \beta_{52}\eta_2 + \beta_{531}\eta_{31} + \dots + \beta_{5311}\eta_{311} + \beta_{54}\eta_4 + \gamma_{52}\xi_2 + \gamma_{53}\xi_3 + \zeta_5$$

$$\eta_6 = \beta_{61}\eta_1 + \beta_{62}\eta_2 + \beta_{631}\eta_{31} + \dots + \beta_{6311}\eta_{311} + \beta_{64}\eta_4 + \beta_{65}\eta_5 + \gamma_{61}\xi_1 + \gamma_{62}\xi_2 + \gamma_{63}\xi_3 + \zeta_6$$