



# Over-education and spatial flexibility: New evidence from Italian survey data\*

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**Abstract.** This paper addresses the effect of workers' spatial flexibility (commuting and migration) on their probability of being over-educated. The empirical analysis deals with two possible sources of misspecification: the endogeneity of migration and the omission of relevant job characteristics. It also controls for area and personal characteristics. Results show that commuting is positively correlated with the quality of the education-job match. However, analysis does not support the conventional wisdom that migration unambiguously reduces over-education. It seems fair to conclude that the link between migration and over-education remains unclear and that further research is needed in order to better ground policy prescriptions.

**JEL classification:** J24, J61, R23

**Key words:** Over-education, spatial flexibility, spatial mismatch

## 1 Introduction

This paper aims to address the effect of workers' geographical mobility on their probability of being over-educated. Over-education denotes a situation in which a worker's level of schooling is higher than the one required for performing their current job. It represents one single dimension of the broader concept of skill underutilization, which embraces all of the worker's characteristics that are potentially valuable in the labour market, including natural ability, on-the-job training, and general experience (see e.g., Halaby 1994; Green et al. 1999; Bauer 2002; Chevalier 2003; Mavromaras et al. 2009). Since the publication of Richard B. Freeman's *The over-educated American* in 1976, there has been increasing interest in the education-job

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mismatch. By now the literature on over-education is vast and an exhaustive review is far beyond the scope of this paper (see McGuinness 2006). Only a few issues are briefly considered here, in order to better set the scene for this study.

An important strand of the literature deals with measurement issues. In fact, the implementation of the above definition of over-education requires the researcher to first define the level of education necessary to carry out any job, which is not a simple process. Three methodologies have been adopted in the literature: job analysis (the required level is based on experts evaluation); statistical testing (the level corresponds to the average, or the mode, in the worker's occupation); and subjective assessment (respondents are asked for the minimum educational requirements of their job). An alternative measure of over-education (that used in this paper) identifies the education-job mismatch from surveys that directly ask workers whether they consider themselves over-educated. Each approach has its own limits and the choice is often imposed by data availability (see Verhaest and Omeij 2010 for a recent discussion and application of different measures of over-education).

Many studies have also addressed the detrimental effects of the education-job mismatch, both at the aggregate and at the individual level. It stands to reason that over-education implies a waste of human capital in the aggregate. At the individual level, several studies show that over-education is associated with lower productivity, greater turnover rates (Tsang 1987; Tsang et al. 1991), lower wages and lower levels of job satisfaction (Battu et al. 1999a, 2000; Di Pietro and Urwin 2006; Dolton and Silles 2008). Recently, Green and Zhu (2010) have connected rising over-qualification with increasing wage dispersion in Britain.

Unfortunately, however, we still know very little about the primary causes of over-education. A unified theory is still lacking and alternative views of the functioning of the labour market deliver competing explanations. McGuinness (2006) reviews the main theoretical frameworks within which over-education has been studied and the related empirical literature. The author identifies as a key distinctive aspect the role that theories assign to jobs/sectors in shaping the relationship between education and productivity (see also Sloane 2003). More precisely, within theoretical frameworks in which individual productivity depends on the job/sector of employment – such as job assignment theories and, more directly, Thurow's (1975) theory of job competition – over-education can be the outcome of the very functioning of the labour market. In fact, educational overinvestment may be an individual's rational strategy for obtaining a particular job. If, on the contrary, the individual human capital has an economic return which is not contingent on the job, as in standard human capital theory (HCT), in equilibrium over-education should be absent. HCT explains the observed mismatch between demand and supply of skills either as a short-run phenomenon (for instance, due to the fact that firms need time to adapt their production techniques to the increased availability of educated workers) or as a statistical artefact induced by the unobserved heterogeneity of workers. Namely, over-education could substitute for a lack of other relevant individual characteristics, either time invariant (as innate ability) or temporary (as, for instance, lack of experience at the beginning of the job career).

In this broad context, some recent contributions (Büchel and Van Ham 2003; Hensen et al. 2009; Jauhiainen 2011; this literature is surveyed in the next section), emphasize the role of spatial mismatch between demand and the supply of skills, arguing that restricted geographical job searches might result in a greater incidence of over-education. Spatially-based explanations for over-education are crucial from a policy perspective. If the misallocation of skills occurs mainly over time, policy-makers might only address future education-job mismatches by channelling the individuals' education decisions (e.g., providing accurate forecasts of the evolution of labour demand for skills and disseminating this information) or the firms' technology adoption. If, instead, the incidence of over-education differs considerably across geographical locations in a given period of time, transparent information flows are just one policy tool; the

other is to enhance workers' spatial flexibility, which, in this literature, denotes both commuting and migration tolerance. A similar reasoning applies if the misallocation of skills occurs across occupations and sectors.

The spatial dimension of over-education has become a key policy issue in Europe. The European Commission (2009, p. 10) explicitly indicates the promotion of workers' geographical mobility and "the removal of obstacles . . . to the free movement of workers in the EU", as a key part of the Europe 2020 Employment Strategy to better match workers' skills and job requirements.<sup>1</sup> These policy prescriptions take for granted the positive effect of increased workers' mobility on the quality of the education-job match. In fact, as is discussed in the next section, this is also a straightforward implication of the theoretical framework generally adopted to approach the relationship between over-education and spatial flexibility. However, quantitative studies on the issue are still scant. According to Büchel and Van Ham (2003, p. 483), "surprisingly, little attention has yet been paid to the spatial aspects of over-education". Since their seminal contribution, only a few studies have addressed the effect of spatial mobility on the education-job mismatch. Results are still inconclusive. This lack of knowledge dramatically limits the scope for policy action.

The present paper tries to add to the existing literature by empirically investigating the effect of workers' spatial flexibility on their probability of being over-educated. The study uses a large survey of the Italian labour market, which contains precise information on both commuting and job related migration. The main contribution of the analysis is that it deals with two possible sources of misspecification, common to the received literature. It explicitly addresses the possible endogeneity of migration, due to an individual's unobservable characteristics, by instrumenting it. This strategy should allow us to better assess the causal effect of migration on over-education. The empirical analysis also controls for observable job characteristics, which are likely to be correlated with both the probability of being over-educated (as suggested by the job competition and the assignment theories) and the decision to migrate. It follows that omitting (observable) job characteristics could cause a bias of the estimated correlation between migration and over-education. The analysis also controls for selection into jobs and for area and personal characteristics, including several proxies of an individual's ability, which HCT identifies as a central explanation of the overinvestment in education.

Results show that commuting is negatively correlated with the probability of being over-educated. The effect of commuting is statistically significant and robust across different specifications, although quantitatively low. However, I find no clear evidence that an individuals' migration reduces their risk of being over-educated: migration turns out to be negatively correlated with over-education only if the regression model does not control for its possible endogeneity and/or for the characteristics of the job. The effect of migration on over-education vanishes once job characteristics are included in the analysis and becomes positive when migration is instrumented to solve for its possible endogeneity.

Overall, these findings cast some doubts on the conventional wisdoms that workers' spatial flexibility unambiguously reduces the incidence of over-education. Section 2 argues that this result can be easily rationalized by complementing the theoretical framework used so far in spatially-based explanations for over-education with some of the suggestions coming from the literature on international migration. Incidentally, one minor contribution of this paper is to try to establish a bridge between the literature on internal and international mobility and over-education, which have rarely been considered together in the past.

The paper proceeds as follows. Section 2 reviews the related literature. Section 3 presents the data and methodology; it also provides some information on the Italian context. Section 4 illustrates the results. Section 5 concludes.

<sup>1</sup> The reader may also refer to web page of the initiative 'New skills for new jobs' (<http://ec.europa.eu/social/>).

## 2 Spatial mobility and over-education

Two distinct strands of the economic literature have recently addressed the relationship between workers' geographical mobility and over-education. A first set of studies looks at the effect of internal mobility (migration within a country and commuting) on an individual's probability of being over-educated. A second large research programme focuses on the (limited) portability of human capital in international migration. To the best of my knowledge, the two research areas have developed independently, ignoring each other. I strongly believe, however, that their combination can be beneficial in better setting the scene for empirical studies.

In order to introduce these literatures, consider the following sketched model of migration. Think of an economy comprising distinct labour markets: the one of initial residence  $r$  and several possible destinations  $d$ . Individuals move from  $r$  to any destination  $d$  if and only if  $u^d(\cdot) \geq u^r(\cdot) - c^{r,d}$ , where  $u^k(\cdot)$  is utility in location  $k = r, d$ , and  $c^{r,d}$  is the moving cost, expressed in utility units. In principle,  $u^k(\cdot)$  is a function of several individual and regional attributes, as discussed below. However, since Sjaastad's (1962) seminal work economists have mainly focused on labour market imbalances. For the moment, assume that utility  $u^k(\cdot)$  is a linear function of the expected wage  $w^k$ . Migration occurs if  $w^d \geq w^r - c^{r,d}$ . In equilibrium the condition  $w^d = w^r - c^{r,d}$  is verified.

### 2.1 Internal mobility and over-education

The present paper is part of (and tries to contribute to) a line of research that aims at quantifying the effect of commuting and internal migration on the individual risk of being over-educated. The theoretical framework adopted by these studies has been developed in Büchel and Van Ham's (2003) seminal contribution (see also Van Ham et al. 2001 and references cited therein). Given his/her initial location  $r$ , a worker has four possible options. First, if no suitable employment is available at  $r$  and if the mobility cost is too high, the individual can decide not to accept an offer and to remain unemployed. Since those workers that have a higher probability of being over-educated are also less likely to leave unemployment, the possibility of unemployment introduces a selection bias which must be tackled in empirical investigations. The other three options are: to accept the best job offer in the home labour market, possibly below one's level of qualification; to commute to a nearby labour market; or to change residence (migration). In terms of the previous notation, the choice depends on the magnitude of the mobility cost  $c^{r,d}$  compared to the wage differential between locations  $w^d - w^r$ , with a lower mobility cost characterizing commuting relative to migration. One crucial assumption of Büchel and Van Ham's (2003) framework is that  $w^k$  is determined by the education-job match only. This assumption (H1, for future references) implies that, given  $c^{r,d}$ , mobility between locations is driven by the quality of the educational match only.

The straightforward implication of this theoretical framework is that "workers who are spatially more flexible . . . are expected to have a lower risk of over-education" (Büchel and Van Ham 2003, p. 485).<sup>2</sup> The reason is that, given the initial location  $r$ , each worker seeks a job for which he/she is better paid, which by assumption H1 corresponds to the one for which he/she is least overqualified. A lower moving cost  $c^{r,d}$  allows individuals to take into account a relatively wider pool of job opportunities, unambiguously reducing the incidence of over-education. In the case of zero moving costs,  $w^d = w^r$  and there is no over-education in the economy.

<sup>2</sup> The other two hypotheses formulated by Büchel and Van Ham relate to the relevance of local labour market conditions (concentration of employment and local unemployment rate) in determining the occurrence of over-education.

Büchel and Van Ham's (2003) test this prediction using German data on self-assessed over-education. The authors estimate a probit model, correcting for self-selection into employment and controlling for personal and area characteristics. Spatial flexibility is measured in terms of having access to a car for personal use<sup>3</sup> and the average travel time (in hours) to the nearest three agglomerations by car. Unfortunately, there is no evidence on migration. Results show that spatial flexibility is negatively correlated with over-education. One important caveat of the analysis is that, as acknowledged by the authors, the result might be driven by reversed causality: workers with a better education-job match receive higher wages and can therefore afford a car for personal use.

Following Büchel and Van Ham (2003), a similar approach has been used by Hensen et al. (2009) and Jauhiainen (2011). Results are mixed.<sup>4</sup> Hensen et al. (2009) use Dutch survey data on over-education (workers were asked to indicate the education level required by the employer), plus four other types of job mismatch (the field of study, part-time and flexible jobs, jobs paid below the average wage). Spatial flexibility is measured using the Euclidean distance between the municipal location of education (implicitly assumed as the residential place) and the location of the current job, 18 months after graduation. Distance is discretized (0–10 km, 11–30 km, 31–70 km, and more than 70 km) and the 30 km threshold discriminates between commuting and migration. Logit regressions, controlling for personal characteristics (including the field of study) and regional unemployment rate, do not reveal a clear correlation between distance and the probability of having a job at one's level of education. Geographical mobility is significantly correlated with the other dimensions of job mismatch (in particular full-time and permanent job and well paid occupations) and their joint combination. Notice, however, that the five dimensions of job mismatch are not independent from each other. For instance, over-education is more frequent in part-time jobs (Hensen et al. 2009). This is a concern for the issue under consideration, as discussed in Section 3.

Jauhiainen (2011) performs a similar analysis on Finnish data, using a statistical approach to identify over-educated workers. The analysis is restricted to individuals with more than nine years of education and controls for the field of education and selection into employment. Spatial flexibility is measured both by previous migration decision (between regions and between municipalities within the same region) and by commuting (having a car). Again, results are mixed: interregional migration decreases the risk of over-education, while intraregional migration has the opposite effect for men (no significant effect for women). Having a car has no significant effect either.

Finally, the theoretical framework presented above is related to an anterior line of research that focuses on the job-seeking behaviour of married women and the gender wage gap. According to Frank's (1978) differential over-qualification theory, migration is an option for males only, within a family. A plausible "family decision rule is one in which the wife accompanies her husband, locating in the geographic labour market that minimizes his over-qualification level" (Frank 1978, p. 364). Once the husband has selected his job within the global labour market, the moving cost becomes unaffordable for the wife, who is then relatively more exposed to the risk

<sup>3</sup> This approach is closely related to the spatial mismatch hypothesis, which focuses exclusively on "the bad labour-market outcomes (high unemployment and low wages) of low-skilled black inner-city residents who are disconnected from suburban job opportunities" (Gobillon et al. 2007, p. 2402). See, also Zenou (2009) and Gautier and Zenou (2010).

<sup>4</sup> See also Sanromá and Ramos (2004) and Croce and Ghignoni (2011). Sanromá and Ramos (2004) use Spanish data and consider both the availability of private transport and, at the regional level, the quality of infrastructures proxied by road kilometres per vehicle. These commuting facilities are found to reduce the probability of being overqualified. Croce and Ghignoni (2011) use the same data as the present paper and run distinct regressions for upper-secondary and tertiary graduates. They find a negative correlation between migration and over-education and mixed results for commuting: commuting is associated with a lower incidence of over-education for upper-secondary graduates only. I will return to some aspects of their study in the next section.

of over-qualification. Notice that in this case the focus is on the migration decision of the household and not on the individual's commuting tolerance. Notice also that Frank (1978) refers to the quality of a match in terms of various potential elements in a list of individual characteristics, such as education, experience, intelligence, and so on. To the best of my knowledge, empirical investigations of the Frank's theory have focused on over-education only; results are mixed (see e.g., McGoldrick and Robst 1996; Battu et al. 1999b; Battu and Büchel 2003).

## 2.2 *International migration and over-education*

The link between geographical mobility and the education–job mismatch has also been studied in relationship with international migration. Here the very different focus is on the incidence of over-education among international migrants, typically from less developed to developed countries, relative to the natives at destination. Two main insights from this literature can usefully enrich the theoretical framework of reference.

First, a natural consequence of looking at international migration is that assumption H1, introduced at the beginning of this section, must be removed. It is a fact that countries differ dramatically in terms of economic conditions (including employment rates, productivity, infrastructures, public services), and social, political, and institutional environment as well. It follows that even if the gains from migration were fully captured by the wage differential  $w^d - w^r$ , it cannot be realistically assumed that the latter is determined by the quality of the educational match only. More generally, cross-country differences in living standards affect international migration flows and other sources of geographical imbalances should be added into the picture. The obvious consequence is that it might be individually optimal to migrate and accept a job for which the migrant is over-qualified, rather than to stay at home. Therefore, the effect of migration on an individual's over-education is theoretically ambiguous and, to the best of my knowledge, no study has addressed it so far.

Remarkably, a well-established evidence in the international migration literature (Kler 2007; Chiswick and Miller 2009), is that migrants are characterized by a higher probability of being over-educated, relative to the native population at destination. Starting from this empirical observation, many authors have addressed the (imperfect) portability of human capital in international migration (see Friedberg 2000; Chiswick and Miller 2009 and references cited therein). Several channels have been highlighted in the literature: immigrants may lack host country-specific skills, the most evident being knowledge of the language; international migrants can be characterized by lower search efficiency, because, for instance, of a poor knowledge of the recruitment channels or a lower availability of job networks at destination; the quality of their home country educational system could be low. It must also be acknowledged that immigrants may be discriminated against in the labour market at destination.

My point here is that some of the channels highlighted for international migration can also be relevant for internal mobility. In countries characterized by large geographical disparities, the educational mismatch cannot be assumed to be the only determinant of migration flows. Moreover, the portability of human capital can also be limited by, for example, poor information on distant labour markets (including scarce knowledge of recruitment channels and low availability of job networks), differences in the quality of the school system, and so on.<sup>5</sup> It follows that the relationship between migration and over-education is undetermined and this theoretical ambiguity motivates the present analysis.

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<sup>5</sup> Büchel and van Ham (2003) acknowledge the potential loss of location-specific human capital, but, in their framework the imperfect portability of human capital can only result in lower migration.



The second important cornerstone of the literature on international migration is that migrants are a self-selected sample of the population at origin. This point is crucial for the following analysis. Suppose that migrants have a lower probability of being over-educated relative to stayers. This crude fact would not allow the conclusion that enhanced worker mobility would improve the education-job match. In fact, the decision to migrate is likely to be associated with unobservable individual characteristics potentially correlated with the probability of being overqualified. For instance, an ambitious individual might be unwilling to accept any job offer for which he/she is overqualified and, at the same time, he/she might be more willing to migrate for job related reasons. In this case, a standard regression approach delivers downward biased estimates of the coefficient of interest, making it more likely that a negative correlation between migration and over-education will be found. In this paper I explicitly deal with the endogeneity of migration, by instrumenting it.

### 3 Data and methodology

This study empirically addresses the link between spatial flexibility and over-education. The analysis is based on a large survey conducted in Italy in 2005. Theoretical considerations discussed in Section 2.2 suggest that the magnitude of regional disparities can have a role in shaping the relationship between geographical mobility and over-education. In this respect, Italy represents an interesting case to consider. The country is characterized by dramatic differences across regions, displaying a clear dualism between the more industrialized northern regions and the less developed southern ones (*Mezzogiorno*). Regional disparities characterize many dimensions of economic and social life, such as *per capita* GDP, productivity, employment, unemployment and participation rates, poverty, quality of public services (including education, health, local transportation), and the incidence of the black economy, just to cite a few (Franco 2010). Few economic indicators can help to illustrate the extent of the north-south divide: since 1975 *per capita* GDP in the southern regions has been always 60 per cent lower in comparison with the average of the rest of the country; the incidence of relative poverty computed at the household level (data refers to 2008) is around 5 per cent in the north, 22 per cent in the south and above 26 per cent in Sicily and Sardinia. Labour market imbalances are also striking: for instance, in 2005, the year of the survey used in this study, the unemployment rate was 16.2 per cent in Sicily and 4.1 per cent in Lombardy. Looked at comparatively, Italy has the largest regional gaps in the unemployment rate across 26 industrialized countries (OECD 2005). Regional labour market imbalances are an enduring problem for the Italian economy and recent trends are not encouraging: OECD (2005, p. 80) finds that between 1993 and 2003, “regional disparities within countries . . . increased in Europe”. Overall, however, the increase in European regional disparities in both employment and unemployment was primarily driven by Italy. Remarkably, there is also evidence of a north-south divide in student competences, as measured by standardized tests. The analysis of data of the OECD Programme for International Student Assessment (<http://www.pisa.oecd.org/>) for the year 2009 reveals that the northern regions of Italy outperform when compared to the OECD average, while southern regions and islands score significantly below (Cipollone et al. 2010).

Regional disparities reflect migration patterns. Italy has experienced remarkably large internal migration flows during the last fifty years. In 2005, more than 1,320,000 individuals have changed their municipality of residence, the highest value since 1990. Large movements occur within the northern regions, while most of migration from the southern regions is directed to the north of Italy. Emigration from the *Mezzogiorno* has not been constant over time. Mocetti and Porello (2010) distinguish four main phases: the emigration rate was around 1.2 per cent during the 1960s; it began declining in the 1970s and early 1990s, reaching the minimum (0.45%) in

1994; thereafter emigration recovered until the beginning of the new century and it is now decreasing once more. Between 1990 and 2005 around 2,000,000 individuals migrated from the south to the north of Italy. As is usual within developed countries, emigration rates are higher for graduate students. The share of educated migrants is increasing over time: in 2005 the percentage of interregional migrants with a university degree was 12 per cent, a value roughly double that of 1995 (data availability limits the possibility of comparisons across time).

The present study data derives from the 2005 Isfol Plus cross section (Isfol-Plus 2005, thereafter). Isfol Plus is an Italian nationwide representative survey, conducted through Cati interviews (see Isfol 2009). The survey contains information on the characteristics of 40,386 individuals, between 15 and 64 years old. I included only individuals with at least an upper secondary education (this is standard in studies on over-education) who are in the labour force. The final sample consists of 16,918 individuals, 12,881 of which are employed. All the results of the paper have been replicated including inactive individuals (excluding students and pensioners).

Three questions in the survey capture the variables of main interest: over-education, commuting and migration. Workers are asked whether their educational attainment is necessary for their job.<sup>6</sup> Over-education, is an indicator equal to one if the respondent answers that their educational level is not necessary for their job, zero otherwise. It must be acknowledged that the question can generate some ambiguity, as the word ‘necessary’ can refer to either doing the job or to obtaining the job and, moreover, it may be related both to the level and field of the educational qualification (see Laj and Raitano 2006; Franzini and Raitano 2011). Similar caveats apply to most self-assessed measures of over-education (Allen and Van der Velden 2005), and it is worth stressing that most studies on over-education in Italy use the Isfol Plus survey.<sup>7</sup> It is not clear how different interpretations of the question could affect the relationship between mobility and over-education. In general, the concern is whether they cause a spurious correlation between migration and over-education. Next, I argue that this is likely to be the case if individuals refer mainly to the formal requirements for obtaining a job and if the empirical model does not control for working in the public sector. Here these problems are addressed by adding sectoral controls and by instrumenting the migration decision.

Compared with studies reviewed in the previous section, Isfol-Plus 2005 reports rather precise information about both commuting (commuting time, one-way, in minutes) and internal migration. Remarkably, the question on migration identifies workers who have moved for reasons related to their current job only.<sup>8</sup> Its main drawback is that it does not report information on when migration occurred and therefore I cannot distinguish between short- and long-run effects of migration (see e.g., Lehmer and Ludsteck 2011) and I cannot control for the historical context in which workers have migrated. This is a limitation of the present study, since in principle the link between migration and over-education might have changed over time. One of the possible reasons is that south-north migration flows have not been constant in recent years. I partially address this problem by controlling for age and, in some specifications, tenure.

<sup>6</sup> “Con riferimento alla Sua attuale attività lavorativa il Suo titolo di studio è necessario?” (With respect to your current work activity, is your educational degree necessary?).

<sup>7</sup> Laj and Raitano (2006) provide a first assessment of the incidence of over-education in Italy; Franzini and Raitano (2011) address the effect of over-education on an individual’s wages, unemployment and training; Meliciani and Radicchia (2011) explore the link between recruitment channels and over-education; Rose and Ordine (2010) estimate a competing risks model for unemployment spells, that can terminate in either a correct educational match or over-education. Alternative data sources have been used by Istat (2006), Almalaurea (various years) and Istat (2009), which offer a descriptive analysis on the incidence of over-education. See also Di Pietro and Urwin (2006), Brunello et al. (2007), Brynin and Longhi (2009) and Cainarca and Sgobbi (2009), for further studies on the effects of over-education on wages in Italy.

<sup>8</sup> The question is: “Con riferimento alla sua attuale attività lavorativa, si è dovuto trasferire?” (Did you need to move for reasons related to your current job?). The question has been changed in the survey for 2006 and therefore only the 2005 cross section can be used for the analysis.



The following linear probability model is estimated:

$$\text{Overeducation}_{i,r,j} = \alpha + \beta_1 \cdot \text{Spatial Flexibility}_i + \beta_2 \cdot X_i + \beta_3 \cdot X_r + \beta_4 \cdot X_j + \varepsilon_{i,r,j} \quad (1)$$

where the dependent variable is an indicator equal to one if the respondent  $i$ , residing in region  $r$  and working in job  $j$ , is over-educated, zero otherwise. The linear probability specification (1) is standard when dealing with instrumental variables and it is adopted throughout this paper in order to facilitate the comparability of the results. When possible, I also present results of probit regressions. Over-education is regressed on a constant and on the two measures of spatial flexibility (commuting time and migration). Model (1) controls for personal, area and, in some specification, job characteristics.

The personal characteristics  $X_i$  are: age (four age brackets 15–29, 30–40, 41–49 and older than 50), gender, education (high school and university graduate), marital status, having children, and an interaction between being a woman and having children. These individual characteristics potentially affect the cost and the expected benefits of geographical mobility and are standard in the literature. As already mentioned, the conventional theory of human capital puts forward the idea that over-education might compensate for lower ability. Accordingly,  $X_i$  also includes three indicator variables intended at capturing individuals' skills other than their educational level: Failed, one if the respondent has failed at least one year during primary and/or low secondary education (zero otherwise); PC, one if the interviewed is able to write on a personal computer and to search on the web (zero otherwise); High mark, one if the final mark in the lower secondary school was either average or high (zero otherwise). Unfortunately, information on the field of study is not available. The regression also controls for being a foreigner, which has been found to be associated with a higher probability of over-education (for recent evidence on Italy see Dell'Aringa and Pagani 2011).

According to the spatial mismatch hypothesis, local labour market conditions are important determinants of an individuals' over-education. Given the focus of the present paper, a flexible specification has been chosen and  $X_r$  includes regional fixed effects (19 regions, as Val d'Aosta is joined with Piedmont). Consequently, all regressions cluster standard errors by region (Büchel and Van Ham 2003). I also include an indicator for living in a metropolitan area (a city with more than 250,000 inhabitants). The data that has been released to me does not allow identification of the province of residence.

As suggested by the job competition and the assignment theories, job characteristics can play a major role in shaping over-education. Variables in  $X_j$  are a dummy for working in the private sector; the type of contract (open-ended employee, fix term employee and self-employed), tenure (in years), the economic sectors<sup>9</sup> and the recruitment channels: network is an indicator variable equal to one if the job has been found through friends, relatives or acquaintances.<sup>10</sup> It is worth stressing that omitting (observable) job characteristics introduces a potential bias in the estimates, since job characteristics are expected to be correlated with both the probability of being over-educated and the decision to migrate. For instance, jobs obtained through public competition are likely to be characterized by fewer educational mismatches. This is certainly the case if over-education captures mismatches in formal requirements, and is verified in the Isfol-Plus data (see also Franzini and Raitano 2011). Moreover, the availability to move for job related reasons is also likely to be higher for individuals working in a public, typically stable, occupation. This fact is also supported by crude data: on average, 56.1 per cent

<sup>9</sup> Agriculture, hunting and fishing; industry, construction; trading and restaurant, services. There are 134 missing observations, which have been attributed to an additional category.

<sup>10</sup> Meliciani and Radicchia (2011) find that recruitment channels affect the probability of over-education. Their results are in line with the results of Bentolila et al. (2010), which show that social contacts reduce spells of unemployment but negatively affect the quality of the match.

(29.7%) of migrants (non-migrants) in the sample work in the public sector. Together, these two facts imply that omitting job characteristics would bias downward the correlation between migration and over-education. Similar considerations apply, for instance, to the type of contract.

Estimation of model (1) raises at least two concerns. First, the variable of interest, over-education, is defined only for those individuals who actually work. However, people self-select into jobs and being unemployed is an option. As is well acknowledged in the literature, self-selection into employment can bias the estimate of the parameter of interest if, prior to the decision to accept the job offer, the probability of being over-educated differs between individuals who decide to work and individuals who decide to remain unemployed. I deal with selection using a standard Heckman correction procedure. The instrument in the employment decision is the number of members in the household. This variable is correlated with the decision to work, as shown in the next section, and should not directly affect the probability of being over-educated. The choice of the exclusion restriction is often questionable. Büchel and Van Ham (2003) use the age of the respondent.<sup>11</sup> I prefer not to follow their option since, as discussed in some detail in Section 4, several considerations suggest a direct effect of age on over-education for my sample. Remarkably, the results of the paper are robust to alternative instruments for the selection equation, as shown in the next section.

The second problem is the possible endogeneity of migration. In Equation (1), the decision to move for job related reasons is likely to be associated with unobservable individual characteristics correlated with the error term, biasing the estimates of interest. The possibility of self-selection into migration is acknowledged by Jauhainen (2011), to interpret some counter-intuitive results of her study, and by Croce and Ghignoni (2011), who test for the endogeneity of migration and reject it. Note, however, that the approach followed by Croce and Ghignoni (2011) is valid only if the adopted instrument – long-term unemployment rate at origin – is a valid one. A first major concern is that the long-term unemployment rate, and any other instrument defined at the local level, cannot capture those individual's unobservable characteristics which are at the origin of the selection problem. More importantly, the underlying assumption that the lagged unemployment rate in one location has no influence on current over-education in the same location is questionable, given the high persistence of unemployment at the local level and the presence of hysteresis in individual's job careers.

In this paper I explicitly deal with the endogeneity of migration, by instrumenting it. This adds to the existing literature. The instrument used is housing tenure, which varies at an individual level. The data allows the identification of individuals living in their own home, renters and young adults living at home; missing observations have been coded in an additional category. A large literature documents a strong correlation between housing tenure and migration for job related reasons (homeowners are less likely to migrate than renters). This empirical finding has been explained by a number of reasons, including the high transaction costs and the risk of capital losses which can occur when moving to a new location to accept a job. OECD (2005) reviews the empirical literature on the link between housing tenure and internal mobility and provides new evidence based on the European Community Households Panel for eight European countries. The general conclusion of the study is that the effect of housing tenure on the probability of migration is relatively strong, even when the possible endogeneity of the housing decision is taken into account. At the same time, housing tenure should not directly affect the probability of being over-educated, after controlling for the other individual's characteristics. A possible concern is that housing tenure can be correlated with income which, in turn, can affect the probability of accepting a job offer, thus casting some doubt on the

<sup>11</sup> Alternative instruments for the selection equation have been used: the regional unemployment rate in Jauhainen (2011); the marital status in Sanromá and Ramos (2004); Croce and Ghignoni (2011) use the information on individuals who have to pay a mortgage loan for accommodation, weighted (for upper secondary graduates only) with the share of the respondent's individual income on the total household income.

exogeneity of the proposed instrument. Unfortunately, no better option is available in the dataset. I try to address this issue by adding, in the robustness checks, parents' education (an indicator variable equal to one if at least one parent has a college degree, which should control for the family income and wealth) and gross labour income.

Table 1 presents the summary statistics of all the variables used in the analysis, distinguishing between the whole sample of the active population (16,918 individuals) and the subsample of employed individuals (12,881 observations). In order to save space, I do not report the distribution of regions and, for all the dummy variables, the excluded category. All the statistics of the paper have been computed using the weights provided by Isfol. On average, 35 per cent of employed individuals define themselves as over-educated. The percentage is higher (41%) for high school graduates compared with workers holding at least a college degree (19%). Finally, 13 per cent of workers have moved for job-related reasons and the average commuting time is 16.9 minutes.

Additional investigation reveals that the incidence of over-education is higher in the north and centre of Italy (37%) than in the south and islands (32%). Among university graduates, the share of over-educated workers is 18 per cent in the north-west of Italy and 13 per cent in the south. A similar pattern is documented for high school graduates. For example, the incidence of over-educated workers is 3 per cent higher in the north-west than in the south of Italy. This feature of the geography of over-education has already been documented by Franzini and Raitano (2011) for the subsample of the panel component of the Isfol-Plus survey for the year 2006 and university graduates only. Using multivariate analysis, the authors show that this result is not driven by sectoral characteristics but leave it unexplained. It is worth stressing that the higher incidence of over-education in the northern, more developed, regions is consistent with the theoretical considerations discussed in subsection 2.2.

## 4 Results

Table 2 reports the results of model (1) without controlling for job characteristics. Ordinary least squares (OLS) estimates in the first column of Table 2 reveals that both measures of spatial flexibility – migration and commuting time – are negatively correlated with the probability of being over-educated. Estimates imply that a one standard deviation increase in migration (commuting time) yields a 0.031 (0.048 respectively) standard deviation decrease in probability of being over-educated. This result is in line with the hypothesis that restricted geographical job searches results in a greater incidence of over-education.

Here I briefly comment on the signs and significance of the other covariates. Women are less likely to be over-educated, but the estimated coefficient is not statistically different from zero at the standard levels. The probability of being over-educated decreases with age (the excluded category is individuals aged between 15 and 29). This result is in line with that of Hensen et al. (2009), who find that over-education is particularly high among young graduates. Several complementary considerations can help in explaining the higher education-job mismatch among young workers. A first possibility is that age captures potential experience and, according to human capital theory, over-education might substitute for the lack of experience at the beginning of the job career. A second explanation is the higher supply of educated workforce among young cohorts of individuals. Finally, recent institutional changes in the Italian labour market have mainly affected young cohorts of workers, who now might be more prone to accept worse job offers, relative to their qualifications.<sup>12</sup> As expected, workers with at least a university degree

<sup>12</sup> This interpretation is supported by the fact that when job characteristics are included among the regressors age does not become statistically different from zero at standard levels (results are available on request). The effect of fixed term contracts on entry wages and wage dynamics of Italian young cohorts is studied, for instance, in Rosolia and Torrini (2007).

**Table 1.** Descriptive statistics

	Mean	sd
Employment selection equation (n = 16, 918)		
Employed	0.90	0.31
Woman	0.45	0.50
Age: 30-40	0.33	0.47
40-49	0.27	0.44
> = 50	0.14	0.35
University	0.24	0.43
Divorced	0.04	0.21
Single	0.36	0.48
Sons	0.80	0.40
Foreigner	0.01	0.10
Failed	0.24	0.42
PC	0.84	0.37
High mark	0.80	0.40
Metropolitan	0.16	0.36
Number of household members = 2	0.16	0.36
= 3	0.32	0.46
= 4	0.36	0.48
> = 5	0.09	0.29
Over-education equation (n = 12,881)		
Over-educated	0.35	0.48
Migrant	0.13	0.33
Commuting time (minutes)	16.90	20.52
Woman	0.44	0.50
Age: 30-40	0.34	0.47
40-49	0.29	0.45
> = 50	0.15	0.36
University	0.25	0.43
Divorced	0.05	0.21
Single	0.33	0.47
Sons	0.79	0.41
Foreigner	0.01	0.10
Failed	0.23	0.42
PC	0.84	0.37
High mark	0.80	0.40
Metropolitan	0.15	0.36
Fixed term employee	0.12	0.32
Self employed	0.25	0.43
Tenure (years)	10.99	9.39
Social Network	0.30	0.46
Sector: Manufacturing	0.17	0.38
Construction	0.04	0.20
Wholesale	0.17	0.38
Services	0.58	0.49
Other	0.01	0.10
Private	0.67	0.47
Housing tenure: Rent	0.11	0.31
Missing	0.01	0.12
Young Adult Living at home	0.25	0.43
Labour income (n = 12,881)	24,631.85	22,670.40
Parents' education (n = 15,782)	0.09	0.28

**Table 2.** Linear probability model for over-education, baseline results

	(1) Ols	(2) Heck.	(3) IV	(4) IV plus Heck.
Migrant	-0.0447** [0.0213]	-0.0441** [0.0188]	0.282** [0.122]	0.352** [0.173]
Commuting time	-0.00113*** [0.000225]	-0.00111*** [0.000233]	-0.00150*** [0.000310]	-0.00156*** [0.000384]
Woman	-0.0489 [0.0292]	-0.0672** [0.0304]	-0.0278 [0.0280]	-0.0438 [0.0292]
Age 30-40	-0.0493*** [0.0155]	-0.0121 [0.0157]	-0.0674*** [0.0158]	-0.0299 [0.0205]
Age 40-49	-0.0620*** [0.0190]	-0.00865 [0.0229]	-0.0816*** [0.0186]	-0.0262 [0.0287]
Age > 50	-0.152*** [0.0158]	-0.0860*** [0.0231]	-0.173*** [0.0138]	-0.104*** [0.0240]
University	-0.181*** [0.0145]	-0.175*** [0.0158]	-0.187*** [0.0152]	-0.182*** [0.0155]
Divorced	0.0642*** [0.0194]	0.0522** [0.0212]	0.0785*** [0.0179]	0.0682*** [0.0190]
Single	0.0282** [0.0131]	0.00255 [0.0117]	0.0280** [0.0135]	-0.000624 [0.0131]
Sons	-0.0201 [0.0179]	-0.0290 [0.0178]	0.00124 [0.0181]	-0.00415 [0.0188]
Woman × sons	0.00664 [0.0264]	-0.000222 [0.0278]	0.00342 [0.0238]	-0.00492 [0.0248]
Foreigner	0.345*** [0.0425]	0.332*** [0.0435]	0.297*** [0.0508]	0.273*** [0.0625]
Failed	0.0341** [0.0130]	0.0282** [0.0120]	0.0380*** [0.0116]	0.0323** [0.0127]
PC	-0.134*** [0.0136]	-0.129*** [0.0129]	-0.135*** [0.0151]	-0.129*** [0.0171]
High mark	-0.0651*** [0.0115]	-0.0579*** [0.0104]	-0.0675*** [0.0108]	-0.0601*** [0.0113]
Metropolitan	0.0519*** [0.0177]	0.0490*** [0.0179]	0.0566*** [0.0146]	0.0543*** [0.0170]
Lambda		0.256*** [0.0490]		0.286*** [0.0483]
F-statistic			20.29	11.47
Region fixed effect	Y	Y	Y	Y
Observations	12,881	12,881	12,881	12,881

Notes: The instrumental variable estimations (3) and (4) partial out region fixed effects (see Baum et al. 2007).

Standard errors (clustered by region) in brackets.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ .

have a lower probability of being over-educated. The same result holds for married workers. The indicator variables for having at least one child, and its interaction with being female, are not statistically different from zero. As well documented by other studies, international migrants experience a higher probability of over-education. All the proxies for individual ability are significant and have the expected sign, meaning that more able individuals are less likely to be over-educated. Finally, similarly to Jauhainen (2011), I find that living in a metropolitan area is associated with a higher probability of over-education. The possibility of a greater mismatch between demand and supply of educated workers in large cities is acknowledged, among the others, in McGoldrick and Robst (1996).

As discussed in the previous section, regression (1) presents at least two possible sources of misspecification: selection into employment and the endogeneity of migration. Column 2 of

Table 2 presents results of the two step Heckman selection model. First, a probit model for the probability of being employed is estimated. Then, the resulting inverse of the Mills' ratio ( $\lambda$ ) is added to the model of column 1, bootstrapping (200 replications) in order to obtain correct standard errors.<sup>13</sup>

The  $\lambda$  coefficient confirms intuition that the probability of being over-educated is positively correlated with the probability of being unemployed. However, self-selection has no influence on the coefficients of interest. Regarding the other controls, note that being a woman is now associated with a lower probability of being over-educated. This finding, together with the results of the selection equation, still to be shown, suggests that women are more likely to choose not to work rather than to accept jobs below their expectations. Overall, the results of column 2 support the hypothesis of a negative correlation between spatial flexibility and over-education.

The selection equation is reported in column 1 of Table A1 of the Appendix. The coefficient on gender reveals that women have a lower probability of being employed (there is a similar result for young workers). It is a well-known feature of the Italian labour market, that female and youth unemployment rates are relatively high. Singles and individuals with children have a lower probability of being employed, but the present analysis does not allow us to infer the direction of the causality link. After controlling for the personal and individual characteristics, foreigners show a lower probability of being employed, but the standard error is large. All the indicators of an individual's ability are statistically significant and in the expected direction. Regional dummies (not reported) are highly significant.

These results do not depend on either the linear probability specification of model (1) or the choice of the exclusion restriction in the selection equation. As a robustness check, Table A2 of the Appendix shows the results of three Heckman's regressions for probit models, implemented through a standard Stata 11 routine (Stata Corp., College Station, TX). A useful conversion rule facilitates comparison across models: the coefficients of the probit model are roughly equal to 2.5 times the coefficients of the linear probability model (Cameron and Trivedi, 2010). In column 1, the instrument in the selection equation is the number of members in the household, as in previous specification. Columns 2 and 3 of Table A2 check whether results depend on this choice. In particular, in column 2, following Büchel and Van Ham (2003), I use age classes (which, consequently, have been dropped from  $X_i$ ); in column 3 the Heckman selection model is run with no exclusion restrictions. Results are virtually unchanged. Overall, findings in Table A2 support those obtained using the linear probability specification (column 2 of Table 2).

The endogeneity of migration is addressed in specifications 3 and 4 of Table 2, by instrumenting it with housing tenure at the time of the interview. The results of the first stage regression are reported in column 2 of Table A1. First, notice that the housing tenure variable is strongly correlated with the decision to migrate (the F-test for excluded instruments is 20.29). As already well-established in the literature, tenants have a lower probability of migrating for job related reasons. The effect of all the other controls goes in the expected direction. In particular, women, young people, divorced and parents have a lower probability of migrating; foreign-born individuals, on the contrary, seem to be more geographically mobile than natives.

The key result of column 3 of Table 2 is that having migrated for job related reasons is now associated with a higher probability of being over-educated. The estimated coefficients of all other variables remain basically unchanged; in particular, commuting time is associated with a lower probability of being over-educated. Column 4 of Table 2 deals with both the endogeneity of actual migration and self-selection into employment. Again, having migrated for job related reasons increases the probability of being over-educated. This result can easily be rationalized within a broader theoretical framework, which includes some suggestions derived from the literature on international migration and over-education, as discussed in subsection 2.2.

<sup>13</sup> For a concise presentation of this procedure, see Cameron and Trivedi (2010).



**Table 3.** Linear probability model for over-education with job characteristics

	(1) Heck.	(2) IV plus Heck.	(3) IV plus Heck.	(4) IV plus Heck.
Migrant	0.00682 [0.0213]	0.380** [0.164]	0.367** [0.156]	0.325** [0.153]
Commuting time	−0.000752*** [0.000244]	−0.00102*** [0.000326]	−0.00101*** [0.000342]	−0.000965*** [0.000320]
Individual's controls	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y
Job characteristics	Y	Y	Y	Y
Parents' education			Y	Y
Labour income				Y
Observations	12,881	12,881	12,881	12,510

*Notes:* Individual controls are: age (four age brackets 15–29, 30–40, 41–49 and older than 50), gender, education (high school and university graduate), marital status, having children, an interaction between being woman and having children, having failed at least one year during primary and/or low secondary education, being able to write on a personal computer and to search on the web, having obtained at least an average final mark in the lower secondary school, being foreigner. Regional controls are: a time invariant regional fixed effect and an indicator for living in a metropolitan area. Job characteristics are: a dummy for working in the private sector; the type of contract (open-ended employee, fix term employee and self-employed), tenure (in years), the economic sectors and the recruitment channels. The instrumental variable estimation partials out region fixed effects (see Baum et al. 2007).

Standard errors (clustered by region) in brackets.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ .

A second important point of this paper is that omitting (observable) job characteristics can introduce a bias of the estimated effect of spatial flexibility on migration, in the same direction of the one caused by the endogeneity of the migration decision. This issue is addressed in Table 3, which estimates model (1) including job characteristics  $X_j$ . Column 1 of Table 3 reports the results for the Heckman selection model (which corresponds to column 2 of Table 2). Results highlight that the negative correlation between migration and over-education vanishes once job characteristics are included in the regression specification. The coefficient of migration is now positive, but statistically not different from zero. Further investigation reveals that this result is driven by the inclusion of the control for working in the public/private sector. This suggests that the lower incidence of over-education among internal migrants might be due to their participation in the public sector, which is structurally associated with a lower level of over-education. The coefficient of commuting decreases in absolute value, but it is still significant at the 1 per cent level. The results for the other controls (not reported) are largely unaffected. Column 2 of Table 3 adds job characteristics to the specification which corrects for selection into employment and instruments the migration variable (as in column 4 of Table 2). The results of the IV estimation hold after the inclusion of these controls.

As already discussed, a possible concern is whether the adopted instrument is uncorrelated with the error term. One might argue that living in their own home is associated with higher income, and that wealthier people can be more selective when choosing a job, thus reducing the incidence of over-education among this group of workers. Column 3 of Table 3 checks the robustness of the above results by adding parents' education to the baseline regression. The education of parents aims at controlling for the income and wealth of the family of origin. Results are unchanged. I also add both parents' education and the (log of the) workers' gross labour income, available for employees with open ended contracts only (12,510 observations).<sup>14</sup>

<sup>14</sup> Notice that labour income is extremely likely to be affected by endogeneity problems too.

The results, reported in column 4, confirm a positive and significant effect of internal migration on the probability of being over-educated.

Table A3 looks at gender differences, by adding an interaction term of gender and migration. Columns 1 and 2 of Table A3 point to a stronger negative relationship between migration and over-education for women. However, the interaction term is not statistically different from zero when migration is instrumented. I interpret this result as evidence that the effect of individuals' unobservables is particularly important for women, probably for cultural reasons. I also ran separate regressions for men and women (available upon request) and the results are in line with those presented here, although the lower number of observations reduces the precision of estimates.

In summary, the hypothesis that workers' spatial flexibility reduces their over-education is verified for short distance commuting only. Furthermore, results show that the negative correlation between migration and over-education, which has received some weak empirical support in previous studies, is likely to be driven by the endogeneity of the migration decision and the omission of relevant job characteristics. I think that these findings add to the existing literature and are relevant for properly based policy prescriptions.

## 5 Conclusions

This paper addresses the relationship between internal mobility and over-education. Using a large survey on the Italian labour market, it estimates the effect of workers' spatial flexibility (precise information on commuting and migration) on their probability of being over-educated.

The main contribution of the analysis is that it tries to deal with two possible sources of misspecification, which can bias the correlation between migration and over-education downward: the endogeneity of migration and the omission of relevant job characteristics. It also deals with selection into employment and controls for area and personal characteristics, including several proxies for individual's ability.

Results cast some doubt on the conventional wisdom that spatial flexibility unambiguously reduces the incidence of over-education. Short distance mobility (commuting) is found to be negatively correlated with an individual's probability of being over-educated. The effect of commuting is statistically significant and robust across different specifications, although quantitatively low. In general, this result conforms to the findings of previous studies and it delivers straightforward policy implications. Policies aiming at improving informational and/or physical connections (infrastructure, public transport) between locations could help to alleviate the incidence of over-education.

However, the effect of internal migration on the quality of the education-job match turns out to be at least ambiguous. Migration for job related reasons is negatively correlated with over-education only if the regression specification does not include job characteristics, treating them as if they were unobservable to the researcher, and it does not address the endogeneity of the migration decision caused by unobservable individual characteristics. The negative correlation between migration and over-education vanishes once job characteristics are included among the controls. When migration is instrumented, to solve for its potential endogeneity, it is found to have a positive effect on the probability of being over-educated. From a policy perspective, this result implies that, in order to address the spatial mismatch of skills, internal migration flows alone might not be the appropriate tool; and policies to reduce regional disparities may also be required. This policy prescription can be particularly relevant for Europe.

The paper argues that the negative impact of migration on the quality of the education-job match can hardly be explained within the theoretical framework adopted so far to address the link between spatial flexibility and over-education. However, it can be easily explained if the

basic framework is enriched with some of the suggestions derived from the literature on international migration. I believe that the attempt to establish a bridge between the literature on internal and international mobility and over-education is a further minor contribution of this paper. This theoretical contamination might be particularly fruitful for addressing the effects of migration within countries characterised by large regional disparities, as Italy certainly is. For this reason I suggest caution in extending the findings of the present study to other countries.

Finally, it is important to bear in mind that the present analysis is subject to a few caveats, mainly due to data availability, discussed throughout the paper. Therefore, it seems fair to conclude that the results presented here point to the fact that the causal effect of migration on over-education is still unclear and further research is needed, to better ground policy prescriptions.

## References

- Allen J, Van der Velden R (2005) The role of self-assessment in measuring skills. Reflex Working paper no. 2, Research Centre for Education and the Labour Market, Maastricht University
- Almalaurea (various years) Graduates' employment condition. URL: <http://www.almalaurea.it/en/>
- Battu H, Belfield C, Sloane P (2000) How well can we measure graduate over-education and its effects? *National Institute Economic Review* 171: 82–93
- Battu H, Büchel F (2003) The theory of differential overqualification: Does it work? *Scottish Journal of Political Economy* 50: 1–16
- Battu H, Seaman P, Sloane P (1999a) Over-education, undereducation and the British labour market. *Applied Economics* 31: 1437–1453
- Battu H, Seaman P, Sloane P (1999b) Are married woman spatially constrained: A test of gender differentials in labour market outcomes. *European Research in Regional Science* 9: 91–110
- Bauer T (2002) Educational mismatch and wages: A panel analysis. *Economics of Education Review* 21: 221–229
- Baum CF, Schaffer ME, Stillman S (2007) Enhanced routines for instrumental variables/GMM estimation and testing. Boston College Working Papers in Economics no. 667. Boston College, Department of Economics, Boston, MA
- Bentolila S, Michelacci S, Suarez J (2010) Social contacts and occupational choice. *Economica* 77: 20–45
- Brunello G, Garibaldi P, Wasmer E (eds) (2007) *Education and training in Europe*. Oxford University Press, Oxford
- Brynin M, Longhi S (2009) Over qualification: Major or minor mismatch? *Economics of Education Review* 28: 114–121
- Büchel F, Van Ham M (2003) Over-education, regional labour markets and spatial flexibility. *Journal of Urban Economics* 53: 482–493
- Cainarca GC, Sgobbi F (2009) Quanto paga studiare? La relazione tra istruzione e retribuzione in Italia. *Economia Politica* 26: 53–83
- Cameron AC, Trivedi PK (2010) *Microeconometrics using Stata*. Stata Press, College Station, TX
- Chevalier A (2003) Measuring over-education. *Economica* 70: 509–531
- Chiswick BR, Miller PW (2009) The international transferability of immigrants' human capital. *The Economics of Education Review* 28: 162–169
- Cipollone P, Montanaro P, Sestito P (2010) L'Istruzione. In: Cannari L, Franco D (eds) *Il Mezzogiorno e la politica economica dell'Italia*, Bank of Italy Workshops and Conferences, no. 4. Centro Stampa della Banca d'Italia, Roma. URL: <http://www.bancaditalia.it/>
- Croce G, Ghignoni E (2011) Over-education and spatial flexibility in Italian local labour markets. *MPRA Paper* n. 29670, University Library of Munich
- Dell'Ara C, Pagani L (2011) Labour market assimilation and over-education: The case of immigrant workers in Italy. *Economia Politica* 2: 219–240
- Di Pietro G, Urwin P (2006) Education and skills mismatch in the Italian graduate labour market. *Applied Economics* 38: 79–94
- Dolton PJ, Silles MA (2008) The effects of over-education on earnings in the graduate labour market. *Economics of Education Review* 27: 125–139
- European Commission (2009) *New skills for new jobs: Anticipating and matching labour market and skills needs*. Directorate-General for Employment, Social Affairs and Equal Opportunities Unit D.2, Directorate-General for Education and Culture, Office for Official Publications of the European Communities, Luxembourg
- Franco D (2010) L'economia del Mezzogiorno. In: Cannari L, Franco D (eds) *Il Mezzogiorno e la politica economica dell'Italia*, Bank of Italy Workshops and Conferences, no. 4. Centro Stampa della Banca d'Italia, Roma. URL: <http://www.bancaditalia.it/>
- Frank RH (1978) Why women earn less: The theory and estimation of differential overqualification. *American Economic Review* 68: 360–373

- Franzini M, Raitano F (2011) Few and underutilized? Over-education of Italian graduates. In: Mandrone E (ed) *L'intermediazione pubblica, privata ed informale*. ISFOL, Roma
- Freeman RB (1976) *The over-educated American*. Academic Press, New York
- Friedberg RM (2000) You can't take it with you? Immigrant assimilation and the portability of human capital. *Journal of Labor Economics* 18: 221–251
- Gautier P, Zenou Y (2010) Car ownership and the labor market of ethnic minorities. *Journal of Urban Economics* 67: 392–403
- Gobillon L, Selod H, Zenou Y (2007) The mechanisms of spatial mismatch. *Urban Studies* 44: 2401–2427
- Green F, Zhu Y (2010) Overqualification, job dissatisfaction, and increasing dispersion in the returns to graduate education. *Oxford Economic Papers* 62: 740–763
- Green F, McIntosh S, Vignoles A (1999) 'Over-education' and skills: Clarifying the concepts. CEP Discussion Paper no. 435. Centre for Economic Performance, London
- Halaby C (1994) Over-education and skill mismatch. *Sociology of Education* 67: 47–59
- Hensen MM, de Vries MR, Cörves F (2009) The role of geographical mobility in reducing education-job mismatches in the Netherlands. *Papers in Regional Science* 88: 667–682
- Isfol (2009) *L'indagine campionaria Isfol-PLUS: Contenuti metodologici e implementazione*. URL: <http://www.isfol.it/>
- Istat (2006) *La situazione economica del paese nel 2005. Rubbettino: Industrie grafiche ed editoriali*. Istat, Soveria Mannelli
- Istat (2009) *L'inserimento professionale dei laureati*. URL: <http://www.istat.it/>
- Jauhiainen S (2011) Over-education in Finnish regional labour markets. *Papers in Regional Science* 90: 573–588
- Kler P (2007) A panel data investigation into over-education among tertiary educated Australian immigrants. *Journal of Economic Studies* 34: 179–193
- Laj C, Raitano M (2006) L'utilizzo del capitale umano in Italia. In: Criss (ed) *Rapporto sullo stato sociale 2006*. De Agostini Scuola SPA, Novara
- Lehmer F, Ludsteck J (2011) The returns to job mobility and inter-regional migration: Evidence from Germany. *Papers in Regional Science* 90: 549–571
- Mavromaras K, McGuinness S, O'Leary N, Sloane P, Fok YK (2009) Job mismatches and labour market outcomes. Economic and Social Research Institute (ESRI) WP314, Dublin
- McGoldrick KM, Robst J (1996) Gender differences in over-education: A test of the theory of differential overqualification. *American Economic Review* 86: 280–284
- McGuinness S (2006) Over-education in the labour market. *Journal of Economic Surveys* 20: 387–418
- Meliciani V, Radicchia D (2011) The informal recruitment channel and the quality of job-worker matches: An analysis on Italian survey data. *Industrial and Corporate Change* 20: 511–554
- Mocetti S, Porello C (2010) La mobilità del lavoro in Italia: Nuove evidenze sulle dinamiche migratory. Banca d'Italia Questioni di Economia e Finanza Occasional Papers 61, Roma
- OECD (2005) *Employment Outlook*. OECD, Paris
- Rose G, Ordine P (2010) Over-education and unemployment spells' duration. *Procedia Social and Behavioral Sciences* 9: 427–438
- Rosolia A, Torrini R (2007) The generation gap: Relative earnings of young and old workers in Italy. Bank of Italy Economic working papers no. 639, Rome
- Sanromá E, Ramos R (2004) Over-education and local labour markets in Spain. Paper presented to the 44th European Regional Science Association Congress, Porto, 25–29 August
- Sloane P (2003) Much ado about nothing? What does the over-education literature really tell us. In: Buchel F, de Grip A, Mertens A (eds) *Over-education in Europe: Current issues in theory and policy*. Edward Elgar, Cheltenham
- Sjaastad LA (1962) The cost and returns of human migration. *Journal of Political Economy* 70: 80–93
- Tsang M (1987) The impact of underutilisation of education of productivity: A case study of the US Bell companies. *Economics of Education Review* 11: 239–234
- Tsang M, Rumberger R, Levin H (1991) The impact of surplus schooling on worker productivity. *Industrial Relations* 30: 209–228
- Thurow LC (1975) *Generating inequality*. Basic Books, New York
- Van Ham M, Mulder CH, Hooimeijer P (2001) Spatial flexibility in job mobility: Macrolevel opportunities and microlevel restrictions. *Environment and Planning A* 33: 921–940
- Verhaest D, Omey E (2010) The determinants of over-education: Different measures, different outcomes? *International Journal of Manpower* 31: 608–625
- Zenou Y (2009) *Urban labor economics*. Cambridge University Press, Cambridge

**Table A1.** Selection equation for employment and first stage regression for IV estimation

	(1) Selection equation employed	(2) First stage migrant
Commuting time		0.00116*** [0.000342]
Woman	-0.423*** [0.0818]	-0.0606*** [0.0202]
Age 30-40	0.375*** [0.0342]	0.0454*** [0.0153]
Age 41-49	0.714*** [0.0623]	0.0475*** [0.0165]
Age > 50	1.244*** [0.105]	0.0543*** [0.0171]
University	0.0852 [0.0524]	0.0186* [0.00919]
Divorced	-0.328*** [0.0788]	-0.0424* [0.0217]
Single	-0.475*** [0.0348]	0.0298* [0.0148]
Sons	-0.114** [0.0548]	-0.0389* [0.0191]
Woman × sons	-0.00970 [0.0838]	0.00440 [0.0177]
Foreigner	-0.196* [0.116]	0.113* [0.0543]
Failed	-0.114*** [0.0240]	-0.0109 [0.0119]
PC	0.133*** [0.0316]	0.00359 [0.0141]
High mark	0.129*** [0.0241]	0.00928 [0.00591]
Metropolitan	-0.0454 [0.0627]	-0.0198 [0.0121]
Housing tenure: rent		0.0941*** [0.0148]
Housing tenure: missing		0.0811* [0.0452]
Housing tenure: young adult living at home		-0.0376*** [0.0124]
Number of household members = 2	-0.367*** [0.0581]	
= 3	-0.290*** [0.0676]	
= 4	-0.283*** [0.0645]	
>= 5	-0.365*** [0.0609]	
Region fixed effect	Y	Y
Observations	16,918	12,881

Notes: Standard errors (clustered by region) in brackets.  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A2.** Probit models for over-education with Heckman correction

	(1) Heckprobit (Size of the household)	(2) Heckprobit (Age)	(3) Heckprobit (None)
Migrant	-0.132** [0.0622]	-0.134** [0.0606]	-0.133** [0.0620]
Commuting time	-0.00329*** [0.000756]	-0.00321*** [0.000745]	-0.00328*** [0.000749]
Individual's controls	Y	Y	Y
Regional controls	Y	Y	Y
Observations	12,881	12,881	12,881

*Notes:* Individual controls are: age (four age brackets 15–29, 30–40, 41–49 and older than 50; in model 2 age has been omitted), gender, education (high school and university graduate), marital status, having children, an interaction between being woman and having children, having failed at least one year during primary and/or low secondary education, being able to write on a personal computer and to search on the web, having obtained at least an average final mark in the lower secondary school, being foreigner. Regional controls are: a time invariant regional fixed effect and an indicator for living in a metropolitan area.

Standard errors (clustered by region) in brackets.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ .

**Table A3.** Linear probability model for over-education with gender-migrant interaction

	(1) Ols	(2) Heck.	(3) IV	(4) IV plus Heck.	(5) IV plus Heck.
Migrant	-0.0248 [0.0260]	-0.0250 [0.0287]	0.404*** [0.154]	0.206 [0.327]	0.199 [0.277]
Woman	-0.0391 [0.0273]	-0.0576** [0.0282]	0.167 [0.147]	-0.232 [0.527]	-0.271 [0.324]
Migrant $\times$ woman	-0.0587* [0.0315]	-0.0561* [0.0333]	-0.405 [0.384]	0.714 [1.653]	0.849 [1.032]
Commuting time	-0.00113*** [0.000222]	-0.00112*** [0.000229]	-0.00156*** [0.000306]	-0.00157*** [0.000431]	-0.00102*** [0.000389]
Additional individual's controls	Y	Y	Y	Y	Y
Regional controls	Y	Y	Y	Y	Y
Job characteristics					Y
Observations	12,881	12,881	12,881	12,881	12,881

*Notes:* Additional individual controls are: age (four age brackets 15–29, 30–40, 41–49 and older than 50), education (high school and university graduate), marital status, having children, an interaction between being woman and having children, having failed at least one year during primary and/or low secondary education, being able to write on a personal computer and to search on the web, having obtained at least an average final mark in the lower secondary school, being foreigner. Regional controls are: a time invariant regional fixed effect and an indicator for living in a metropolitan area. Job characteristics are: a dummy for working in the private sector; the type of contract (open-ended employee, fix term employee and self-employed), tenure (in years), the economic sectors and the recruitment channels. The instrumental variable estimations partial out region fixed effects (see Baum et al. 2007).

Standard errors (clustered by region) in brackets.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .





**Resumen.** Este artículo aborda el efecto de flexibilidad espacial de los trabajadores (desplazamiento al trabajo y migración) en la probabilidad de que estén sobrecualificados en lo educativo. El análisis empírico trata dos fuentes posibles de error de especificación: la endogeneidad de la migración y la omisión de características pertinentes de los trabajos. También se controla en cuanto a las zonas y las características personales. Los resultados muestran que los desplazamientos al trabajo están correlacionados positivamente con la calidad del emparejamiento entre educación y trabajo. Sin embargo, el análisis no apoya la creencia convencional de que la migración reduce inequívocamente la sobrecualificación educativa. Parece justo concluir que el vínculo entre la migración y la sobrecualificación educativa permanece poco claro y que se necesita más investigación para poder ofrecer prescripciones políticas prácticas.

要約：本論文は労働者の空間的フレキシビリティ（通勤と移住）が過剰教育状態の発生率に与える影響を分析する。実証分析においては、ミスペシフィケーションの原因となりうる2つの要因（すなわち、移住の内生性、および重要な職の適性の除外の問題）を取り扱う。また本分析では、地域および個人の特性もコントロールする。分析によれば、通勤は学歴と職業の適合性のクオリティーとプラスの相関を示している。しかし本分析では、従来から常識とされている移住は明らかに過剰教育を減少させるという説を支持する結果は得られなかった。移住と過剰教育の関係は依然として明確ではなく、また総合的な政策の策定には更なる調査が必要であると結論づけるのが適當であると考えられる。