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EDUCATIONAL QUALIFICATIONS YIELDS AS EMPLOYMENT RISK: AN EMPIRICAL ANALYSIS OF THE HORIZONTAL INEQUALITY

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Abstract. *The analysis of horizontal inequalities in the educational yields has recently raised an increasing interest, as they explain a larger portion of the inequalities in the labour market, both in terms of wages and in terms of employment risk. This paper analyses the horizontal inequalities in terms of one-year employment risk for bachelor and master's graduates between 2009 and 2013 at the University of Trento (Italy). It is studied the employment situation of students one year after graduation, distinguishing between those who are unemployed, those whose job is consistent with their academic career, and those whose job is at all different from studies. It is also considered the portion of graduates who are involved in an internship, as this seems to have become an important way of access to the Italian job market. In order to describe both the multiplicity of the employment situations and the hierarchical clustering of graduates with respect to their degree courses, data are modelled by means of multilevel multilogit models. The analysis is based both on administrative data of the University of Trento and on results of the periodic surveys on Italian graduates conducted by the Italian intercollegiate consortium Almalaurea; this allows us to assess the effect of the regularity of the educational path, the time of graduation, the final mark and other characteristics of students' academic careers on their employment situation one year after graduation.*

Keywords*: education yields; horizontal inequality; multilevel modelling; multilogit model; employment risk.*

1. INTRODUCTION

From the seminal work of Shavit, Arum and Gamoran (2007), many recent studies on social stratification in education have begun to analyse the role of horizontal stratification of educational qualifications in the reproduction of social inequality. This paper follows this stream of research focusing on tertiary education, and analyses the horizontal inequalities in terms of one-year employment risk and study-work consistency for bachelor and master's graduates between 2009 and 2013 at the University of Trento (Italy).

This work is motivated by three main considerations. Firstly, higher education enrolment has expanded considerably in recent decades, and this pointed out the question about the qualitative differentiation within tertiary education for occupational and non-occupational outcomes (Lucas, 2001; Triventi, 2013). Secondly, the increase in numbers of students have been accompanied by a diversification in course levels, fields of study, types of institutions, and educational sectors (Teichler, 1988) with a consequent problem of unity and homogeneity among industrialised countries and among universities within country. Thirdly, there are relevant differencies in labour market outcomes among graduates from different fields of study. Several comparative studies indeed have shown that different fields of study have different occupational returns in terms of wages, unemployment risks, occupational status (Reimer, Noelke and Kucel, 2008; van de Werfhorst, 2008, Brunello and Cappellari, 2008).

In this context, the aims of this paper are to assess: (i) the heterogeneity in occupational return of Trento graduates among different fields of studies one year after graduation; (ii) whether and to what extent social origin and gender are related to the success on labour market even after controlling for the school and the university career (academic track and final grades in secondary education and in university).

Data used in this paper resulted from the integration between survey data provided by the Italian intercollegiate consortium Almalaurea on bachelors and master's graduates of the University of Trento between 2009 and 2013, and administrative registers on students' careers of the same university. Information collected by Almalaurea permitted to reconstruct the employment situation of bachelors and masters one year after graduation, distinguishing between those who were working from those who were having a training work experience and those who were not employed but were looking for a job. Moreover, amongst workers, it has been possible to distinguish graduates who found a job consistent with their studies from those who did not.

From a methodological point of view, the employment situation and the study-work coherence have been studied by means of multilogit and logit multilevel models, in order to take into account (and model) clustering effects and field-of-study heterogeneity emerged from aggregated statistics (see Section 2) and confirmed by model estimates (Sections 4 and 5).

The rest of the paper is organised as follows. Section 2 illustrates and discusses some stylised facts about graduates of the University of Trento considered in the analysis. Section 3 provides details on data and variables used in the paper, as well as methodological approach issues emerged and the statistical tool we have adopted in order to address them. Section 4 and Section 5 illustrate and discuss the results of model estimates on employment situation and study-work coherence for

bachelors and masters respectively, whereas Section 4 focuses also on bachelors' decision to enrol a master's degree course after graduation. Section 6 concludes.

2. SOME STYLIZED FACTS

The Italian academic education, after the Bologna Process, is structured into three levels, which correspond to *laurea* (bachelor's degree, also known as *laurea triennale*), *laurea magistrale* (master's degree), and'*dottorato di ricerca* (philosophy doctor).

Italian students typically conclude the high school when they are 19,[1] then they can enrol either a bachelor's programme or a single-cycle master's programme.

The former path is the most common, and consists in a three-year programme which confers the bachelor's degree and allows the graduates to enrol a two-year master's programme.

The latter path consists in five or six-year programme which directly confers a master's degree. The single-cycle master's courses are provided for by law for some specific academic programmes such as law, medicine, and architecture.

Bachelors can enrol a two-year master's course called *corso di laurea specialistica* (until 2012) or *corso di laurea magistrale*.

Two-years, five-years, and six-years master's degree have the same academic and legal value, and allow one to enrol a PhD programme. If a student completes either a bachelor's course and a two-year master's course or a five-year master's course on time, she should be 24 (25 in case of a six-year master's programme).

In the context of educational yields, horizontal inequality is defined as inequality in the employment opportunities (in terms of employment risk, wages, legal framework, and other terms of employment) amongst groups of people with equivalent level of education, in contrast to vertical inequality which regards groups of individuals with different levels of education. It follows that the analysis of horizontal inequality requires a grouping criterion to be specified.

Although several variables are eligible as grouping criterion (e.g. field of study, gender, residence, social class, ...), a multitude of variables is typically taken into account in order to control for several sources of horizontal inequality.

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[1] It is possible that a student concludes the high school when she is older than19 if she has failed one or more than one year at the high school or at the primary school. There is also the possibility that a student concludes the high school before she is 19 either if she completes the school programme in less than five years or if she was born before April 30, as the law allows parents to enrol their sons or daughters at the primary school one year in advance if they were born before April 30. Yet, it should be pointed out that the cases of students who concludes the high school before 19 are not frequent (about 1% in our dataset).

Tables 1 and 2 report data on employment situation of 8592 graduates of the University of Trento one year after graduation; data refers to students graduated between 2009 and 2013 and are grouped with respect to the type of degree (hence, the level of education) and the faculty (that is, the field of study).

Tab. 1: Per cent distribution of bachelors and masters one year after graduation. Bachelors and masters are grouped depending on whether either they are in workforce, or they are studying, or none of them. Graduates which are either apprentice or are in a (paid or non-paid) training work experience are included in the labour force. 8592 graduates are considered.

Faculty	Labour force	Education	None
Bachelor's degree			
Economics and Management	50.16	48.97	0.87
Cognitive Sciences	56.67	41.78	1.56
Engineering	35.75	63.51	0.74
Arts and Humanities	57.31	39.99	2.71
Science	36.24	62.15	1.61
Sociology	59.10	37.36	3.54
Master's degree			
Economics and Management	95.17	3.70	1.12
Cognitive Sciences	75.10	16.73	8.16
Engineering	85.53	13.21	1.26
Law	92.43	4.96	2.61
Arts and Humanities	89.47	7.66	2.87
Science	59.60	38.11	2.29
Sociology	86.21	10.28	3.50
International Studies	83.85	13.85	2.31
Single-cycle master's degree			
Engineering	94.18	5.14	0.68
Law	93.30	5.67	1.03

In particular, Table 1 distinguishes between graduates who participate in the labour force, those who are studying, and those who are neither working, nor looking for a job, nor studying. Graduates who are apprenticed or are in a (paid or non-paid) training work experience are included in the labour force.

Table 2 shows the composition of the labour force and reports data on coherence between university studies and work.

Data on bachelors in Tables 1 and 2 allow us to identify three groups of

faculties which are characterised by quite different workforce participation rates, unemployment rates, and skills-work coherence rates.

Tab. 2: Per cent distribution of bachelors and masters by employment situation one year after graduation. Numbers in parentheses are the percentages of working graduates who have a job consistent with their university studies. 8592 graduates are considered.

Faculty	Employed		Trainee	Unemployed
Bachelor's degree				
Economics and Management	82.48	(78.01)	12.05	5.47
Cognitive Sciences	86.27	(59.09)	3.92	9.80
Engineering	87.24	(62.15)	4.13	8.63
Arts and Humanities	85.10	(62.52)	3.36	11.54
Science	90.00	(73.66)	3.33	6.67
Sociology	85.58	(66.67)	5.35	9.08
Master's degree				
Economics and Management	76.53	(91.53)	13.33	10.14
Cognitive Sciences	63.04	(82.76)	27.17	9.78
Engineering	87.21	(93.09)	6.18	6.62
Law	36.44	(75.97)	55.37	8.19
Arts and Humanities	78.79	(75.34)	2.85	18.36
Science	87.98	(90.71)	3.37	8.65
Sociology	76.40	(78.74)	6.35	17.26
International Studies	66.06	(81.94)	12.84	21.10
Single-cycle master's degree				
Engineering	81.45	(96.88)	8.73	9.82
Law	30.52	(71.04)	61.33	8.15

Tab. 3: Percentage of female graduates by field of study (faculty) and type of degree. 8592 graduates are considered

Faculty	Bachelors' degree	Master's degree	Single-cycle master's degree
Economics and Management	48.97	48.15	
Cognitive Sciences	75.78	69.80	
Engineering	16.90	17.99	48.97
Law	60.98	65.27	63.66
Arts and Humanities	76.37	78.79	
Science	33.96	31.23	
Sociology	72.22	70.68	
International Studies		62.31	

The first group consists of graduates in engineering and science which have the highest inclination (about 60%) to continue studying after the bachelor's degree, whilst face a medium (7%) risk to be unemployed if they decide to look for a job.

The second group includes bachelors in cognitive sciences, arts and humanities, and sociology. This class of graduates have the lowest inclination to go on with their studies and they face the highest unemployment rate (roughly 10%).

Finally, the third group consists of bachelors in economics and management, which exhibit a high inclination in taking training work experiences (about 12%, nearly three times higher than other bachelors), face a low unemployment rate (5%), and the percentage of graduates who have found a job consistent with their university studies is by far higher than other bachelors (close to 80% against an average rate near 65%).

Data on master's and single-cycle master's degrees are more complex and are also affected by legal obligations about the apprenticeship required to practice a profession. Yet, data in Tables 1 and 2 show a remarkable variety amongst the fields of study in the employment situation of graduates, and reveals a horizontal inequality which is even more pronounced than in the case of bachelors. Consider, for example, masters in arts and humanities: they face an unemployment rate larger than 18%, whereas only 75% of workers have a job consistent with their studies. On the other hand, masters in science face an unemployment rate less than 9% and a percentage of workers which have a job coherent with their studies near 93%.

Data in Tables 1 and 2 suggest that there is a high horizontal inequality amongst both bachelors and masters of the University of Trento in terms of employability one year after graduation, however two issues should be considered.

Firstly, there may be several confounding factors which may be able to explain part of such inequality. Gender, social class, quality of curriculum studiorum, and other relevant characteristics may not be evenly distributed amongst courses, and this may results in a composition effect on aggregate percentages of Tables 1 and 2.

Table 3 proves that this issue may be relevant for gender: since there is an uneven distribution of male and female graduates amongst the faculties, part of the horizontal inequality exhibited by data in Tables 1 and 2 may stem from gender inequality, and it may have nothing to do with, say, labour market segmentation.

Tab. 4: Per cent distribution of graduates from the University of Trento one year after graduation by faculty and employment situation. The range of numbers relates to within-faculty course estimates. Ranges in parentheses refer to percentages of working graduates who have a job consistent with their university studies; 8592 graduates are considered. (Note: there is only one master's course in law, that is the reason why there is only one value instead of the range.)

Faculty	Employed		Trainee	Unemployed
Bachelor's degree				
Economics and Management	69.23-100.00	(62.50-100.00)	0.00-24.62	0.00-6.15
Cognitive Sciences	69.70-89.53	(56.67-65.22)	2.21-9.09	5.81-21.21
Engineering	63.64-100.00	(46.15-90.00)	0.00-9.09	0.00-27.27
Arts and Humanities	79.59-98.36	(28.21-81.43)	0.00-5.13	0.00-16.33
Science	79.17-95.24	(37.04-92.86)	0.00-6.25	0.00-16.67
Sociology	80.51-90.23	(46.39-78.05)	2.87-7.50	5.00-12.82
Master's degree				
Economics and Management	33.53-88.24	(50.00-100.00)	3.85-40.00	0.00-33.33
Cognitive Sciences	50.00-87.50	(81.90-100.00)	0.00-29.41	8.82-50.00
Engineering	81.67-95.92	(84.86-100.00)	0.00-11.11	1.92-11.67
Law	36.44	(75.97)	55.37	8.19
Arts and Humanities	60.00-91.30	(55.36-97.14)	0.00-8.00	4.35-32.00
Science	66.67-95.12	(50.00-100.00)	0.00-11.11	0.00-33.33
Sociology	63.33-100.00	(63.16-89.13)	0.00-13.73	0.00-28.33
International Studies	56.10-72.22	(76.92-91.30)	6.25-19.51	16.67-24.39
Single-cycle master's degree				
Engineering	69.23-82.06	(96.74-100.00)	0.00-9.16	8.78-30.77
Law	30.43-100.00	(70.91-100.00)	0.00-61.41	0.00-8.16

Secondly, there is heterogeneity also amongst degree programmes belonging to the same field of study. Table 4 reports the ranges of the percentages of Table 2 computed for each degree programme and aggregated with respect to the faculty. As Table 4 shows, some faculties (such as, for example, economics and management or arts and humanities) offer bachelor's and master's courses which provide heterogeneous employment prospects. It follows that the effects of factors affecting graduates' employment situations may be either masked or warped by course-level heterogeneity, if not properly treated.

In order to tackle both composition effects and course-level heterogeneity, in the rest of the paper data are analysed by means of multilevel models (see e.g. Goldstein 2011) where level-1 units are graduates and level-2 units are degree

courses. The choice of graduates as level-1 units permits to avoid composition effects originating from aggregation, whereas the hierarchical multilevel structure allows to model clustering effects of graduates with respect to degree courses (course-level heterogeneity).

3. DATA AND MODELLING APPROACH

Data analysed in this paper resulted form the integration of answers to the surveys conducted by the Italian intercollegiate consortium Almalaurea and administrative data about graduates' university careers of students graduated between 2009 and 2013.

The administrative data has been provided by the University of Trento and mainly consists in personal data and detailed information on graduates' academic careers (exams, marks, dates when the exams have been passed, and so on).

Data provided by Almalaurea consists of several surveys (they experienced several updates between 2009 and 2013) conducted at the moment of graduation and one year later over the population of bachelors and masters of the University of Trento.

The survey conducted when students are about to graduate covers the entire population, as the students have to fill in the questionnaires in order to take the final examination and get graduated. The survey is conducted on-line, so data are collected continuously, whilst the structure and the questions of the questionnaires are updated yearly and are shared by all graduates of the same cohort.

The survey on employment situation is conducted by Almalaurea one year after graduation in a first step on-line and later by phone for non-respondents. Although the survey aims to cover the entire population of graduates, there is a portion of non-respondents (11%). The survey has been carried out once one year had passed after graduation and respondents have been asked to fill in the questionnaire with reference to their situation on the day of the first anniversary of their graduation. Just like the survey for graduating students, the questionnaire on employment situation is updated yearly for homogeneous cohorts of graduates.

Almalaurea's questionnaires are mainly focused on students' and graduates' employment situation, their social and family conditions, their personal skills and competencies, their opinions on their university experiences and their preferences about the job (if any) they are looking for (e.g. about industry, working hours, type of contract, business trips and mobility, type of employer).

As previously stated, this paper analyses the employment situation of bachelors and master's graduates, and the coherence between studies and job for those who are working; it is also studied the bachelors' decision to enrol a master's course after graduation. All analyses refer to graduates' situation one year after graduation.

The employment situation has been described by means of a trinomial

variable which classifies graduates in the workforce as "employed", "trainee", or "unemployed" (according to data in Tables 2 and 4). The "trainee" group consists both of apprentices and graduates in a paid or non-paid training work experience, whilst "unemployed" are people in the labour force which are neither "employed" nor "trainee" (that is, graduates which are not working, studying, or training, and are looking for a job).

The study-work coherence and bachelor's decision to keep on studying have been modelled by means of dichotomous variables. In particular, information available from Almalaurea's surveys allowed us to determine whether a working graduate had a job consistent with her degree course or not, as well as to know whether a bachelor enrolled a master's degree programme or not.

We have excluded from all the analyses illustrated in this paper graduates who were working when they graduated. Although working students represent a sizeable portion of students of the University of Trento,[2] they are particularly heterogeneous in terms of economic and personal condition, age, and employment situation. In the same group there are, for example, part-time workers who work for earning extra money for their studies, and full-time workers who enrolled a university course for improving their professional position. Since data do not allow us to effectively distinguish amongst such different situations, we focus only on non-working students, as they face more homogeneous conditions.

The three variables of interest are categorical, hence they can be analysed by means of multilogit (employment situation) and logit (study-work coherence and bachelors' decision on studies) regression (see e.g. Madsen and Thyregod 2010, Agresti 2002), however, as it is discussed below, multilogit and logit models fitted in this paper capture the hierarchical structure of data by including intercept and covariate random effects at a degree course level (i.e. multilevel modelling approach).

The regressors included into the analysis are based on graduates' personal information, information on the university studies they have just concluded, and other information about their school career and the matriculation time.

The personal information considered are:

- *gender*, dichotomous (male/female);
- *domicile*, which may be "Trentino – Alto Adige", "North-East", "North-West", "Centre, South, and Islands", and "Abroad";
- *social class*, as classified by Almalaurea according to information about parent's

[2] The portion of graduates which were working when they graduated ranges from 30% (for bachelors) to 60% (for masters) in our sample.

education, job, and income, and other family and social information. There are four social classes:[3] "working class" (*classe operaia*), "white-collar workers" (*classe media impiegatizia*), "petty bourgeoisie" or "lower middle class" (*piccola borghesia*), "upper middle class" (*borghesia*), and a residual category consisting of graduates that for any reason do not fall within any of the previous categories.

The information on university studies are based on the following variables:

- *duration*, computed as the number of days between matriculation date and graduation date, and expressed in years (with decimals);
- *final degree score*, which ranges between 66 and 110;
- *irregularity index of the academic career*, which measures the divergence between the planned and the effective timing of the exams taken by students. The irregularity index of student s is computed as follows:

$$Irr_s = \sum_{j=1}^{n} \frac{w_j}{\sum_{h=1}^{n} w_h} \left| T_{s,j} - t_j \right|$$

where n is the total number of exams of the degree course, t_j is the year when the exam j should be taken (according to the plan of studies), $T_{s,j}$ is the year when student s effectively took the exam j, and w_j is the number of ECTS credits (European Commission, 2009) of exam j;

- *number of course changes*, that is, the number of degree courses that a graduate has changed between the matriculation and the graduation.

Since the distributions of the first three variables vary a lot amongst faculties and courses, we have standardised those variables within each degree course, that is, the sample distribution of *duration*, *final degree score*, and *irregularity index* has zero mean and unit variance within each degree course. This fact implies that the regressors are relative measures of duration, level of competence, and career irregularity respectively. All three variables have been included into the regression models as dummy variables, once they have been categorised according to whether standardised values belong to either the first, the second, or the third tertile of the course distribution. Thus, the possible values of each variable are three: either *short/average/long* (for *duration*), or *low/average/high* (for *final degree score* and *irregularity index*).

The variable "*number of course changes*" is included amongst regressors

[3] We put in brackets the original names of social classes assigned by Almalaurea.

along with two other dummy variables. The first is defined as an indicator variable (called "*if changed*") which equals one if the student has changed the degree course at least once (that is, if variable "*number of course changes*" is greater than zero). The second dummy variable (called "*internal*") indicates whether the student enrolled only degree courses of the same faculty or not. These three variables have been included as regressors in the following manner:

$$(\beta + \delta_1 \text{number\_of\_changes} + \delta_2 \text{ internal}) * \text{ if \_changed}$$

According to such parameterisation, the effect of, say, two internal changes is $\beta + 2\delta_1 + \delta_2$.

The other variables we have considered are:

- *high school*, which may be "Liceo scientifico", "Liceo classico", and others lycea, technical schools and vocational schools;
- *final mark of high school*, ranging between 60 (minimum) and 100 (maximum). The scores based on different grading systems are rescaled on the interval [60, 100];
- *matriculation age*, measured as the difference between the year of matriculation and the year of birth;
- *year of graduation*.

The "*matriculation age*" has been used to determine whether students enrolled the degree course on time or later. If a student regularly attended the high school, she should enrol a bachelor's course or a 5-year master's course during the year when she becomes 19 and she should enrol a 2-year master's course in the year when she becomes 22. Thus we have included the variable "*matriculation time*" as a regressor which may have one of the following values: "On time", "Up to two years late", and "Later than two years".[4]

As mentioned above, the multilevel modelling approach (see Goldstein 2011) has been adopted both in case of multilogit and logit models, so as to account for clustering effects originating from hierarchical structure of data. Indeed, it is worth noting that data about University of Trento graduates can be organised according to a 2-level structure where level-1 units (graduates) are clustered into groups which represent the level-2 units (degree courses) and determine the hierarchical structure of data.

Multilevel models permit to describe cluster effects (that is, group

[4] The *matriculation time* of students who enrolled any degree course earlier than expected equals "On time".

heterogeneity) by including random effects at level-2 units, such that all level-1 units belonging to the same cluster share the same value of random effects. We refer to the literature on multilevel (also known as mixed-effects) models for further details (see e.g. Goldstein 2011).

Multilogit and logit multilevel models (Madsen and Thyregod 2010, Agresti 2002, Fahrmeir and Tutz 1994) considered in this paper capture course-level heterogeneity by including random effects on the intercept and on the dummy variables about final degree score and duration. Random effects on the intercept allow us to model covariate-independent heterogeneity, whereas random effects on final degree score and duration dummies permit to capture possible heterogeneity in the relation between indicators of relative performance and the probability distribution of the dependent variable.

Since the estimation of generalised linear multilevel models is particularly tricky, especially from a computational point of view (see e.g. Goldstein 2011, Pinheiro and Chao 2006), all the models in this paper have been fitted through the cross-entropy algorithm (Rubinstein and Kroese 2004) as proposed in Bee et al. (2017). The presence of small clusters (some degree courses consist of a little number of graduates) and the large number of parameters make the cross-entropy method suited both from a computational and a statistical point of view (see. Bee et al. 2017).

In the rest of the paper we separately present and discuss the results of models estimation for bachelors (Section 4) and masters (Section 5).

4. BACHELORS

In this section we analyse the estimates of models on the employment situation and the decision to enrol a masters' degree course of bachelors. Table 5 reports the results of the 2-level multilogistic regression for bachelors' employment situation, whilst Table 6 shows the result of the 2-level logistic regression on employed graduates' coherence between study and work. Table 7 reports the results of a 2-level logit model about the choice to enrol a master's programme.

Estimates in Tables 5 and 6 suggest that gender has a significant effect on the employment situation and the study-work coherence of bachelors one year after graduation. Female bachelors face an unemployment risk higher than their male colleagues (see Table 5), and the probability that an employed bachelor found a job which is inconsistent with its studies is statistically larger for females than for males (Table 6).

The estimates on the effect of domicile show marked differences amongst the

four regions we considered in terms of job opportunities. In particular, it seems that bachelors coming from the Northeast Italy face a less favourable job market than bachelors who are domiciled in Trentino-Alto Adige, whilst the opportunities are much richer for bachelors coming from the Northwest Italy. This fact is borne out by the effect of the domicile on both the unemployment risk (Table 5) and the probability of finding a job incoherent with the studies (Table 6).

Tab. 5: Parameter estimates and standard errors (in parenthesis) of the 2-level multilogistic regression on the employment situation one year after graduation for 1377 bachelors graduated at the University of Trento between 2009 and 2013.

	Unemployed		**Trainee**	
	coef.	**s.e.**	**coef.**	**s.e.**
Intercept	-2.308 ***	(0.0661)	-2.125 ***	(0.0874)
Personal information				
Female	0.314 ***	(0.0699)	-0.006	(0.1773)
Domicile (ref.: Trentino – A. A.)				
North-East	0.134 *	(0.0800)	0.156 *	(0.0811)
North-West	-1.269 ***	(0.0970)	0.136 *	(0.0775)
Centre, South and Isles	-0.100	(0.1680)	0.720 ***	(0.1640)
Social class (ref.: working class)				
White-collar workers	-0.168	(0.1949)	0.422 ***	(0.0854)
Lower middle class	-0.238 .	(0.1511)	0.669 ***	(0.0573)
Upper middle class	-0.284 *	(0.1505)	0.717 ***	(0.0598)
Indeterminate social class	-0.263 ***	(0.0740)	1.294 ***	(0.1180)
University career				
Duration (ref.: average)				
Short	-0.336 ***	(0.0962)	0.325 ***	(0.0888)
Long	0.573 ***	(0.1390)	-0.023	(0.1850)
Final degree score (ref.: average)				
Low	-0.962	(0.0902)	-0.124	(0.0992)
High	-0.106	(0.1071)	0.462 ***	(0.0653)
Irregularity index	-0.025	(0.0719)	0.074	(0.0904)
if_changed	0.796 ***	(0.1420)	-0.021	(0.1060)
*if_changed * number_of_changes*	-0.324 ***	(0.1020)	0.094	(0.1730)
*if_changed * internal*	-0.570 ***	(0.0767)	-0.855 ***	(0.0774)

following

following from page 79 **Tab. 5:**

	Unemployed		Trainee	
	coef.	**s.e.**	**coef.**	**s.e.**
Other information				
High school (ref.: scient. lyceum)				
Classical lyceum	-0.350 ***	(0.0747)	0.091	(0.0901)
Other	0.062	(0.1230)	0.185	(0.1520)
High school final mark	-0.003	(0.0793)	-0.005	(0.1482)
Matriculation age (ref.: on time)				
Up to two years late	0.307 **	(0.1182)	-0.305 ***	(0.0563)
Later than two years	0.722 ***	(0.1030)	0.419 ***	(0.0639)
Year of graduation (ref.: 2009)				
2010	0.803 ***	(0.1530)	-0.292 *	(0.1690)
2011	0.931 ***	(0.1180)	0.094	(0.1520)
2012	0.906 ***	(0.1120)	-0.789 ***	(0.0630)
2013	0.901 ***	(0.1129)	0.048	(0.0894)
Random effects				
Intercept	0.031	(0.1060)	0.247 *	(0.1350)
Short duration	0.004	(0.1873)	0.022	(0.0852)
Long duration	0.020	(0.0822)	0.012	(0.1713)
Low final degree score	0.004	(0.0507)	0.021	(0.1062)
High final degree score	0.014	(0.1350)	0.031	(0.1700)

Sign. codes: " . " for p-values between 0.05 and 0.1, " * " for p-values between 0.01 and 0.05, " ** " for p-values between 0.001 and 0.01, " *** " for p-values smaller than 0.001. No symbol is reported for p-values larger than 0.1.

Tab. 6: Parameter estimates and standard errors (in parenthesis) of the 2-level logistic regression on coherence between study and work one year after graduation for 1002 employed bachelors graduated at the University of Trento between 2009 and 2013.

	Study-work incoherence	
	coef.	**s.e.**
Intercept	-0.229 **	(0.0772)
Personal information		
Female	0.340 ***	(0.0658)
Domicile (ref.: Trentino – A. A.)		
North-East	0.077 .	(0.0497)
North-West	-0.532 ***	(0.0615)
Centre, South and Isles	0.799 ***	(0.0691)

following

following from page 80 **Tab. 6:**

	Study-work incoherence	
	coef.	**s.e.**
Social class (ref.: working class)		
White-collar workers	0.278 **	(0.1060)
Lower middle class	-0.046	(0.0869)
Upper middle class	-0.071	(0.0667)
Indeterminate social class	-0.315 ***	(0.0789)
University career		
Duration (ref.: average)		
Short	0.129 *	(0.0695)
Long	-0.238 *	(0.1220)
Final degree score (ref.: average)		
Low	-0.115 .	(0.0779)
High	-0.309	(0.1030)
Irregularity index	0.087 .	(0.0648)
if_changed	-0.498 ***	(0.0814)
*if_changed * number_of_changes*	0.099	(0.1230)
*if_changed * internal*	0.565 ***	(0.0782)
Other information		
High school (ref: scient. lyceum)		
Classical lyceum	0.300 ***	(0.0746)
Other	-0.255 **	(0.0950)
High school final mark	-0.011	(0.0564)
Matriculation age (ref.: on time)		
Up to two years late	0.336 **	(0.1130)
Later than two years	-0.518 ***	(0.0695)
Graduation year (ref.: 2009)		
2010	-0.331 ***	(0.0445)
2011	0.437 ***	(0.0829)
2012	-0.046	(0.0838)
2013	0.228 ***	(0.0511)
Random effects		
Intercept	0.273 ***	(0.0352)
Short duration	0.007	(0.0882)
Long duration	0.004	(0.1320)
Low final degree score	0.011	(0.1350)
High final degree score	0.015	(0.0513)

Sign. codes: " . " for p-values between 0.05 and 0.1, " * " for p-values between 0.01 and 0.05, " ** " for p-values between 0.001 and 0.01, " *** " for p-values smaller than 0.001. No symbol is reported for p-values larger than 0.1.

Unlike what may be expected, bachelors coming from the centre-south of

Italy do not face a significantly higher unemployment risk, in spite of the high unemployment rates which characterised that part of the Country, whilst they seem to take training work experiences more often than graduates from the rest of Italy and face a high probability to find a job which is not consistent with their studies.

The effect of the social class is particularly clear and unambiguous. The coefficients on the unemployment risk monotonically become more and more negative as the graduate's social class raises, whilst the statistical significance strengthens. The inclination to take a training work experience grows with the social class, and the magnitude of the coefficients suggests that this phenomenon tends to be more important than the effect on the unemployment risk.

On this regard, it should be pointed out that any coefficient of a multilogistic regression cannot be interpreted as the effect of a covariate on the *probability* that the dependent variable assumes a certain value. On the contrary, the coefficients of multilogistic regression represent the effect of covariates on the *relative probability* that the dependent variable assumes a certain value, where the reference probability is given by the probability of the reference value of the dependent variable. In terms of the regression reported in Table 5, we may indicate with π_E and π_U the probabilities to be employed and unemployed for a given profile of a male bachelor. The estimated effect of gender on the unemployment risk (0.314) allows us to infer that if the same profile would have been a female, the log-ratio $\log(\pi_U/\pi_E)$ increase by 0.314. Obviously, analogous interpretation is valid for the coefficients of the "Trainee" column.

The modelling approach of multilogistic regression makes sometimes difficult to interpret the effect of the covariates on the probabilities of the values of the dependent variable by just looking at the coefficients. For this reason, we use the ternary plots suggested in Santi et al. (2017) for representing the effect of a covariate in a multilogistic regression when the dependent variable can assume three values.

Figure 1 represents in a ternary plot the effect of the covariate "Upper middle class" on the probabilities to be employed, unemployed, or in a trainee work experience. In particular, each arrow shows how the three probabilities change if we consider a given graduate's profile in the working class (starting point of the arrow) and we assume that the social class changes to "Upper middle class" (the arrowhead). Consider, for example, the arrow starting from the bullet drawn near the lower-right vertex of the ternary plot. The bullet point has the coordinates given by the average employment rate (72,9%), unemployment rate (15,7%) and rate of participation to internships (11,4%) in the population of bachelors. The arrow endpoint shows the probability distribution of the employment situation for graduates from the upper middle class. The arrow shows that, *ceteris paribus*, graduates in the upper middle class have nearly 10% higher probability to be in an

internship and roughly 6% lower probability to be unemployed than graduates in the working class, whose expected probabilities to be employed, unemployed or trainee are respectively 0.729, 0.157, 0.114. Since the effects of covariates depends on probabilities, plot in Figure 1 shows several arrows for various points in the probability space (see Santi et al. 2017).

As mentioned, the magnitude of the effect of the dummy variable "Upper middle class" on the probability to be in a trainee work experience is larger than the magnitude of the effect on the probability to be unemployed. Figure 1 shows that the asymmetries between these two effects tend to grow as the expected unemployed probability decreases, suggesting that graduates of the upper middle class are more inclined to take a training work experience as the unemployment risk lowers.

The effect of other dummy variables on social class follows the same pattern

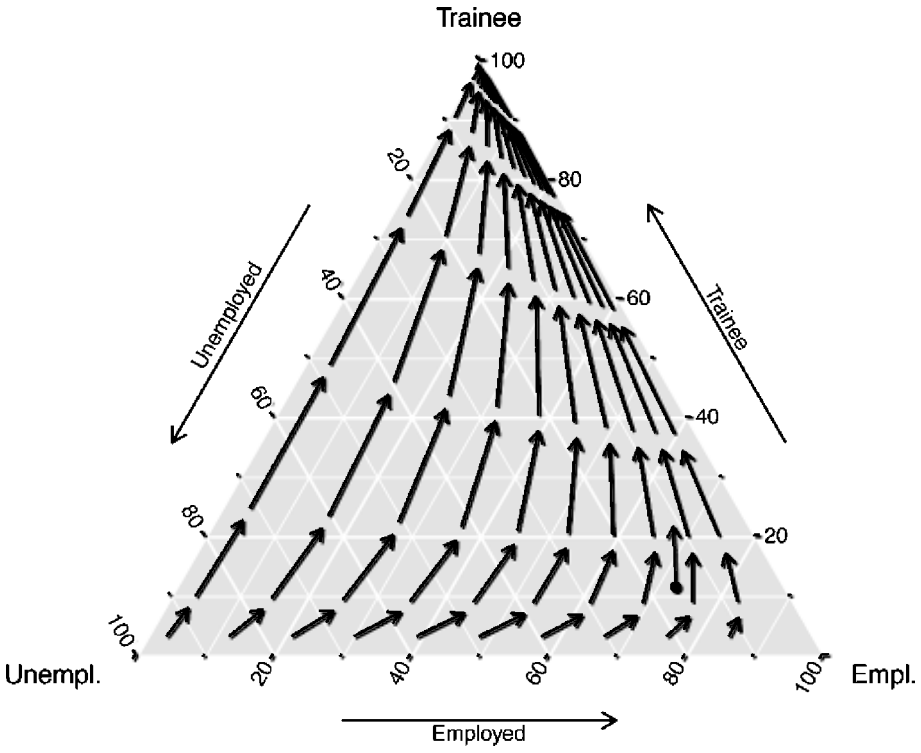

Fig. 1: Effect of dummy variable "Upper middle class" on the probability to be employed, unemployed or in an internship for bachelors according to estimates of Table 5, represented as a vector field in a ternary plot. The bullet represents the population values, and the linked arrow shows the effect associated to them.

as Figure 1, however the strength of the effect (and thus the length of the arrows) increases as the social class is higher (see Figure 2).

In general, estimates of Table 5 shows that *ceteris paribus* the bachelors'

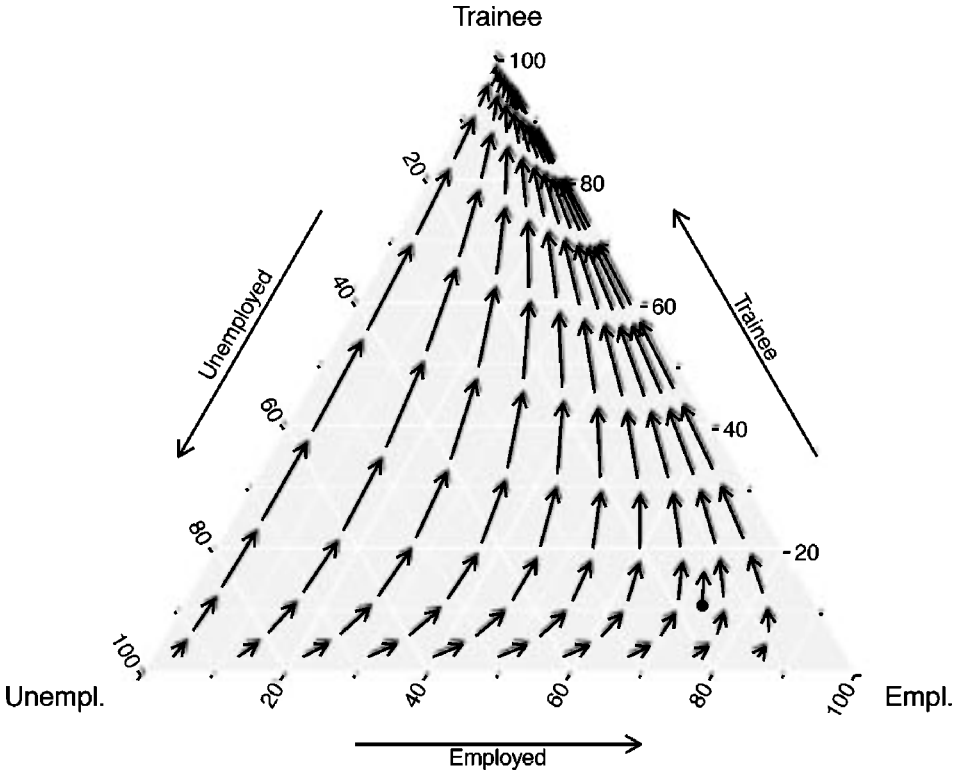

Fig. 2: Effect of dummy variable "White-collar workers" on the probability to be employed, unemployed or in an internship for bachelors according to estimates of Table 5, represented as a vector field in a ternary plot. The bullet represents the population values, and the linked arrow the effect associated to them.

employment situation improves as the social class raises, even though estimates on coherence between studies and work do not completely agree with such pattern (see Table 6).

The university career of bachelors seems to affect mainly the unemployment risk. As Table 5 shows, the duration of the university studies heavily affects both the unemployment risk and the probability to take a training work experience. Figure 3 shows that a short duration of the university studies mainly tends to reduce the unemployment risk when the expected unemployment probability is high, whereas tends to increase the participation to internships when there is a low

unemployment risk. On the other hand, a long duration of the university career seems to affect only the unemployment risk (which sharply increases), but significantly increases the probability to find a job inconsistent with bachelors' studies.

The final degree score affects only the probability to take a training work experience when it is high, whereas there is no evidence of an effect on the unemployment risk or the study-work coherence.

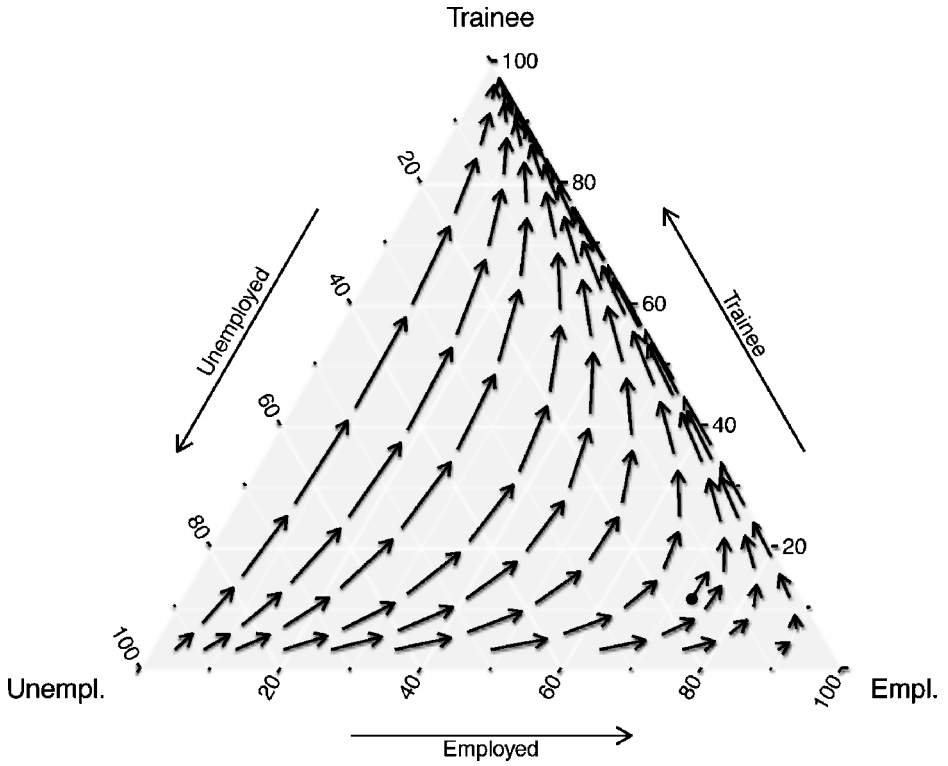

Fig. 3: Effect of dummy variable "Short duration of university studies" on the probability to be employed, unemployed or in an internship for bachelors according to estimates of Table 5, represented as a vector field in a ternary plot. The bullet represents the population values, and the linked arrow the effect associated to them.

The effect of matriculation age is marked and significant both for unemployment risk, probability to take an internship, and also the probability to find a job consistent with the university study. In the case of unemployment risk, the longer is the delay, the higher is the probability of being unemployed one year after graduation. The other two probabilities do not have a monotone behaviour, as the

probability to take a trainee work experience is lower for graduates who enrol the university up to two years late than for bachelors who enrol it on time, and it is higher for people whose delay is longer than two years. On the other hand, the probability of finding a job consistent with the university studies has the opposite behaviour (higher for delays up to two years, lower later).

Once personal information, university curriculum and other control variables are considered, horizontal inequality should emerge in terms of course-level heterogeneity. Tables 5 and 6 show the estimates on random effect standard deviations over intercept and covariates about duration and final degree score.

The first remarkable result concerns the non-significant heterogeneity on duration and degree score coefficients. Since both dummies on duration and final degree score have been standardised at a course level (and thus are relative measures of graduates' performances), non-significant random effects should be interpreted in terms of a homogeneous effect of those two covariates (actually, four dummies) on employment opportunities once the relative performances are accounted for. In other words, both relative duration and relative final score have a significant effect on the graduates' employment opportunities (as discussed earlier, say, engineers who conclude their studies earlier than their mates reduce their unemployment risk), however, such effects are homogeneous amongst all degree courses (according to the previous example, we could conclude that, *ceteris paribus*, the quickest engineers reduce their unemployment risk to the same extent as the quickest philosophers).

The second result concerns estimates of standard deviation of random effect on the intercept, as this is the only case where there are statistically significant results. Estimates of Tables 5 and 6 suggest that there is horizontal inequality amongst bachelors, however this does not appear to affect the unemployment risk, but rather the probability either to be in a training work experience or to have a work inconsistent with one's studied. This result suggests that the field of study have a little effect on the unemployment risk, which is mainly influenced by other factors (such as personal condition, university career, and so on), whereas it has a significant effect on the way bachelors access the labour market (training work experiences) and the type of job they find (study-work coherence).

Since a large number of bachelors decide to enrol a master's course (see Table 1), we have analysed also what are the factors that explain the bachelors' decision to go on with their studies after graduation. Table 7 reports the results of a 2-level logistic regression estimated on the population of bachelors who were either studying or participating to the workforce one year after graduation (see the first two columns of Table 1). As Table 7 shows, most of the variables we have considered are statistically significant at 0.1%.

Tab. 7: Parameter estimates and standard errors (in parenthesis) of the 2-level logistic regression on the decision to continue studying one year after graduation for 4382 bachelors graduated at the University of Trento between 2009 and 2013.

	Studying	
	coef.	**s.e.**
Intercept	0.018	(0.0540)
Personal information		
Female	-0.626 ***	(0.0544)
Domicile (ref.: Trentino – A. A.)		
North-East	0.241 ***	(0.0629)
North-West	0.294 ***	(0.0464)
Centre, South and Isles	0.641 ***	(0.0898)
Abroad	15.864 ***	(0.0544)
Social class (ref.: working class)		
White-collar workers	0.205 ***	(0.0711)
Lower middle class	0.019	(0.0343)
Upper middle class	0.161 ***	(0.0405)
Indeterminate social class	0.170 ***	(0.0519)
University career		
Duration (ref.: average)		
Short	0.201 **	(0.0709)
Long	-0.523 ***	(0.0733)
Final degree score (ref.: average)		
Low	-0.117 ***	(0.0362)
High	0.0853 .	(0.0616)
Irregularity index	-0.178 ***	(0.0449)
if_changed	0.748 ***	(0.0797)
*if_changed * number_of_changes*	-0.511 ***	(0.0361)
*if_changed * internal*	-0.323 ***	(0.0717)
Other information		
High school (ref.: scient. lyceum)		
Classical lyceum	0.327 ***	(0.0321)
Other lycea	-0.480 ***	(0.0524)
Technical institutes	-0.665 ***	(0.0610)
Other high schools	-0.182 ***	(0.0542)
High school final mark	0.014	(0.0633)

following

following from page 87 **Tab. 7:**

	Studying	
	coef.	**s.e.**
Matriculation age (ref.: on time)		
Up to two years late	-0.505 ***	(0.0441)
Later than two years	-1.005 ***	(0.0509)
Year of graduation (ref.: 2009)		
2010	-0.037	(0.0587)
2011	-0.065	(0.0924)
2012	0.157 ***	(0.0347)
2013	0.261 ***	(0.0645)
Random effects		
Intercept	0.183 ***	(0.0235)
Short duration	0.006	(0.0513)
Long duration	0.012	(0.0710)
Low final degree score	0.004	(0.0745)
High final degree score	0.030	(0.0371)

Sign. codes: " . " for p-values between 0.05 and 0.1, " * " for p-values between 0.01 and 0.05, " ** " for p-values between 0.001 and 0.01, " *** " for p-values smaller than 0.001. No symbol is reported for p-values larger than 0.1.

Variables on personal condition show that, *ceteris paribus*, females have a much lower probability to continue their studies than male bachelors. Moreover, the inclination to go on with studies increases as bachelors' domicile gets far away from Trento: Northeast Italy (0.241), North-West (0.294), Centre, South and Isles (0.641), and abroad (15.846).

The social class is a significant explanatory variable, however, two facts are worth being noted. Firstly, the significant coefficients on social class are not mutually statistically different, it follows that there are two groups of classes which affect the probability to continue with bachelors' studies. Secondly, the group with low inclination to study after bachelor's degree includes the working class and the lower middle class. The reasons for such a limited inclination to continue studies from those two classes of bachelors may be different. In case of bachelors from the working class, economic condition may play some role, whereas bachelors from the lower middle class may have job opportunities within their family business.

Unlike the analysis on employability, the choice on continuation of bachelors' studies is affected by all the variables about the university career. As Table 7 shows, the shorter is the time taken to graduate (duration), the higher is the probability to

continue with studies, although the effect is asymmetric: a long duration affects the probability more than a short duration (0.523 > 0.201). There is an analogous asymmetry in the effect of final degree score: a low degree score significantly (0.1%) reduce the probability to continue studying, whereas a high degree score have a weaker positive effect (significant only at 10%) on the probability itself. The magnitude of the two groups of coefficients reveals that duration of bachelors' studies has a critical role on the decision to enrol a master's programme, whereas the final degree score has a weaker association which may be interpreted in terms of a threshold effect: once a given final grade has been reached, such a variable does not affect the probability to enrol a master's course anymore.

The variables which measure the irregularity in the university career are significant and consistent with the effect of duration: in general, as the irregularity and the duration of a career grows, the probability to continue with studies drops. It follows that the coefficient of the irregularity index is negative, as well as the coefficient of the number of changes, however it should be noted that the sign of the coefficient of the dummy variable "*internal*" is negative. This suggests that if a bachelor enrols degree courses from different faculties (thus if_changed = 1, num_changes > 0, and internal = 0), it is likely that he will continue studying after graduation. In this regard, note that a single non-internal change of degree course has a positive effect (0.748 – 0.511 = 0.237) on the probability to go on with studies.

As Table 7 shows, we introduced a finer description of bachelors' high school. Estimates suggest that students of classical lyceum and scientific lyceum (the reference class) have the highest probability to continue studies, whereas bachelors who attended technical high schools have the lowest probability to continue.

The variables on matriculation age show a remarkable effect of the delay: the later bachelors enrolled their course, the lowest is the probability to continue with studies after graduation. Finally, dummy variables on the year of graduation show a positive effect for bachelors graduated after 2012; this may be indicative of an increased propensity to go on with studies after the bachelor's degree.

Random effects suggest that there is not any form of course-level heterogeneity on coefficients about duration and final degree score, whilst the significant random effect of intercept reveals the presence of a marked heterogeneity[5] in the inclination to enrol a master's degree programme amongst bachelors from different fields of study once that personal condition and other variables are accounted for. This result

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[5] Note that the estimated standard deviation of the random effect is about ten times larger than the absolute value of the estimated intercept.

may be related to the heterogeneity emerged in the employment opportunities of bachelors and master's graduates (see Section 5), as it may reflect both the employment condition that bachelors face after graduation and the employment opportunities they expect to have if they would enrol and complete a master's programme.

5. MASTER'S GRADUATES

Models on master's employment situation are discussed in this section. Tables 8 and 9 report the results of 2-level multilogistic and 2-level logistic regression on employment situation and on the study-work coherence.

If we focus on gender, we note that both the statistical significance and the magnitude of the effect are much larger than in the case of bachelors for both models. The estimates bring out the presence of a strong gender inequality in terms of job opportunities which results mainly in a higher unemployment risk (as the ternary plot in Figure 4 shows) and a larger probability to have a job which is inconsistent with graduate's studies.

The effect of masters' domicile is significant for unemployment risk, the probability of taking an internship, and the probability of finding a job consistent with university studies. The estimates of Tables 8 and 9 suggest that the better are the employment opportunity of a geographic area (both in terms of unemployment risk, and study-work incoherence risk), the lower is the probability that a master is taking an internship one year after graduation.

Like for bachelors, the social class has a statistically significant effect on the unemployment risk of masters, however the magnitude of the coefficient is smaller for lower social classes, whereas there is not a statistically significant effect on the probability of taking a trainee work experience. On the other hand, the social class has a remarkable, statistically significant, and increasing effect on the probability of finding a job consistent with the masters' studies: the higher the social class, the higher is the probability (see Table 9).

Unlike bachelors, the unemployment risk is weakly affected by the duration of the university career, which indeed has a marked negative effect on the probability of finding a job consistent with masters' studies, if longer than normal. Duration seems to positively affect the probability to be in a training work experience both when it is shorter and longer than normal.

The effect of final degree score is significant and marked. The unemployment risk is slightly increased if the final degree score is low, whereas it markedly drops if the final degree is higher than normal. The probability of being in a training work

experience one year after graduation grows significantly with the final degree score, as well as the probability of having a job consistent with university studies. It is worth stressing the marked reduction in the probability of having an incoherent job for masters which graduated with a high final score (see Table 9).

The number of course changes positively affects the unemployment risk, although the effect tends to decrease as the number of changes grows. If the courses have been chosen in the same faculty (internal = 1), the unemployment risk drops. The effect on the probability of being in a training experience is positively affected by course changes, however it is independent of the number of changes, and it decreases if the changes are internal.

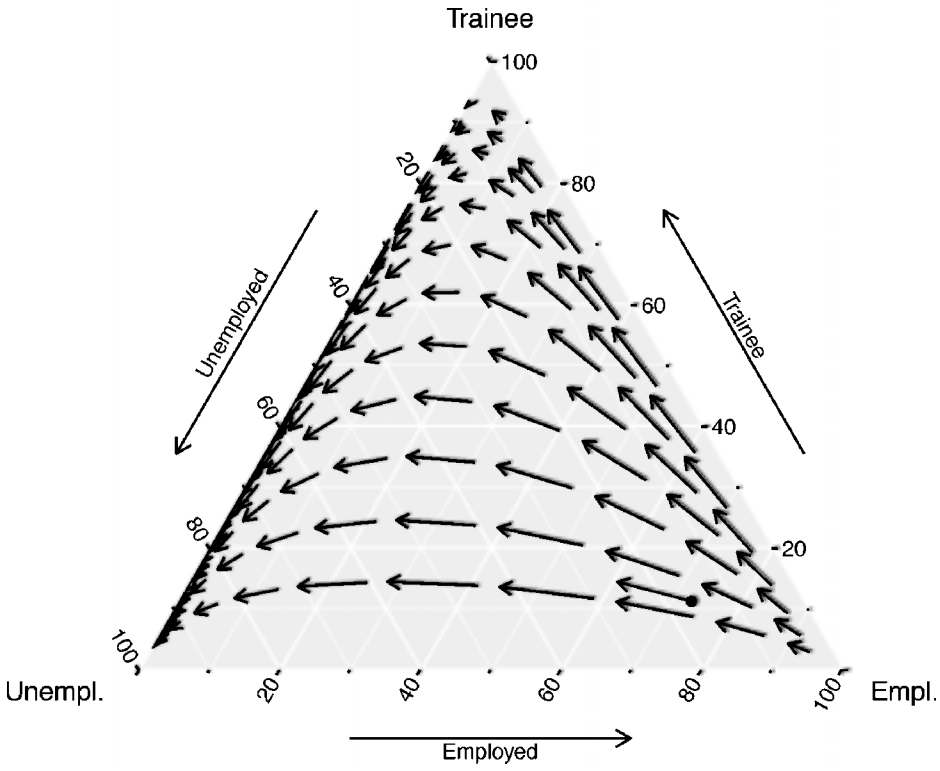

Fig. 4: Effect of dummy variable "female" on the probability to be employed, unemployed or in an internship for masters according to estimates of Table 8, represented as a vector field in a ternary plot. The bullet represents the population values, and the linked arrow the effect associated to them.

The magnitude of the effect of the matriculation age on unemployment is significant but does not show a regular and common pattern both for 5-years and 2-years master's courses. On the other hand, the effect is negative and significant on the probability to be in a training experience for graduates of 2-years programmes, whilst it is positive and significant for graduates of 5-years programmes. This fact can be explained if we consider that 5-years master's programme are preparatory courses for professions which can be legally practiced only once an apprenticeship and an examination are successfully passed.

Random effects are statistically significant only for intercepts of the probability to take a training work experience and the probability to find a job inconsistent with graduates' studies. These results follow those on bachelors, with the difference that significant estimates of Tables 8 and 9 are larger in absolute value, suggesting that heterogeneity (horizontal inequality) is larger amongst master's graduates than amongst bachelors. This result may reflect the segmentation of labour market, which emerges more clearly as graduates' professional profiles become more qualified.

Tab. 8: Parameter estimates and standard errors (in parenthesis) of the 2-level multilogistic regression on the employment situation one year after graduation for 2775 masters graduated at the University of Trento between 2009 and 2013. The dummy variable "2YMC" (2-years master's course) indicates if the master's course is a 2-years programme.

	Unemployed		**Trainee**	
	coef.	**s.e.**	**coef.**	**s.e.**
Intercept	-0.020	(0.0243)	0.895 ***	(0.0148)
Personal information				
Female	0.632 ***	(0.0261)	0.429 ***	(0.0407)
Domicile (ref.: Trentino – A. A.)				
North-East	0.053	(0.0496)	0.442 ***	(0.0476)
North-West	0.128 **	(0.0456)	0.195 ***	(0.0312)
Centre, South and Isles	0.736 ***	(0.0258)	1.060 ***	(0.0489)
Social class (ref.: working class)				
White-collar workers	-0.076 **	(0.0316)	0.041	(0.0583)
Lower middle class	-0.065 .	(0.0453)	0.032	(0.0306)
Upper middle class	-0.470 ***	(0.0197)	0.054	(0.0491)
Indeterminate social class	-0.507 ***	(0.0292)	-0.669 ***	(0.0567)

following

following from page 92 **Tab. 8:**

	Unemployed		Trainee	
	coef.	**s.e.**	**coef.**	**s.e.**
University career				
Duration (ref.: average)				
Short	-0.018	(0.0465)	0.346 ***	(0.0182)
Long	0.117 ***	(0.0199)	0.343 ***	(0.0227)
Final degree score (ref.: average)				
Low	0.093 ***	(0.0223)	-0.178 ***	(0.0383)
High	-0.435 ***	(0.0216)	0.206 ***	(0.0369)
Irregularity index	0.015	(0.0307)	-0.062 **	(0.0220)
if_changed	2.090 ***	(0.0177)	0.732 ***	(0.0406)
*if_changed * number_of_changes*	-0.917 ***	(0.0364)	0.008	(0.0438)
*if_changed * internal*	-0.530 ***	(0.0239)	-0.106 ***	(0.0339)
Other information				
High school (ref.: scient. lyceum)				
Classical lyceum	-0.451 .	(0.0325)	0.356 ***	(0.0303)
Other	-0.075 **	(0.0319)	0.146 ***	(0.0471)
High school final mark	-0.025 .	(0.0180)	-0.025 .	(0.0186)
Matriculation age (ref.: on time)				
Up to two years late	-0.574 ***	(0.0300)	0.738 ***	(0.0249)
Later than two years	1.118 ***	(0.0323)	1.709 ***	(0.0224)
On time * 2YMC	0.205 ***	(0.0520)	-1.083 ***	(0.0270)
Up to two years late * 2YMC	0.707 ***	(0.0247)	-1.867 ***	(0.0291)
Later than two years * 2YMC	-0.937 ***	(0.0387)	-2.782 ***	(0.0420)
Year of graduation (ref. 2009)				
2010	0.034	(0.0324)	-0.017	(0.0573)
2011	0.185 ***	(0.0478)	-0.074 *	(0.0395)
2012	0.352 ***	(0.0232)	0.102 ***	(0.0260)
2013	0.400 ***	(0.0217)	-0.138 ***	(0.0217)
Random effects				
Intercept	0.001	(0.0359)	0.643 ***	(0.0440)
Short duration	0.007	(0.0499)	0.030	(0.0369)
Long duration	0.008	(0.0437)	0.021	(0.0509)
Low final degree score	0.005	(0.0591)	0.019	(0.0541)
High final degree score	0.044	(0.0359)	0.021	(0.0303)

Sign. codes: " . " for p-values between 0.05 and 0.1, " * " for p-values between 0.01 and 0.05, " ** " for p-values between 0.001 and 0.01, " *** " for p-values smaller than 0.001. No symbol is reported for p-values larger than 0.1.

Tab. 9: Parameter estimates and standard errors (in parenthesis) of the 2-level logistic regression on coherence between study and work one year after graduation for 1668 employed masters graduated at the University of Trento between 2009 and 2013. The dummy variable "2YMC" (2-years master's course) indicates if the master's course is a 2-years programme.

	Study-work incoherence	
	coef.	**s.e.**
Intercept	-0.558 ***	(0.1000)
Personal information		
Female	0.769 ***	(0.0934)
Domicile (ref.: Trentino – A. A.)		
North-East	0.242 *	(0.1290)
North-West	-0.675 ***	(0.1280)
Centre, South and Isles	0.393 ***	(0.0732)
Social class (ref.: working class)		
White-collar workers	-0.347 ***	(0.0946)
Lower middle class	-0.482 ***	(0.0853)
Upper middle class	-0.905 ***	(0.0474)
Indeterminate social class	-1.018 ***	(0.1510)
University career		
Duration (ref. average)		
Short	-0.086	(0.1230)
Long	0.484 ***	(0.0630)
Final degree score (ref.: average)		
Low	0.174 ***	(0.0517)
High	-1.022 ***	(0.0460)
Irregularity index	-0.134 **	(0.0456)
if_changed	-0.954 ***	(0.0725)
*if_changed * number_of_changes*	0.476 ***	(0.1180)
*if_changed * internal*	0.335 ***	(0.0687)
Other information		
High school (ref.: scient. lyceum)		
Classical lyceum	0.055	(0.1160)
Other	-0.146 *	(0.0706)
High school final mark	-0.015	(0.0437)

following

following from page 94 **Tab. 9:**

	Study-work incoherence	
	coef.	**s.e.**
Matriculation age (ref.: on time)		
Up to two years late	0.495 ***	(0.0516)
Later than two years	-8.768 ***	(0.0549)
On time * 2YMC	0.307 *	(0.1440)
Up to two years late * 2YMC	-0.655 ***	(0.1190)
Later than two years * 2YMC	8.685 ***	(0.0550)
Year of graduation (ref.: 2009)		
2010	-0.271 ***	(0.0515)
2011	-0.405 ***	(0.1080)
2012	-0.192 **	(0.0641)
2013	-0.446 ***	(0.0987)
Random effects		
Intercept	0.284 ***	(0.0356)
Short duration	0.002	(0.1040)
Long duration	0.019	(0.1090)
Low final degree score	0.015	(0.1020)
High final degree score	0.041	(0.0747)

Sign. codes: " . " for p-values between 0.05 and 0.1, " * " for p-values between 0.01 and 0.05, " ** " for p-values between 0.001 and 0.01, " *** " for p-values smaller than 0.001. No symbol is reported for p-values larger than 0.1.

6. CONCLUSION

The analysis proposed in this paper highlighted the presence of factors affecting the employment opportunities of graduates: gender and social class. Both variables have a significant and remarkable effect both on unemployment risk and on the probability of finding a job consistent with their studies.

Female graduates and graduates from the lowest social classes face the hardest work opportunities, nevertheless such disparities are by far more pronounced amongst masters than bachelors.

A possible explanation to this fact may be labour market segmentation, which is more pronounced for high-skilled workers. Support to this interpretation is provided by estimates on course-level random effects, which suggest that there is a larger heterogeneity in employment opportunities amongst masters than bachelors.

A second result which is worth of being stressed has to do with field of study heterogeneity. Estimates illustrated in Section 4 and in Section 5 indicate that there is not horizontal inequality in the unemployment risk once personal conditions and

university curriculum is accounted for. On the other hand, a significant (and in some cases remarkable) horizontal inequality emerges on the probability to be in a training work experience and on the probability to find a job consistent with one's studies.

This evidence may be interpreted as the result both of labour market segmentation which gives rise to inhomogeneous working conditions amongst different industries, and of low overall unemployment rate of Northeast Italy (where most of graduates considered actually lives and works) which makes easier to find a job (eventually inconsistent with people's skills) for any person looking for it.

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