

[Simona Iammarino](#) and Elisabetta Marinelli

Education-job (mis)match and interregional migration: Italian university graduates' transition to work

**Article (Accepted version)
(Refereed)**

Original citation:

Iammarino, Simona and Marinelli, Elisabetta (2015) *Education-job (mis)match and interregional migration: Italian university graduates' transition to work*. *Regional Studies*, 49 (5). pp. 866-882. ISSN 0034-3404

© 2014 [Regional Studies Association](#)

This version available at: <http://eprints.lse.ac.uk/59526/>

Available in LSE Research Online: May 2015

LSE has developed LSE Research Online so that users may access research output of the School. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LSE Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain. You may freely distribute the URL (<http://eprints.lse.ac.uk>) of the LSE Research Online website.

This document is the author's final accepted version of the journal article. There may be differences between this version and the published version. You are advised to consult the publisher's version if you wish to cite from it.

Education-job (mis)match and interregional migration.

Italian university graduates' transition to work

Simona Iammarino^a and Elisabetta Marinelli^{a,b}

^a London School of Economics and Political Science, Department of Geography and the Environment, Houghton Street, London WC2A 2AE, United Kingdom. E-mail: S.Iammarino@lse.ac.uk

^b European Commission JRC-IPTS, C/ Inca Garcilaso 3, 41092, Seville, Spain. E-mail: Elisabetta.MARINELLI@ec.europa.eu

Abstract

This paper analyses the micro-level determinants of the education-job (mis)matches of recent university graduates in Italy. As the Italian graduate population has experienced increasing internal migration, we focus in particular on the role of interregional migration in driving education-job match. The methodology takes into account both the endogenous relationship between migration and employment, and the self-selection bias between employment and education-job (mis)match. Using a survey on Italian graduates' entry into the labour market, we find that whilst migration at the national level is confirmed to have a positive role in both finding a job and decreasing the probability of overeducation, robust differences emerge when looking at the subnational dimension. Indeed, the Northern regions by receiving inflows of Southern graduates that manage to attain a good education-job match in the recipient labour markets, are apparently reaping part of the return to the investment in university education bore in the South.

Key words: graduate education-job match, overeducation, interregional migration, graduate entry in labour markets, Italian regions.

JEL classification: R1, R23, J2

Acknowledgements: The authors gratefully acknowledge the funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 266959. The authors would like also to thank the participants in the European Seminar EuroLIO Geography of Innovation, January 2012, St Etienne; the AAG 2012 Annual Meeting, February 2012, New York; and the Regional Studies Association European Conference, May 2012, Delft. All errors and omissions remain our own.

1. Introduction

It is largely acknowledged that graduates' entry into the labour market is a critical mechanism through which public investment in higher education generates its returns (e.g. Pavitt, 1991; Salter and Martin, 2001). As well as carrying up-to-date knowledge, graduates possess competencies and capabilities to combine and use knowledge in new productive ways (e.g. Walters, 2004; von Tunzelmann and Wang, 2007). It follows that the returns to public, as well as private, investment in human capital crucially depend on the use that graduates can make of their education in the labour market, that is, on the degree of their education-job match.

From a regional perspective, a crucial question becomes whether university graduates' education-job match or mis-match – the latter commonly indicated as overeducation – vary across regions within countries, leading to different returns to investments in higher education across space. Following the seminal work of Büchel and van Ham (2003), recent contributions have shown that geographical characteristics are likely to affect labour market outcomes such as match or overeducation. At the same time, the literature on technological

change has long posited that an alignment between the local stage of socio-economic development and the quality of local human capital is a necessary condition for the latter to generate regional economic growth (e.g. Nelson and Phelps, 1965; von Tunzelmann, 2009). The rationale behind this view crucially depends on the assumption that graduates remain within the region where the investment in learning and education was carried out, or that gaps between the local demand and supply of human capital are met by adequate migration flows. Indeed, one of the explanations for the existence of education-job mismatch indicated by the literature is the limitation in the geographical scope of the graduates' job search.

Despite the links between the literature on skills/education and regional/spatial perspectives, the geographical dimension of graduates' skill use and their sub-national mobility are still underexplored. This paper addresses this gap focussing on the case of Italy, testing whether spatial mobility has an impact on education-job matching in the early stage of the graduate's professional career. Indeed, one of the tasks of evolutionary economic geography is to understand how a territorial perspective can shed light on the learning processes underpinning economic evolution. By showing that geography shapes the relationship between migration and education-job match, this paper provides critical insights to the field, further supporting the need to look at migration not simply as a mechanism for labour reallocation but also in terms of the knowledge flows it generates

Italy, with its marked sub-national disparities and increasing internal graduate migration, allows important insights to emerge, by framing the phenomenon under scrutiny against the geographical context that produce and employ graduate skills. The exercise adds novel empirical evidence to a crucial area of research and policy interest, so far largely investigated with reference to Anglo-Saxon or Northern European countries (Consoli et al., 2013).

The data used in this paper come from the survey on graduates' entry into the labour market carried out by the Italian National Statistical Institute (ISTAT, 2010). We use originally

developed indicators of education-job (mis)match, and apply ordered logit models. In so doing we take into account both the endogeneity between migration and labour market outcomes, and the graduates' self-selection into employment, issues normally not tackled simultaneously in the current literature.

The paper is organised as follows. Section 2 reviews the relevant strands of literature that provide the background of the study, and identifies the contribution of the paper; at the same time, it briefly sketches the Italian context and its territorial dualism. Section 3 introduces the data, defines the indicators of education-job match and overeducation, and provides some descriptive statistics. Section 4 describes the econometric strategy and specification, whilst Section 5 discusses the empirical findings. Section 6 concludes with a summary of the main results and their possible implications, and some future research directions.

2. Background literature and context of the study

2.1. Graduate education-job match, overeducation and spatial mobility

The vast literature on education-job (mis)match, and in particular on overeducation, has been stimulated by the observation that generalised increases in education levels have not been always mirrored by rises in skills' use and remuneration (see Sloane, 2003, and McGuinness, 2006, for excellent reviews). Although in the seminal work of Rosen (1972) overeducation emerges as a rather transitory phenomenon – as workers accept jobs requiring less education than that they actually possess in order to gain experience and improve their chances of a more suitable occupation in the future – the debate on the nature and persistence of education-job mismatch is still far from being conclusive, with disconcerting evidence particularly with respect to university graduates (e.g. Dolton and Vignoles, 2000; McGuinness, 2003; McGuinness and Wooden, 2009).

There are several reasons why understanding education-job (mis)match in relation to university graduates is important (Boudarbat and Chernoff, 2010). At the micro-level, it is well established that an inadequate alignment between acquired and required competences is associated to worse employment conditions (Sicherman, 1991), such as for instance lower salary (e.g. Battu et al., 2000; Heijke et al., 2003; Di Pietro and Urwin, 2006; Robst, 2007; Dolton and Silles, 2008) and employee dissatisfaction (e.g. Garcia-Espejo and Ibanez, 2006; Iammarino and Marinelli, 2011; Green and Zhu, 2012). At the organisation or firm level, on the other hand, overeducation is reflected in lower productivity and higher labour turnover (e.g. Wolbers, 2003).

The literature that has tried to disentangle the determinants of graduate overeducation at the micro-level has found that this condition is more common in part-time or temporary jobs, in which graduates may often find themselves at the beginning of their career – the so called *waiting room effect* (Dekker et al., 2002). In the same line, other empirical contributions indicate that overeducation decreases with tenure within a job (Groot and Maassen van der Brink, 2000). Scholars have also shown that graduates' education-job match depends on the field of study (Boudarbat and Chernoff, 2010; Venhorst and Cörvers, 2011) and, although the results are more mixed, on study performance measured by final grades (Battu et al., 1999; Biggeri et al., 2001; van der Klaauw and van Vuren, 2010).

Notably, on the basis of the high heterogeneity of graduates' conditions, some recent studies have pointed to the distinction between two different components of overeducation: the first can be related to the mismatch of the formal qualification, while the second refers to the underutilisation of skills and competencies acquired through the university study. These two components are conceptually and empirically different (see, for various interpretations, Allen and van der Velden, 2001; Chevalier, 2003; Green and McIntosh, 2007; Green and Zhu, 2012) and have been used in the attempt to disentangle between different degrees of mismatching, some deemed more serious than others.

Along with the interest for the micro level drivers and implications of education-job match, in the last decades emphasis has been put on the alignment, at the macro- or meso-level of the country or the region, between the skills demanded and the skills produced in a territory. Such debate has been framed within the discussion on the developmental role of universities and their explicit mission towards the generation and dissemination of knowledge and innovation (e.g. Rosenberg and Nelson, 1994; Etzkowitz and Leydesdorff, 1997; Morgan, 1997; Salter and Martin, 2001; Mowery and Sampat, 2005; Gulbrandsen et al., 2011). Scholars have emphasised that the impact of graduates on economic performance and knowledge creation depends on the overall level of social, technological and economic development of the regional system where they are employed (e.g. Nelson and Phelps, 1965; Vandebussche et al., 2006; von Tunzelmann, 2009; Crescenzi et al., 2013). A regional system with a strong knowledge base will thus benefit more from a highly skilled labour force than a backward one, as, for higher education investment to translate into local socio-economic benefits, the knowledge embodied in graduates needs to match or complement that embedded in the region (e.g. Frenken et al., 2007; Faggian and McCann, 2009; Rodríguez-Pose and Tselios, 2011; Kraber and Flöther, 2012; Consoli et al., 2013).

Whilst the importance of education-job match at the individual and systemic levels have been recognised as critical to understand the evolutionary mechanisms of learning and knowledge creation processes (Healy and Morgan, 2009; Rodríguez-Pose and Tselios 2011, 2012; Consoli et al., 2013), more needs to be done to fully appreciate how geography shapes these phenomena.

In this respect, the study of the link between interregional migration and education-job match can shed light on how spatial conditions, by affecting the opportunity to apply – or not – skills, generate – or fail to do so – virtuous cycles of accumulation, creation and diffusion of

knowledge.¹ Whilst the literature covering the links between migration and education-job match has not specifically taken this perspective, the current wealth of results indirectly encourage this line of analysis. For instance, one of the explanations for overeducation has been identified in the limited spatial scope of the job search (Sloane, 2003). Büchel and van Ham (2003) and Ramos and Sanromà (2011) show how spatial constraints are very likely to affect labour market outcomes. The former, focussing on the effect of regional characteristics and spatial mobility across labour markets in West Germany, point to a negative relationship between mobility (i.e. in terms of possibility of commuting by car) and overeducation. The latter show that young graduates may be forced into overeducation conditions by the peripherality and lack of effective connections of their location, highlighting the importance of geographical characteristics such as city size and access to larger labour markets. Similar results are found by Croce and Ghignoni (2011) in Italy, Hensen et al. (2009) and Venhorst and Cörvers (2011) in the Netherlands.

The above empirical studies, while mostly confirming that spatial mobility/migration can be a means of reducing overeducation, invariably demand to look more in depth into geographic-specific explanations for overeducation. As the full use of competencies and skills is a crucial input to both regional innovative activity and economic growth, graduates' spatial movements can potentially affect the long-term dynamics of regional development (see also Faggian and McCann, 2006; Marinelli, 2011, 2013).

2.2 The Italian case

This paper aims at shedding light on the links between education-job match and interregional migration by focusing on the case of Italy. The country is an interesting example for this purpose, as its dualistic socio-economic structure, with the South lagging historically behind the rest of the country (among a vast literature, Vaccaro, 1995; Viesti, 2003; Iammarino,

¹ A rather abundant stream of literature refers to international migration and general overeducation (i.e. not specifically at the university level). See, among others, Quinn and Rubb (2005), and Chiswick and Miller (2009).

2005; Barca, 2006; SVIMEZ, 2009), results in strongly geographically differentiated skill markets. Broadly speaking, the North comprises, on the one hand, some highly innovative regions, with strong interactions among local economic actors and institutions, good scientific and technological infrastructure and effective policies; on the other, a group of *learning regions* (particularly in the North East) with strong endogenous competences, despite the relatively low formal R&D. The Centre is dominated by Lazio, the capital-region, which although captures a large proportion of the national public R&D, does not show the same dynamic industrial structure and specialisation of the North. The regions of the South (or Mezzogiorno) are largely lagging behind, with scattered specialisation mostly in traditional and low technology industries, and weak innovation and systemic linkages. Furthermore, in recent years these geographical disparities have been accompanied by an increasing internal brain-drain. Since the mid-1990s, the Mezzogiorno regions have experienced substantial outflow of graduates (e.g. Piras, 2005 and 2006; D'Antonio and Scarlato, 2007), particularly towards more innovative and dynamic regions that offer wider and better opportunities to apply competences and skills (Svimez, 2009; Marinelli, 2011; Dotti et al., 2012; Meliciani and Radicchia, 2014).

A further reason that makes Italy an interesting case study is that, whilst the typical Italian dualism is not reflected in university educational attainment, with the Centre and the North showing levels of higher education similar to those of the Mezzogiorno (e.g. Piras, 2005 and 2006; Di Liberto, 2007), there are large differences in the employment opportunities open to graduates from different parts of the country (Coniglio and Peragine, 2007). Three years after graduation the proportion of employed graduates is 74% in the country as a whole, while in the South it drops to 59.2% (ISTAT, 2005; 2006). Moreover, jobs are often not accessible by merit alone, as the area is characterized by very low social mobility (Cecchi and Dardanoni, 2002) with the family upbringing influencing the access to the labour market (Cecchi and Peragine, 2005).

Against this background, the present paper aims at contributing to the still overlooked spatial dimension of overeducation, focussing on the empirical investigation of two research questions: 1. whether interregional migration impacts on education-job match and overeducation in the early stages of graduates' integration in the labour market; 2. whether such link differs according to the geographical area the graduates are moving from and towards.

3. Data and indicators

3.1 Dataset

The paper uses the *Indagine sull'Inserimento Professionale dei Laureati* (ISTAT, 2010) carried out periodically by the Italian National Statistical Institute. The survey investigates the entrance of graduates into the labour market three years after they completed their studies. In what follows, we use the 7th edition of the survey, carried out in 2007 and covering 2004 graduates. At the time, the Italian system was in transition from the old *Laurea degree* (a longer degree comprising Bachelor and Master) to the new system aligned to the Bologna process, based on Bachelor and Master at two different stages. Here we will focus exclusively on graduates from the old system: they account for 167,886 of the total universe of 260,070 Italian graduates in 2004, and for 26,570 of the Indagine's sample of 47,300.

The *Indagine* is characterised by one-stage stratification by gender, university and type of degree. Each of the surveyed individuals is attributed a sampling weight which allows to build indicators representative at the level of nation, field of study and, most importantly for the objective of the present work, region of study and current region of residence and employment.

3.2 Education-job (mis)match: indicators

Different indicators and methods of measuring education-job match have been applied in the literature. According to Verhaest and Omey (2006) three categories of indicators can be identified: 1. those based on a professional job-analyst's definition of the skills or educational requirements for each occupation, labelled as 'objective' measures; 2. those based on the 'subjective' assessment of the educational requirements (i.e. the graduate's or the employer's) of the job; 3. those based on the distance between the worker's education and the mean or modal education level of her/his occupational group, labelled as 'empirical method'.²

The indicators used here fall in the second category of subjective or self-reported measures. In particular we use, both separately and in conjunction, information on (a) the formal educational requirements of the employer (referred in the literature as Indirect Self-Assessment), and (b) the graduates' self-assessment with respect to the competences and skills required to perform their job (Direct Self-Assessment). According to Wald and Fang (2008), this type of measures has the advantage of being job-specific. However, being subjective, it may be biased by the individual's attitudes, for instance when the graduate wishes to increase the standing of the job (Hartog, 2000; Sgobbi and Suleman, 2013).

The *Indagine* asks graduates the following question related to the employers' educational requirement (Indirect Self-Assessment):

1a. Was the laurea degree formally required by the employer to apply for the job?

As for the Direct Self-Assessment, the question from the survey is:

1b. Is the laurea degree effectively necessary to carry out the job?

² On the limitations of all the three measures of education-job match, see Sloane (2003), and Sgobbi and Suleman (2013).

Both questions generate a yes/no dichotomous variable. However, whilst question 1a gives insights on the qualification required, question 1b provides information on the graduate's perception of the use of her/his competences and skills acquired through university education. We employ a combined indicator, building on Allen and van der Velden (2001), Chevalier (2003), Ungaro and Verzicco (2005), and Iammarino and Marinelli (2011), incorporating the crucial distinction between qualification and competencies/skills utilization discussed in Section 2 above.³

We obtain a matrix of four possible education-job (mis)matches, as described in Figure 1:

[Figure 1 about here]

Following the literature, a match or mismatch (overeducation) are defined as *real* when the opinion of the graduate on the effective need of her/his qualifications is coherent with the perception of the formal requirement of the job. A *real match (real overeducation)* therefore arises when the graduate believes (does not believe) that her/his education level is effectively needed in the job, and when the degree was also (was not) a formal requirement of the employer. Whenever the opinion of the graduate and the employer's condition differ, on the other hand, *apparent match (apparent overeducation)* arises. Specifically, when a graduate feels that the degree is needed in her/his work, though the employer did not formally require it, the graduate is experiencing *apparent education-job match*. Conversely, when the graduate is in a job for which the degree was formally required but is perceived unnecessary she/he is experiencing *apparent overeducation*.

In other words, of the two typologies of the matrix above that correspond to overqualification (i.e. those for which, according to the Indirect Self-Assessment, the degree was NOT formally required by the employer), only the situation in which the graduate is both overqualified and

³ See also Di Pietro and Urwin (2006) and Quintano et al. (2008) for alternative indicators based on the *Indagine*.

overskilled represents what the literature has indicated as *real overeducation*; the other category is instead indicated as *apparent match*, as it implies a full skills' utilisation. Conversely, *apparent overeducation* is the category where graduates have a matched qualification but their competences and skills are perceived as underutilised: these graduates may be hired by employers who want to benefit from highly qualified labour force even in low-skilled and low-salary jobs (a phenomenon already discussed for Italy by Di Pietro and Urwin, 2006). On the other hand, *apparently matched* graduates may be frustrated with their economic treatment, because employers are labelling the occupation as 'non-graduate' in order to pay lower wages, but employees perceive their skills as necessary to perform the job.

The above four typologies can be ordered in the following way: *real overeducation* indicates the lowest (or worst) degree of education-job match, followed by *apparent overeducation*, *apparent match* and a *real match*.⁴ An ordinal variable of education-job (mis)match is thus created, comprising the following levels:

1. Real overeducation
2. Apparent overeducation
3. Apparent match
4. Real match

3.3 Descriptive statistics

Interregional migrants are here defined as graduates whom, three years after graduation, are residing in a region different than the one in which they studied, and represent about a quarter

⁴ In placing *apparent overeducation* below *apparent match* in the ordered scale, we have assumed that the graduate's judgement on skill's use is more relevant than the employer's assessment. This choice is supported, in the results, by strongly significant coefficients for the cut off points. Nevertheless, in our robustness tests we have collapsed the two categories and the key results of the analysis remain stable (see footnote 13).

of Italian graduates: such proportion is similar across the three Italian macro-regions (see Figure 2 for the geographical definition).⁵

[Figure 2 about here]

As Table 1 shows, whilst nearly 25% of total migrants move from the South to the Centre or North of the country (9.6% and 14.9% respectively), the proportion of those who leave the North for the Centre or the South is less than 15% in total: to be noted that nearly 27% of total migrants are intra-North. The proportion of total migrants that leave the Centre for another macro-region is slightly above 19% (8.9% for the North and 10.2% for the South).

[Table 1 about here]

Table 2 firstly highlights the remarkable differences among the three macro-regions in terms of employment rate. In the South only 59.8% of graduates are employed, as compared to 83.4% in the North and 72% in the Centre. Although employment opportunities are significantly lower in the Mezzogiorno, the proportion of graduates with favourable education-job match is slightly higher in the South than in the other parts of Italy, whilst the shares are lower for overeducation (both real and apparent). Overall, those who qualify for having achieved real overeducation (real match) according to our composite indicator based on the matrix reported in Figure 1 are 18.3% (61%) in the South, versus 21.7% (55.3%) in the Centre and 20.2% (58.3%) in the North.

[Table 2 about here]

⁵ For the definition of the mobility categories see the variable list in Table 4.

Finally, Table 3 compares stayers, migrants and South-to-Centre/North migrants across the main indicators of education-job (mis)match. Remarkably, the values for graduates migrating after university from the South to work in other regions are higher across all indicators but for overeducation (both real and apparent), indicating an overall better education-job matching for these southern migrants as compared to other migrants and stayers.

[Table 3 about here]

4. Econometric strategy and specification

4.1 Endogeneity and sample selection

In exploring our research questions we need to take into account two possible biases.

1. the endogenous relationship between mobility behaviour and employment;
2. the issue of self-selection into employment.

As a long scholarly debate has explored whether migration is the cause or the consequence of employment and other labour market outcomes (see Hoogstra et al., 2011, for a meta-review), we take such issue into account in our methodology. As for self-selection, the degree of education-job (mis)match is observable only for those graduates that are actually employed (see, among others, Buchel and van Ham, 2003; Jauhiainen, 2011; Devillanova, 2013). Thus, if unobserved factors affecting the outcome (in the case here, the education-job (mis)match) are correlated with unobserved factors affecting the selection process (i.e. whether graduates are employed or not) standard regression techniques deliver inconsistent estimators (Heckman, 1979).

To tackle both issues we apply the methodology devised by Arendt and Holm (2006), which is an extension of the Heckman correction (Heckman, 1979).⁶ Specifically, we follow these three logical steps: first, we estimate an equation explaining the migration decision; based on this, we calculate the Inverse Mill's Ratio (IMR)⁷, which becomes an explanatory variable for the employment equation, accounting for the endogeneity between the latter and migration. Secondly, we estimate the employment equation, and calculate its own IMR, which then becomes one explanatory variables of the third step, to account for self-selection between employment and education-job match. Finally, we estimate the education-job match equation.

As the software STATA allows for estimating probit and ordered probit with sample selection, empirically the three steps are collapsed into two stages, as follows:

1. Stage 1: we estimate the migration equation and calculate the IMR;
2. Stage 2: we run both ordered (Miranda and Rabe-Hesketh, 2006) and binary probit with sample selection. These models estimate two equations simultaneously: one selection equation, which accounts for the probability of the graduate being employed; and one outcome equation, where the level of education-job match is estimated.

To assess whether there is effectively a selection bias we look at the parameter ρ , which measures the correlation between the error terms of the two equations: when ρ is significantly different from zero, then the Heckman selection model is appropriate. When ρ is not significantly different from zero, we estimate only the outcome equation, including the IMR from the migration equation among the independent variables.

⁶ Current routines available in STATA do not allow accounting, at the same time, for self-selection and endogeneity in ordered models. It is thus necessary to use an approximation and, to do so, we extend the approach of Arendt and Holmes (2006) – who focus on a binary dependent – to our ordered dependent variable.

⁷ The IMR is the ratio of the probability density function to the cumulative distribution function of a distribution.

4.2 Econometric Specification

As mentioned above we need to specify three equations, explaining migration, employment status and education job-match respectively. The complete list of variables and their explanation for all three equations is reported in Table 4 below.

4.2.1 Step 1: migration equation

We estimate the probability of being a migrant versus being a stayer (Migr), where migrant is defined as a graduate whom, three years after graduation, is residing in a region different than the one in which she/he studied (conversely a graduate who remained in the same region of study is classified as a stayer).⁸ The migration equation is specified as follows:

$$Migr = f(\text{Field1}, \text{Mark}, \text{High_school_mark}, \text{Prev_degree}, \text{Study_migr}, \text{Erasmus}, \text{Work}, \text{Study_father}, \text{Uni_city}, \text{Uni_regio})$$

Following the literature discussed in Section 2, among the explanatory variables for the migration equation we include covariates accounting for the geographical origin (i.e. of study, Uni_city, Uni_regio) and academic (Field1, Mark, High_school_mark, Prev_degree) and social background (Study_father) of the graduate. Furthermore, we include experience of previous migration, of study abroad and work (Study_migr, Erasmus, Work), as these factors

⁸ This definition of interregional mobility (as well as that more articulated used in the outcome equation) is clearly limited, as it does not distinguish between those who moved to return to their home region – having studied somewhere else – from the rest. Unfortunately, the *Indagine* does not allow performing such a distinction; however, in one of our robustness checks we take this aspect into account, following the methodology devised in Marinelli (2013).

have been shown to affect the likelihood of future moves (see, among others, de Grip et al., 2010).⁹

4.2.2 Stage 2: selection and outcome equations

Our selection equation, which explains graduates' employment status (a binary variable, expressing whether the graduate is employed or not), is specified as follows (for the detailed list of variables see Table 4):

$$Employment = f(\text{Migr}, \text{Field2}, \text{PERSONAL}, \text{CURR_EDU}, \text{Macro_Region}, \text{Uni_city}, \text{IMR})$$

where Migr is a binary variable defined as in the migration equation, Field2 captures the broad field of university study (including five disciplinary groups)¹⁰, PERSONAL is a vector of variables on personal characteristics of graduates, CURR_EDU is a vector on engagement in further education. Two other controls take into account the location of study of the graduate (Macro_Region and Uni_city); IMR is the Inverse Mills ratio, derived from the migration equation.

Finally, the outcome equation, explaining the education-job (mis)match – expressed as an ordinal variable with 4 levels as described in section 3.2 above – is specified as follows:¹¹

$$Edu\text{-}job\ match = f(\text{Mobility}, \text{Field2}, \text{Mark}, \text{ATTITUDE}, \text{JOB}, \text{Female}, \text{IMR})$$

⁹ Different specifications were explored: the final choice was based on indicators of goodness of fit, such as the Pseudo-R2 (0.3007) and the percentage of correctly predicted cases (83.7%).

¹⁰ In the migration regression we use the expanded version for this variable (9 fields). The reason is that, whilst in the migration equation our main concern was the predictive power of the model, in the employment and education-job match models we opted for a more parsimonious specification.

¹¹ As a robustness check, we run regression also on the binary indicators based on the questions of the survey (see section 3.2). Results are available on request from the authors.

where Mobility, our regressor of interest, is a categorical variable that distinguishes between migrants from the South to the Centre and North of Italy (StoCN), and the rest of interregional migrants (i.e. either within each macro-region or between the Centre and the North in either direction, or from them to the South). Other independent variables are: Field2, defined as in the selection equation; Mark; ATTITUDE, which is a vector of variables that capture the graduates' attitude towards their field of study; JOB, a vector of job-specific characteristics¹²; Female and IMR, both as in the employment equation.

[Table 4 about here]

We run the regressions for the ordinal indicator of education-job (mis)match identified in Section 3 for Italy as whole, and then separately for the North, Centre and South to evaluate whether differences emerge with respect to the integration of migrant graduates in the recipient labour markets.

5. Results

The results of the migration equation are reported in Table a.1 in Appendix 1. As this stage is only instrumental to our main selection and outcome regressions, commenting in detail the results is not deemed necessary. However, it is interesting to note that previous geographical mobility impacts on the chances of future relocation, with those who changed region to attend university (Study_migr) and those who took part in programmes of student mobility abroad (Erasmus) being more likely to move subsequently. In addition, and in line with expectations,

¹² In our analysis graduates who are in seasonal employment are excluded as well as graduates who started their current job before the end of their degree (about 9% of the total sample), as the *Indagine* does not provide information on their education-job match.

graduates who studied in large cities (Uni_city) are less likely to move, as they are more easily absorbed by the local labour market. The regional dummies highlight that Southern regions are invariably losing graduates to other Italian regions (with the only exception of Sardinia), while the results are far more mixed (and largely non-significant) for the North and Centre of the country.

Turning to our core research issue – the impact of interregional migration on education-job match – Table 5 shows the results of the ordered logit regressions for the four models: Italy as a whole, North, Centre, and South. In the latter case, however, the ρ was not significant, thus we report only the outcome equation, which includes the IMR from the migration equation among the explanatory variables.

[Table 5 about here]

First of all, in line with the empirical evidence reported in Section 2 on the overall positive effects of spatial mobility, the results indicate that for the country as a whole interregional migration increases both the probability of being employed and the probability of a better education-job match. Interestingly, migrating from the Mezzogiorno's regions towards the Centre-North of the country (Migr_StoCN) raises the likelihood to achieve a good education-job match relative to stayers and other migrants. It has to be noted that in our sets of regressions the cut-offs across the four categories of the education-job matrix represented in Figure 1 are all highly statistically significant and with coefficients of remarkable magnitude (bottom of Table 5), supporting our choice to rank the matching according to ordinal degrees of importance, from real overeducation to real match.

This main result at the national level, though, tends to average down different geographical peculiarities. In the regression for the North, whilst migrants and stayers have, other things being equal, the same chance of being employed (i.e. Migr is not significant in the selection

equation), migrants are overall more likely to improve their education job-match. Furthermore, as in the case of Italy as a whole, migrants from the South (Migr_StoN) are more likely than all the other graduates (both stayers and other migrants) to achieve a good match (the coefficient is highly significant and of notable magnitude). Conversely, in the regression for the Central regions the results at the national level are neither confirmed in the employment equation nor in the outcome equation: interregional mobility of graduates seems to have no impact on employability, or on the education-job match. Although the results for the South (outcome equation only) have to be interpreted with caution, some positive effect of overall inflows of migrants from the rest of Italy in the Mezzogiorno is exerted on the probability of a better match. A tentative explanation may be that migration from the Centre-North to the South occurs under specific circumstances in which a good education-job match is likely for graduate-profiles that are lacking in the local market.

Looking at the other explanatory variables, we notice that in the outcome equation graduates in Medicine and Science are more likely to experience a good education-job match, independently on geography. On the contrary, graduates in Humanities and Social sciences have always negative coefficients, which turn out to be highly significant in the regressions for Italy and the North, indicating that graduates in such fields are less likely to achieve a good education-job match (graduates in sport constitute the base category). As for the selection/employment equation, graduates in Medicine are the least likely to work within three years after graduation, reflecting the fact that the most common path for them is to enter further medical training, whereas those who studied Science are, consistently, the most likely to be employed; graduates with a degree in Humanities find more easily employment in the models for Italy and the North, both not in the Centre, whilst Social sciences seems to have no impact at all on employability. Overall, these findings confirm the widespread perception that while hard and technical science graduates incontrovertibly tend to have significantly better education-job matches, showing a shortage of such specialisations, social scientists tend to

experience a much worst underutilisation of their competencies, but in the case of the Centre (where the variable is never significant), possibly due to the wide use of these backgrounds in the public sector.

As expected, graduates who chose their degree out of interest and because of the job-prospects it provides are more likely to have a better match (coefficients of Interest and Job_prospects positive and significant in all equations but that for the South). In line with some previous findings, graduates with a higher grade are found to be more likely to be matched in all four models.

Job-specific characteristics seem to matter considerably in influencing overeducation. Not surprisingly, those who are self-employed are always far better matched than the other graduates in all regions of employment, conceivably demonstrating the rewarding role of entrepreneurship in terms of skill application across geographical areas (the magnitude of the coefficients of the variable Self_emp is impressive in all cases, and particularly in the equation for the South). The opposite is true for graduates who had previous job-experience, who seem invariably less likely to achieve a good education-job match independently on geography: this might hint to a worse capacity of integrating in the labour markets of those who had to work before and/or during their university studies, presumably because of personal financial constraints. Whilst the coefficient for salary is, as expected, generally positive, it is significant only for the models for Italy and the North; seniority does not seem to impact on education job-match, and actually it even shows a negative and significant role in the North regression.

Turning to personal characteristics, whereas gender has no effect on education-job match in any of our four models, in line with previous results being a female graduate definitely decreases the probability of finding a job across geographical boundaries. Among the explanatory variables inserted only in the selection equations – insofar as, following the

literature, they are likely to bear an impact on employability, more than determining overeducation versus a more favourable match – age does not show any impact on the probability of being employed, as well as the social background of the graduate (in terms of having at least one parent with university degree, i.e. Par_uni), which even turns out to exert a negative and significant effect on in the regression for the North. The variables PhD, Training and Otheredu, are – as expected – negative and significant across the models. Finally, geographical differences are reflected in the remarkably lower probability of graduates from the Centre and the South (as regions of university study) to be employed than those from the North, whereas having studied in a large city (Uni_city) seems to exert a positive and significant effect on employability in the regression for the North.¹³

7. Discussion and conclusions

The aim of this paper was to test empirically whether and where interregional migration has an impact on the education job-matches at the early stage of graduates' professional career. In so doing, we paid particular attention to graduates leaving the Southern regions of Italy, adding a more geographic-specific perspective on the determinants of overeducation. Such a perspective has indeed proved to be critical in understanding the learning processes and outcomes associated with graduate migration, and ultimately underpinning regional economic evolution.

¹³ To check further the robustness of the findings and the indicators we estimated the ordered models also with an alternative variable, collapsing the categories of Apparent overeducation and Apparent match. Furthermore, given the afore-mentioned limitations of the used definition of migration, we applied a method to tentatively distinguish (and exclude) returners from migrants in the *Indagine*, as defined in Marinelli (2013). The results across the different specifications confirm our main results on interregional migration as a means to reduce overeducation, particularly when migrating from the South.

Our findings confirm, for the national model, previous empirical literature on the positive role that interregional migration exerts both on decreasing the probability of real overeducation – i.e. the combination of both overqualification and underutilization of the graduate’s skills and capabilities – and on increasing the likelihood of finding a job. However, remarkable differences emerge when looking at the subnational dimension: whilst in the North – characterised by the most dynamic regional economic and innovation systems – migration significantly increases the likelihood of achieving a better education-job match, this is not the case for migrants to the Centre, in spite of the weight of the capital region in terms of employment in the public sector, structurally associated with a lower level of overeducation (Devillanova, 2013). Furthermore, whilst the North does not provide more job opportunities to migrants with respect to the local graduates, here the inflows of human capital, and particularly those from the Southern regions, seem to find a better fit between their own competences and the highly diversified economic structure of the area. Hence, the benefits of migration – general, if looking at the national case – seem to be particularly pronounced for those migrants coming to work in the North after graduating in the more peripheral and disadvantaged Mezzogiorno regions.

In the traditional role of ‘vector of regional convergence’ assigned to labour mobility by classical economics, the North of Italy emerges, once again, as a net winner: not only it gains from public investment in higher education made in other regions of the country, but it is also able to ensure a more productive use of such an investment than other areas. On the other hand, our analysis offers support to the more general story that the Mezzogiorno’s enduring productive capacity constraint pushes part of its endogenously created human capital somewhere else in order to be employed (see also Crescenzi et al., 2014). However, graduates who stayed seem to incur less in overeducation, while those who leave finds a more favourable application of their own competences in other parts of the country – indicating an overall strong capacity of getting integrated in the local job markets of destination.

These preliminary results need obviously further validation and extension: yet, they do seem to put in question the common perception of a lower quality of Southern university systems. Graduates from the South of Italy seem relatively better off in terms of education-job match if they do find a job in the same area: often, however, this is not the case, as the very low employment rate shows, consistently with the unemployment rate in the Mezzogiorno compared to the rest of the country: in the year of the survey, 2007, whilst the national average was 6.1%, the North displayed an unemployment rate of 3.5%, against the 11% in the South (ISTAT, 2014).¹⁴ Those graduates that then decide to move to other parts of the country, and especially to the Northern regions, are benefitting from such an interregional mobility far more than the others, either migrants or stayers.

Future research should dig further in the distinction between qualification and skill utilisation, and in the four categories of real and apparent overeducation and match. Following Devillanova (2013), we conclude that the positive effect of spatial mobility on education-job match needs additional investigation, particularly by assuming geographically-specific research perspectives. A better understanding of the profiles needed at the territorial level should have critical implications for public policies targeting the gap between the demand and the supply of competences and skills. At the same time, more effective regionally-designed interventions for the expansion and diversification of the Southern economic and innovation systems are extremely urgent, especially in light of the rising competition from global markets, which has made even more apparent the vulnerability of the Mezzogiorno's productive system as a whole. Education-job match is likely to be achieved only by enabling

¹⁴ Unemployment has not improved after the recent crisis, and for 2013, while Italy as a whole reported a rate of 12.2%, the Southern regions had a share around 20%, double and more than double than those for the Centre (10.9%) and for the North (8.4%) respectively.

complementary and coordinated efforts on both demand and supply of skills and upgrading and diversification of local economic structures.

References

- ALLEN, J. and VAN DER VELDEN, R. (2001) Educational Mismatches Versus Skill Mismatches: Effects on Wages, Job Satisfaction and On-the-Job Search', *Oxford Economic Papers*, 53(3), 434-452.
- ARENDT, J.N. and HOLM, A. (2006) Probit Models with Binary Endogenous Regressors, CAM Working Paper, 2006-06.
- BARCA, F. (2006) *Italia Frenata, Paradossi e Lezioni della Politica per lo Sviluppo*, Rome, Donzelli.
- BATTU, H., BELFIELD, C.R. and SLOANE, P. (1999) Overeducation Among Graduates: A Cohort View, *Education Economics*, 7(1), 21-38.
- BATTU, H., BELFIELD, C.R. and SLOANE, P. (2000) How well can we measure graduate overeducation and its effects?, *National Institute Economic Review*, 171: 82–93.
- BIGGERI, L., BINI, M. and GRILLI, L. (2001) The Transition from University to Work: a Multilevel Approach to the Analysis of the Time to Obtain the First Job, *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 164, 2, 293-305.
- BOUDARBAT, B. and CHERNOFF, V. (2010) The determinants of education-job match among Canadian university graduates, Scientific Series, Ciranos Working Paper 14-2010.
- BÜCHEL, F., & VAN HAM, M. (2003) Overeducation, Regional Labor Markets and Spatial Flexibility, *Journal of Urban Economics*, 53(3), 482-493.
- CHECCHI, D. and DARDANONI, V. (2002) Mobility Comparisons: Does Using Different Measures Matter ? *Research on Economic Inequality*, 9, 113-145.
- CHECCHI, D. and PERAGINE, V. (2005) Regional Disparities and Inequality of Opportunity: The Case of Italy. IZA Discussion Papers 1874, Institute for the Study of Labor, Bonn
- CHEVALIER, A. (2003) Measuring overeducation, *Economica*, 70: 509–531.

- CHISWICK, B. R. and MILLER, P. W. (2009) The international transferability of immigrants' human capital, *The Economics of Education Review*, 28: 162–169.
- CONIGLIO, N. and PERAGINE, V. (2007) Giovani al Sud: tra Immobilità Sociale e Mobilità Territoriale. In CONIGLIO, N. and PERAGINE, V. (Eds.) *Primo Rapporto Banche e Mezzogiorno*. Bari, Banca Carime-University of Bari.
- CONSOLI, D., VONA, F. and SAARIVIRTA, T. (2013) Analysis of the Graduate Labour Market in Finland: Spatial Agglomeration and Skill–Job Match, *Regional Studies*, 47:10, 1634-1652, DOI: [10.1080/00343404.2011.603721](https://doi.org/10.1080/00343404.2011.603721)
- CROCE, G. and GHIGNONI, E. (2011) Overeducation and spatial flexibility in Italian local labour markets, MPRA working paper no. 29670, October 2011.
- CRESCENZI, R., GAGLIARDI, L. and PERCOCO, M. (2013) Social capital and the innovative performance of Italian provinces, *Environment and Planning A*, 45(4), 908-929.
- CRESCENZI, R. GAGLIARDI, L. and ORRU', E. (2014) Learning mobility grants and skill (mis)matching in the labour market. The case of the 'Master and Back' Programme, LSE, mimeo.
- D'ANTONIO, M. and SCARLATO, M. (2007) I Laureati del Mezzogiorno: una Risorsa Sottoutilizzata o Dispersa. Quaderni SVIMEZ, SVIMEZ, Roma.
- DE GRIP, A., FOUARGE, D. and SAUERMAN, J. (2010) What affects international migration of European science and engineering graduates? *Economics of Innovation and New Technology*, 19(5), pages 407-421.
- DEKKER, R., DE GRIP, A. and HEIJKE, H. (2002) The Effects of Training and Overeducation on Career Mobility In A Segmented Labour Market, *International Journal of Manpower*, 23, 2, 106-125.
- DEVILLANOVA, C. (2013) Over-education and spatial flexibility: New evidence from Italian survey data, *Papers in Regional Science*, 92, 3, 445-464

- DI LIBERTO, A, 2007, Education and Italian Regional Development, *Economics of Education Review*, 27 (1), 94-107.
- DI PIETRO, G. and URWIN, P. (2006) Education and Skills Mismatch in the Italian Graduate Labour Market”, *Applied Economics*, 38, 1, 79-93.
- DOLTON, P.J. and SILLES, M.A. (2008) The effects of overeducation on earnings in the graduate labour market, *Economics of Education Review*, 27: 125–139.
- DOLTON, P.J. and VIGNOLES, A. (2000) The incidence and effects of overeducation in the U.K. graduate labour market, *Economics of Education Review*, 19(2), 179-198.
- DOTTI, N.F., FRATESI, U., LENZI, C. and PERCOCO, M. (2012) Local labour markets and the interregional mobility of Italian university students, Working Paper, BEST, Politecnico di Milano.
- ETZKOWITZ, H. and LEYDESDORFF, L. (eds.) (1997) *Universities in the Global Economy: A Triple Helix of University-Industry-Government Relations*, London: Cassell Academic.
- FAGGIAN, A. and McCANN, P. (2006) Human capital flows and regional knowledge assets: a simultaneous equation approach, *Oxford Economic Papers*, 58(3), 475-500.
- FAGGIAN, A. and McCANN, P. (2009) Human Capital, Graduate Migration and Innovation in British Regions, *Cambridge Journal of Economics*, 33(2), 317-333.
- FRENKEN, K., VAN OORT, F.G. and VERBURG, T. (2007) Related variety, unrelated variety and regional economic growth, *Regional Studies*, 41(5), 685–697.
- GARCÍA-ESPEJO, I. and IBÁÑEZ, M. (2006), Educational-Skill Matches and Labour Achievements among Graduates in Spain, *European Sociological Review*, 22, 2, 141-156.
- GREEN, F. and McINTOSH, S. (2007) Is there a genuine under-utilization of skills amongst the over-qualified?, *Applied Economics*, 39(4), 427-439.
- GREEN, F. and ZHU Y. (2010) Overqualification, job dissatisfaction, and increasing dispersion in the returns to graduate education, *Oxford Economic Papers*, 62: 740–763.

- GROOT, W. and MAASSEN VAN DEN BRINK, H. (2000) Overeducation in the Labor Market: A Meta-Analysis, *Economics of Education Review*, 19, 149-158.
- GULBRANDSEN, M., MOWERY D. and FELDMAN M. (2011) Introduction to the special section. Heterogeneity and University-Industry Relations, *Research Policy*, 40(1), 1-5.
- HARTOG, J. (2000) Mismatch and Earnings: Where Are We, Where Should We go, *Economics of Education Review* 19, 131-147.
- HEALY, A. and MORGAN, K. (2009), Spaces of Innovation: learning, proximity and the ecological turn, Utrecht University, Papers in Evolutionary Economic Geography (PEEG), No. 0918.
- HECKMAN, J. (1979), Sample selection bias as a specification error, *Econometrica*, 47, 153-161.
- HEIJKE, H., MENG, C. and RIS, C. (2003) Fitting to the job: the role of generic and vocational competencies in adjustment and performance, *Labour Economics*, 10, 215-229.
- HENSEN, M. M., DE VRIES, M. R., and CÖRVERS F. (2009) The Role of Geographic Mobility in Reducing Education-job Mismatches in the Netherlands, *Papers in Regional Science*, 88, 3, 667- 682.
- HOOGSTRA, G.J., VAN DIJK, J. and FLORAX, R.J.G.M. (2011) Determinants of Variation in Population–Employment Interaction Findings: A Quasi-Experimental Meta-Analysis, *Geographical Analysis*, 43(1), 4–37.
- IAMMARINO, S. and MARINELLI, E. (2011) Is the Grass Greener on the Other Side of the Fence? Graduate Mobility and Job Satisfaction in Italy, *Environment and Planning A*, 43, 2761-2777.
- IAMMARINO, S. (2005) An evolutionary integrated view of regional systems of innovation. Concepts, measures and historical perspectives, *European Planning Studies*, 13, 4, 495-517.

- ISTAT (2005) *L'Istruzione della Popolazione al 2001. Dati Definitivi del Censimento*, Istat, Rome.
- ISTAT (2006) *I Laureati e il Mercato del Lavoro*, Istat, Rome.
- ISTAT (2010) Indagine Campionaria sull'Inserimento Professionale dei Laureati. ISTAT, Rome.
- JAUHAINEN, S. (2011) Overeducation in the Finnish regional labour markets, *Papers in Regional Science*, 90(3), 578-588.
- KRABER, S. and FLÖTHER, C. (2012) Here Today, Gone Tomorrow? Regional Labour Mobility of German University Graduates, *Regional Studies*, DOI: [10.1080/00343404.2012.739282](https://doi.org/10.1080/00343404.2012.739282)
- MARINELLI, E. (2011) Graduates on the Move: Knowledge Flows and Italian Regional Disparities. Migration Patterns of 2001 Graduates, PhD thesis, London School of Economics and Political Sciences.
- MARINELLI, E. (2013) Sub-national graduate mobility and knowledge flows: An exploratory analysis of onward-and return-migrants in Italy, *Regional Studies*, 47 (10), 1618-1633.
- McGUINNESS, S. (2006) Overeducation in the Labour Market, *Journal of Economic Surveys* 20, 3, 387-418.
- McGUINNESS, S. and WOODEN, M. (2009) Overskilling, job insecurity, and career mobility, *Industrial Relations: A Journal of Economy and Society* 48 (2), 265-286.
- MELICIANI, V. and RADICCHIA, D. (2014) Informal networks, spatial mobility and overeducation in the Italian labour market, paper presented at the CIMR Workshop on Scientific Labour Markets and Innovation Systems, CIMR, Birkbeck College, London, 4 July 2014.
- MIRANDA, A. and RABE-HESKETH, S. (2006) Maximum likelihood estimation of endogenous switching and sample selection models for binary, ordinal, and count variables, *Stata Journal*, 6, 3.

- MORGAN, K. (1997) The Learning Region: Institutions, Innovation and Regional Renewal, *Regional Studies*, 31 (5) 491-503.
- MOWERY, D.C. and SAMPAT, B.N. (2005) The Bayh-Dole Act of 1980 and University-Industry Technology Transfer: A Model for Other OECD Governments?, *Journal of Technology Transfer* 30, 115-127.
- NELSON, R. R. and PHELPS, E. S. (1965) Investments in Humans, Technology Diffusion and Economic Growth, *American Economic Review*, 56.
- PAVITT, K. (1991), What makes basic research economically useful? *Research Policy*, 20,109-119.
- PIRAS, R. (2005) Il Contenuto di Capitale Umano dei Flussi Migratori Interregionali: 1980-2002. *Politica Economica*, 21, 461-491.
- PIRAS, R. (2006) I Movimenti Migratori Interregional per Titolo di Studio: una Stima dei Tassi Migratori ed un'Analisi dei Flussi. *Studi di Emigrazione*, 43, 153-170.
- QUINN, M. A. and RUBB, S. (2005) The Importance of Education-Occupation Matching in Migration Decisions, *Demography*, 42, 1, 153-167.
- QUINTANO, C., CASTELLANO, R. and D'AGOSTINO, A. (2008) Graduates in Economics and educational Mismatch: the Case Study of the University of Naples 'Parthenope', *Journal of Education and Work*, 21, 3, 249-271.
- RAMOS, R. and SANROMÀ, E. (2011) Overeducation and Local Labour Markets in Spain, IZA DP No. 6028, October 2011.
- ROBST, J. (2007) Education and Job Match: The Relatedness of College Major and Work, *Economics of Education Review*, 26, 397-407.
- RODRIGUEZ-POSE, A. and TSELIOS, V. (2010) Returns to migration, education and externalities in the European Union, *Papers in Regional Science*, 89(2), 411-434.

- ROSEN, S. (1972) Learning and experience in the labour market, *Journal of Human Resources*, 7(3), 326-42.
- ROSENBERG, N. and NELSON, R.R. (1994) American universities and technical advance in industry, *Research Policy*, 23(3), 323-348.
- SALTER, A. J. and MARTIN, B.R. (2001) The economic benefits of publicly funded basic research: a critical review, *Research Policy*, 30, 509 – 532.
- SGOBBI, F. and SULEMAN, F. (2013) A Methodological Contribution to Measuring Skills (Mis)Match, *The Manchester School* 81 (3) 420–437.
- SICHERMAN, N. (1991) Overeducation in the Labor Market, *Journal of Labor Economics*, 9(2), 101–122.
- SLOANE, P. J. (2003) Much ado about nothing? What does the over-education literature really tell us? In F. Büchel, A. deGrip, and A. Mertens (Eds.), *Overeducation in Europe: Current issues in theory and policy* (11–48). Cheltenham, UK: Edward Elgar.
- SVIMEZ (2009) *Rapporto sull'economia del Mezzogiorno 2008*, Bologna, Il Mulino.
- UNGARO, P. and VERZICCO, L. (2005) Misura e Analisi del Rendimento dei Titoli di Studio Superiori nella Fase di Primo Inserimento nel Mondo del Lavoro, Paper presented at the XX Convegno Nazionale di Economia del Lavoro. Rome, 22-23 September.
- VACCARO, R. (1995) *Unità Politica e Dualismo Economico in Italia: 1861-1993*. Padova, Cedam.
- VAN DER KLAUW, B. and VAN VUUREN, A. (2010) Job Search and Academic Achievement, *European Economic Review*, 54, 294–316.
- VANDEBUSSCHE, J., AGHION, P. and MEGHIR, C. (2006) Growth, Distance to Frontier and Composition of Human Capital, *Journal of Economic Growth*, 11, 97-127.

- VENHORST, V.A. and CÖRVERS, F. (2011) Entry into working life: spatial mobility and job match quality of higher educated graduates, Faculty of Spatial Science, University of Groningen, Mimeo.
- VERHAEST, D. and OMEY, E. (2006) The Impact of Overeducation and its Measurement, *Social Indicators Research*, 77, 3, 419-448.
- VIESTI, G. (2003) *Abolire il Mezzogiorno*, Bari, Laterza.
- VON TUNZELMANN, N. (2009) Regional Capabilities and Industrial Regeneration, in FARSHCHI, M., JANNE, O. and McCANN, P. (Eds), *Technological Change and Mature Industrial Regions: Firms, Knowledge and Policy*, Edward Elgar, Cheltenham, 11-28.
- VON TUNZELMANN, N. and WANG, Q. (2007), Capabilities and Production Theory, *Structural Change and Economic Dynamics*, 18, 192-211.
- WALD, S. and FANG, T. (2008) Overeducated Immigrants in the Canadian Labour Market: Evidence from the Workplace and Employee Survey, *Canadian Public Policy*, 34, 4, 457-479.
- WALTERS, D. (2004) The Relationship Between Postsecondary Education and Skill: Comparing Credentialism with Human Capital Theory, *Canadian Journal of Higher Education*, 34, 2, 97-124.
- WOLBERS, M.H.J. (2003) Job Mismatches and their Labour-Market Effects among School-Leavers in Europe, *European Sociological Review*, 19(3), 249-266.

Figure 1 – The matrix of education-job (mis)match

		Was the degree effectively necessary to carry out the job?	
		YES	NO
Was the degree formally required?	YES	REAL MATCH: matched qualification, full skill utilisation	APPARENT OVEREDUCATION: matched qualification, skill underutilisation
	NO	APPARENT MATCH: overqualification, full skill utilisation	REAL OVEREDUCATION: overqualification, skill underutilisation

Figure 2 – The Italian macro-regions



Table 1 - Graduate migration flows by macro-area

Origin	Destination		
	North	Centre	South
North	26.9%	7.4%	7.2%
Centre	8.9%	5.8%	10.2%
South	14.9%	9.6%	9.1%

Table 2 - Employment rate and indicators of education-job (mis)match by macro-area

	% Empl. rate	% Degree necessary for job (q.1b)	% Degree formally required (q.1a)	% Real overeducation	% Apparent overeducation	% Apparent match	% Real match
North	83.4%	68.5%	69.5%	20.2%	11.3%	10.3%	58.3%
Centre	72.0%	67.4%	66.2%	21.7%	10.9%	12.1%	55.3%
South	59.8%	72.6%	70.0%	18.3%	9.1%	11.7%	60.9%

Table 3 - Education-job (mis)match indicators by mobility category

	% Degree necessary for job (q.1b)	% Degree formally required (q.1a)	% Real overeducation	% Apparent overeducation	% Apparent match	% Real match
Stayers	68.5%	68.1%	20.7%	10.2%	12.2%	56.9%
All Other Migrants	70.4%	70.7%	19.1%	9.6%	12.9%	57.4%
South to Centre/North Migrants	75.4%	72.3%	15.9%	8.7%	11.8%	63.6%

Table 4 – List of variables included in the migration equation, selection and outcome equations (in alphabetical order)

ATTITUDE	A vector of variables that capture the graduates' attitude towards their field of studies. It includes: <ul style="list-style-type: none"> • Interest: a dummy variable that identifies those graduates who chose their degree because they were interested in the topic • Job prospects: a dummy variable that identifies those graduates who chose their degree because of the job prospects it offered
CURREDU	A vector of variables capturing those graduates currently engaged in further education, and includes: <ul style="list-style-type: none"> • PhD: the graduate is currently enrolled in a PhD programme • Training: the graduate is currently enrolled in a training/internship • Otheredu: the graduate is currently enrolled in other qualifications/courses
Edu-job match	Ordered indicator of education-job (mis) match based on Figure 1. It is the dependent variable of the outcome equation
Employment	Binary variable identifying graduates who are employed vs those unemployed. It is the dependent variable of the selection-equation
Erasmus	A binary variable capturing whether the graduate participated in international mobility programmes, such as Erasmus, during the degree.
Female	A dummy variable identifying the gender of the graduate (also in PERSONAL in the selection equation)
Field1	It captures the fields of study of the graduate and it is a covariate in the migration equation: <ul style="list-style-type: none"> • Humanities (base category) • Economics and statistics • Social and political sciences • Law • Sciences • Engineering • Architecture • Medicine • Sports
Field2	It captures the broad field of study and includes five groups, which collapse the 9 fields of Field1 (in parenthesis): <ul style="list-style-type: none"> • Sports (base category) • Humanities • Social Sciences (Economics and statistics, Social and political sciences and Law) • Hard & Technical Sciences (Sciences, Engineering and Architecture) • Medicine
High_school_M	It captures the high-school graduation mark and is expressed on a scale from 36 to 60
IMR	It is the Inverse Mills Ratio, derived from the migration equation
JOB	A vector of job-specific characteristics and includes: <ul style="list-style-type: none"> • Previous_job: a dummy variables that identifies graduates that had job experience before the current employment • Self_emp: a dummy variable that identifies graduates who are self-employed • Seniority: number of years the graduate has been in the job (from 0 to 3, as this question is asked exclusively to graduates who started their job after graduating and the <i>Indagine</i> targets graduates three after the end of their studies) • Salary: monthly salary of graduates expressed in euros
Macro_Region	A categorical variable identifying whether the graduate obtained the university degree in the North (the base category), Centre or South
Mark	A continuous variable that expresses the graduation mark of the graduate (in the Italian system from 70 to 110 <i>cum laudem</i> , the latter coded 111)
Migr	It is a binary variable which distinguish migrants (those who live in a region different than the one in which they graduates) from stayers (those who live in the same region of graduation). It is the dependent variable of the migration equation and one of the covariates in the selection equation. For the education-job match equation, we adopt a

	more complex indicator (mobility) accounting for the direction of migration
Mobility	<p>A categorical variable that distinguished between migrants from the South to the Centre and North of Italy, and the rest of interregional migrants (i.e. either within each macro-region or between the Centre and the North, or from there to the South). Specifically it distinguishes between.</p> <ul style="list-style-type: none"> • Stayers (the base category, those who remain in the same region in which they studied) • Migr_Italy: those who live in a different region than that of graduation, excluding South-to-Centre/North migrants (Migr_StoCN) • Migr_StoCN: those who left a region of the South to move to a region the Centre-North <p>As we run separate models for Italy and its three macro-areas, this latter variable is then split into the following:</p> <ul style="list-style-type: none"> ○ Migr_StoN: those who left a region of the South to move to a region the North ○ Migr_StoC: those who left a region of the South to move to a region of the Centre
PERSONAL	<p>A vector of variables capturing personal characteristics of graduates, including:</p> <ul style="list-style-type: none"> • Age: age of the graduate expressed in years • Female: a dummy variable that identifies female graduates • Par_uni: a dummy variable that captures the social background of the graduate by identifying whether she/he has at least one parent with university education
Prev_degree	A categorical variable that captures whether the graduate had other university titles before her/his graduation in 2004
Study_migr	A dummy variable that identifies whether the graduate attended University in the same region where she/he was residing before starting university
Study_father	An ordered variable, inserted in the regression as a continuous one, capturing the level of education of the father, with the following values: no title, elementary school, middle or vocational school, high school or high vocational school; university degree or doctorate
Uni_city	A binary variable that identifies graduates from the largest 9 cities of Italy: Torino, Genova, Milano, Bologna, Firenze, Roma, Napoli, Bari and Palermo
Work	<p>A categorical variable that identifies whether the graduate worked during her/his studies. It can take three values:</p> <ol style="list-style-type: none"> 1 Occasional work – the base category 2 Continuous work 3 Never worked

Table 5 – Regression results: order logit equations with ordered dependent variable in the outcome equations (education-job (mis)match, 4 levels)

	Italy	North	Centre	South ^a
	Outcome equations			
Migr_Italy	0.117*** (3.11)	0.167*** (3.07)	0.146 (1.64)	0.371* (1.76)
Migr_StoCN	0.195*** (3.16)			
Migr_StoN		0.364*** (4.77)		
Migr_StoC			0.0858 (0.81)	
Migr_StoS				0.0227 (0.10)
Humanities	-0.261*** (-3.43)	-0.264*** (-2.74)	-0.285 (-1.26)	-0.0270 (-0.10)
Soc Sciences	-0.337*** (-4.86)	-0.328*** (-3.88)	-0.144 (-0.66)	-0.588** (-2.34)
Hard Sciences	0.261*** (3.81)	0.235*** (2.79)	0.415* (1.87)	0.556** (2.18)
Medicine	1.451*** (12.60)	1.531*** (8.45)	1.356*** (4.46)	2.487*** (6.30)
Mark	0.0171*** (7.93)	0.0150*** (5.34)	0.0205*** (4.28)	0.0289*** (3.59)
Interest	0.165*** (3.68)	0.158*** (2.63)	0.252** (2.57)	0.216 (1.39)
Job_prospects	0.176*** (4.37)	0.208*** (3.78)	0.306*** (3.52)	-0.0723 (-0.52)
Previous_job	-0.132*** (-3.97)	-0.112** (-2.45)	-0.134* (-1.82)	-0.321*** (-2.88)
Self_emp	0.417*** (9.83)	0.428*** (7.10)	0.376*** (4.62)	0.817*** (5.32)
Seniority	-0.0103 (-0.64)	-0.0496** (-2.23)	0.0476 (1.46)	0.0192 (0.37)
Salary	0.000136*** (4.27)	0.000136*** (2.82)	0.0000763 (1.20)	0.000148 (1.36)
Female	0.000675 (0.02)	0.0194 (0.44)	-0.0586 (-0.89)	-0.0310 (-0.29)
IMR				0.366** (2.01)
	Selection equations (employment)			
Migr	0.195*** (4.38)	0.0364 (0.39)	-0.0487 (-0.28)	
Humanities	0.227*** (2.61)	0.437*** (3.63)	0.336 (1.45)	
Soc Sciences	-0.121 (-1.63)	-0.0872 (-0.84)	0.211 (0.99)	
Hard Sciences	0.405***	0.282***	0.668***	

	(5.23)	(2.65)	(2.98)	
Medicine	-0.938***	-1.089***	-0.615***	
	(-11.21)	(-8.93)	(-2.79)	
Par_uni	-0.0492	-0.152**	-0.0561	
	(-1.07)	(-2.31)	(-0.52)	
Age	0.00317	-0.00515	0.00795	
	(0.39)	(-0.50)	(0.37)	
Female	-0.260***	-0.276***	-0.238***	
	(-7.69)	(-5.14)	(-3.23)	
PhD	-1.556***	-1.703***	-1.435***	
	(-21.88)	(-16.79)	(-10.23)	
Training	-0.831***	-0.931***	-1.002***	
	(-14.17)	(-9.80)	(-7.87)	
Other_Edu	-0.398***	-0.391***	-0.435***	
	(-6.62)	(-4.50)	(-3.18)	
Centre	-0.413***	-0.0169	-0.0163	
	(-7.60)	(-0.13)	(-0.08)	
South	-0.605***	-0.0301	0.267	
	(-16.35)	(-0.24)	(1.59)	
Uni_city	0.00955	0.132**	-0.0446	
	(0.27)	(2.52)	(-0.59)	
IMR	0.149***	0.0703	-0.109	
	(3.82)	(1.30)	(-1.34)	
_cons	0.914***	1.285***	0.628	
	(4.11)	(4.43)	(1.05)	
Auxiliary parameters				
cut1	1.217***	0.970***	1.997***	2.208**
	(5.30)	(3.29)	(3.73)	(2.39)
cut2	1.575***	1.339***	2.337***	2.803***
	(6.86)	(4.53)	(4.37)	(3.03)
cut3	1.891***	1.631***	2.663***	3.400***
	(8.23)	(5.51)	(4.98)	(3.68)
load	0.391***	0.655**	1.781***	
	(3.14)	(2.21)	(3.75)	
Rho	0.257 ***	0.387***	0.617***	0.127
	(0.071)	(0.122)	(0.039)	(0.114)
N	26570	12093	5929	3005

t statistics in parentheses * p<0.10, ** p<0.05, *** p<0.01

Note: ^a In the South model, the ρ was not significant and thus the results of a simple ordered logit are reported.

Appendix 1

Table a.1 – Migration equation: results

	Migr
Economics and statistics	0.0103 (0.20)
Social and political disciplines	0.0656 (1.08)
Sciences	0.0455 (0.94)
Law	-0.0627 (-1.12)
Engineering	0.199*** (3.61)
Architecture	0.0158 (0.23)
Medicine	-0.375*** (-7.51)
Physical Education/Sports	0.00410 (0.06)
Mark	0.00604*** (3.38)
High_school_mark	0.000600 (0.25)
Prev_degree	0.168*** (2.61)
Study_migr	1.919*** (55.18)
Erasmus	0.323*** (6.89)
Worked continuously	0.0237 (0.55)
Never worked	-0.0365 (-1.11)
Study_father	0.0192* (1.74)
Uni_city	-0.159*** (-4.04)
Lombardia	-0.124 (-1.52)
Trentino Alto Adige	0.122 (1.05)
Veneto	-0.0459 (-0.47)
Friuli Venezia Giulia	0.379*** (3.84)
Liguria	0.154 (1.48)
Emilia Romagna	0.151* (1.80)
Toscana	0.00893

	(0.09)
Umbria	0.176*
	(1.67)
Marche	0.384***
	(4.34)
Lazio	-0.141
	(-1.53)
Abruzzo	0.338***
	(3.40)
Molise	0.563***
	(4.59)
Campania	0.685***
	(8.36)
Puglia	0.548***
	(5.89)
Basilicata	0.602***
	(4.48)
Calabria	0.601***
	(5.48)
Sicilia	0.568***
	(6.06)
Sardegna	0.168
	(1.52)
_cons	-2.116***
	(-11.12)
Pseudo R2	0.3007
N	26177

t statistics in parentheses * p<0.10, ** p<0.05, *** p<0.01