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Spatial mobility and overeducation of young workers: New evidence from France

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Abstract

This paper explores the influence of spatial mobility on the risk of overeducation of French young workers. We mobilise a survey that follows a cohort of young people who graduated in 2010 until 2013. The effect of residential migration on the probability of being overeducated is estimated through linear probability models. Our analysis deals with self-selection into employment and endogeneity of mobility decision by combining Heckman procedure and instrumental variables method. Estimated results reveal that regional migration decreases the risk of (statistical and subjective) overeducation. We also evidence differentiated effects for migration to Paris and/or according to the educational level.

Keywords: overeducation, educational mismatch, spatial mobility, migration, employment

JEL codes: C35, J24, R23

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Introduction

Most job seekers are searching for jobs on local labour markets, around their residential location. However, smaller markets often mean less suitable job opportunities. If there is no adequate job available in the area, an individual has three options (Simpson, 1992). The first is to remain unemployed. The second is to accept a job requiring less education than she or he actually has, *i.e.* become overeducated. To avoid both unemployment and overeducation, the third option is to search for jobs located farther from them. The economic literature has indeed shown that spatial mobility tends to reduce the risk of unemployment as it permits access to new areas with better job opportunities (see for instance the works of Pissarides and McMaster (1990); Détang-Dessendre (1999); Fahr and Sunde (2006); Rupert and Wasmer (2012); Langella and Manning (2022) etc.). A recent work of Schmutz et al. (2021) confirms that this is especially true for the most educated workers. While the links between spatial or geographical mobility and unemployment have been the subject of numerous empirical analyses, it is not the case concerning the links with overeducation. This phenomenon, which particularly concerns the most educated young workers, remains somewhat under-studied.

In France, as in many OECD countries, young graduates entering the labour market experience important issues in their early professional careers. Firstly, they face a higher risk of unemployment. In 2021, 19.6% of the 15-24 years old labour force were unemployed¹. Secondly, they also face a higher risk of overeducation (Dolton & Vignoles, 2000). However, being overeducated at the beginning of the career has a detrimental impact on future labour market outcomes (Baert et al., 2013; Baert & Verhaest, 2019), due to the negative signal of overeducation and the decline of skills over time. Then, it is essential for young workers to access to a matched job as soon as possible after their graduation. In this context, broadening their job search area may be a strategy for these young workers to avoid overeducation and its scarring effects. In the French case, although young graduates generally tend to stay in the same region for higher education and employment, their share has declined over the past few decades (Bernela & Bonnal, 2022), the spatial mobility allowing them to increase chances to find suitable and better paid jobs (Lemistre & Moreau, 2009).

In this work, we contribute to the existing literature by investigating the consequences of spatial mobility for young workers in their early career. In particular, we examine the links between geographical mobility (between graduation and the job currently occupied) and the risk

¹Source: OECD data.

of overeducation, the latter being defined as the fact of occupying a job requiring a educational level lower than one's own. Previous works have indeed shown that expanding the job search area could be an important factor in avoiding overeducation in OECD countries (see Büchel and van Ham (2003) for Germany; Hensen et al. (2009) for the Netherlands; Devillanova (2013) for Italy or even Romani et al. (2016) for Spain). However, to our knowledge, such a question has not been studied yet in the French context.

To do this, we use the *Génération 2010* survey, from the Céreq (*Centre d'études et de recherche sur les qualifications*, French Center for Studies and Research on Qualifications), allowing us to follow a cohort of French young people who left the educational system in 2010 until 2013. Because the survey provides information on residential mobility, it is used to check if a regional migration since graduation is a way to avoid overeducation. The empirical design retained to analyse the relationship between migration and overeducation combines three econometric models. The first one is to account for the sample selection problem as overeducation is observable only for individuals that actually works. The second one is for the endogeneity of migration decision. Indeed, it may exist some unobserved factors determining simultaneously migration and overeducation, or some reverse causality as overeducation might affect the migration decision. For these reasons, we run instrumental variables estimations, in which the migration decision is instrumented by migrations observed during past education. The last equation is for testing the relationship between the migration decision and the risk of overeducation on the labour market. This econometric strategy should allow us to better identify the causal effect of spatial mobility (or migration) on overeducation.

Our approach is original for at least three reasons. *Firstly*, if there are already some works investigating the role of migration and the implications for education-job matching issues, there is none for France. It represents a particularly interesting study case as the Paris region polarises a significant proportion of jobs and workers. In this context, a migration to Paris may have differentiated effects compared to migration to other regions. We try to disentangle these questions by examining all migrations between regions and those only related to the Paris region. *Secondly*, our work is based on a representative sample of the stock of both short-cycle higher education and long-cycle higher education graduates. By studying these different populations, we want to check if migration is more favourable for the most educated profiles. Combes et al. (2012) indeed shown that relocation of workers between French local labour markets may differ according to their skills. *Thirdly*, our data enable us to use two measures of overeducation, a statistical measure and a subjective one. More specifically, the statistical measure is based

on statistical characteristics of the distribution of education for each occupation, while the subjective one is based on workers' self-assessments about the skills required to do their job. We can therefore explore the actual situation of overeducation and the feeling of being overeducated, respectively.

The main results are as follows. First, we find that having migrated (*i.e.* changed of region) between the last degree obtained and the job currently held tends to decrease the probability of being overeducated. It is confirmed for both of our measures of overeducation, the statistical and the subjective ones. Considering self-selection into employment and the endogeneity of migration decision does not change conclusions for the statistical measure, but makes the effect observed for the subjective one significant. In addition, when we focus on the migration to Paris, we evidence an even stronger negative effect on the risk of overeducation, confirming the advantage of such a region in terms of job opportunities. Finally, we show that the benefits of migration may differ according to the educational level of young workers. In fact, no effect is found for the individuals with a 2-year degree, while it is particularly “advantageous” for those with a 3- or 4-year degree. In comparison, individuals with a 5-year degree (or more) also decrease their risk of being overeducated with spatial mobility, but the effect is smaller than for the previous group.

The first section offers a description of the theoretical links between the migration decision and overeducation, and a literature review of the previous empirical works exploring this question. The second section presents the data and variables retained for our analysis. The third section provides some descriptive statistics of our study sample. The fourth section describes the estimation strategy and the fifth section displays the results of our estimations. The last section concludes.

1 Spatial mobility and overeducation

1.1 Theoretical links

Individuals working in occupations for which they have more education than that is required are considered overeducated. This phenomenon is known to particularly affect young workers entering the labour market (Dolton & Vignoles, 2000). Theoretically, the career mobility theory (Sicherman & Galor, 1990) exposes overeducation as a temporary phenomenon, where workers accept a job requiring less education than they actually have in order to improve future outcomes

on the labour market. Baert et al. (2013) challenge this conclusion by showing that being overeducated at the beginning of the career is detrimental for future labour market positions. Moreover, in the short term, overeducated workers have lower wages (Verdugo & Verdugo, 1989) and a lower satisfaction at work (Tsang et al., 1991) than individuals with the same level of education but working in a matched occupation. Therefore, extending their geographic mobility may be a strategy for these individuals to avoid overeducation and its scarring effects, as in the theory of Simpson (1992).

Concretely, it is expected that the risk of overeducation is higher for the workers who are restricted to a smaller local labour market. In such places, the lower density of suitable job opportunities is likely to hinder the job search process and the matching quality between workers and job vacancies. As a consequence, spatial mobility can be seen as a way of avoiding overeducation because it provides an access to more job opportunities. Some previous works have indeed found that geographic mobility positively influences workers' labour market positions (Büchel & Battu, 2003; Hensen et al., 2009; van Ham, 2001).

In this work, we start from this assumption and we hypothesise that geographically mobile graduates have a lower probability of being overeducated compared to those who are less mobile. With our data, we are able to see if French young workers have changed their region of residence between the last degree obtained and the moment when they are interrogated for the survey (three years later). We believe that those who make the decision to move between the two dates are less likely to be overeducated. The mobility decision is indeed based on an arbitration between the costs and benefits associated to it. Because the costs of mobility may be high (due to financial and psychological costs), the job occupied must offer good working conditions, that is to say it has to be matched to the worker's skills, and the wage offered should partially or fully offsets the costs associated with the mobility decision. To the extent that job opportunities are richer in the Paris region than in other regions, we assume that the probability to find a well suitable job is higher in this region, and then that the risk of overeducation should be lower.

In addition, it has been shown that spatial mobility or migration are more frequent for the most skilled people (Combes et al., 2012). Starting from this fact, if we consider different groups of young workers with different behaviours related to migration (*i.e.* the highly skilled workers who have a high propensity to migrate *and* the skilled workers who do it less frequently), some differentiated effects on the probability of being overeducated might be observed. We can indeed consider that the expected benefits of migration are higher for those who are less likely to adopt

such a behaviour. Indeed, if the decision to migrate has been taken, it is theoretically to obtain a job corresponding to the skills offered. Concerning the workers for whom these mobilities are frequent, the expected benefits could be lower. We try to disentangle these questions by considering the short- and long-cycle higher education graduates separately.

Finally, the links between spatial mobility and overeducation are likely to be different between men and women. Frank (1978) argues that, in a couple, the husband is looking for a job on the global labour market, whereas the wife is looking only in the local labour market where her partner has obtained a job. Then, we can expect that women are more likely to be overeducated due to a smaller job search area. Büchel and Battu (2003) confirm this hypothesis as they show that the probability of being overeducated is higher for married women living in rural areas. The size of the local labour market or access to other labour markets through some mobilities can help them to find a suitable job. However, when the marital status is taken into account, Büchel and van Ham (2003) evidence that women (in particular those with children) suffer from a penalty in chances of finding a job, but are not more exposed to overeducation than men.

1.2 Literature review

In recent decades, a few works have examined the links between spatial mobility and the risk of overeducation. Most of them focused on local labour markets in OECD countries and looked at the situation of young people with higher education. On the whole, two problems must be addressed so that they can confirm a clear causal relationship between the mobility decision and overeducation. The first one is a possible “selection bias” due to the fact that overeducation is observable only for the graduates who are actually employed. The second one is the endogeneity of mobility decision. Indeed, it may exist some unobserved characteristics affecting both the mobility behaviour and the probability of being overeducated. While the first studies did not necessarily consider these biases, the most recent ones attempt to do so. The difficulty is then to find the appropriate identification and instrumental variables.

Büchel and van Ham (2003) are among the first to highlight the role of regional labour market size (determined by the ability to search far away from the place of residence) as a potential explanatory variable of overeducation. On German data, the authors find that this risk decreases with individual spatial mobility and increases with the time to travel to a large agglomeration. They confirm that the size of the labour market is an important factor in avoiding overeducation.

However, if the authors take into account the self-selection into employment through a bivariate probit model, they do not consider the endogenous relationship between the mobility decision and overeducation, which is likely to bias their results. Using Dutch data, Hensen et al. (2009) investigate the relationship between spatial mobility and education-job mismatch. Even though they do not address any of the two problems mentioned above, they find that being more mobile decreases vertical educational mismatches (*i.e.* when the worker's level of education is higher than the one required of his/her employment) and increases horizontal educational mismatches (*i.e.* when the worker's field of education is different from the mode field for his/her occupation). In other words, the risk of being overeducated is lower for spatially flexible workers, but they are more often employed in jobs outside their field of study.

Jauhiainen (2011) also investigates the influence of mobility on the risk of overeducation in Finnish regional labour markets. Mobilising a probit model that controls for selection bias (the Heckman two-step method), he shows an ambiguous effect of spatial mobility: moving to another region has a negative effect on the probability of being overeducated, while moving inside the same region has a positive effect. This is consistent with the idea of limited spatial flexibility increasing overeducation. With the same methodology, Ramos and Sanromá (2013) analyse the influence of some local characteristics and spatial mobility on overeducation in Spanish local labour markets. Their results are in accordance with the previous ones as they evidence that the size of local labour markets and the possibility of extending the job search area (by commuting) represent relevant factors reducing the risk of overeducation.

Devillanova (2013) goes a step further and proposes an analysis taking into account self-selection and the endogeneity of migration simultaneously. His results show that short distance mobility is negatively correlated with Italians' probability of being overeducated, but they do not reveal a clear relationship for internal migration. The author concludes that the links between migration and overeducation remain unclear and that further researches are needed to better identify the effects at stake. Some other works have also focused on the Italian local labour markets. For example, Croce and Ghignoni (2015) tend to confirm the relevance of spatial mobility as an explanatory factor of the individual risk of educational mismatch. In line with Devillanova (2013), they control for self-selection into employment and test for the endogeneity of spatial mobility. Results are not totally in accordance with the previous ones since they reveal a negative effect of both commuting time (short distance mobility) and migration. Interestingly, the effects differ by educational level: commuting is favourable for upper-secondary graduates, while migration is for university graduates.

Iammarino and Marinelli (2015) also study the determinants of the education–job mismatches of recent university graduates in Italy and particularly focus on the role of inter-regional migration. Controlling for both the endogenous relationship between migration and employment and the self-selection bias, they evidence that whilst migration at the national level decreases the probability of overeducation, strong differences may emerge when looking at the sub-national dimension. It is this kind of relationship that we want to identify in the French context by distinguishing Paris from other regions (when considering migration). Finally, Melicani and Radicchia (2016) are more specifically interested in the role of informal recruitment channel on the risk of being overeducated, but also consider its role on spatial mobility. They estimate different equations allowing them to control for selection into employment and a likely endogeneity bias for mobility decision. If the main result is that using an informal channel has a positive effect on the risk of overeducation and a negative one on migration, another important result is that migration may reduce this risk. Nevertheless, in line with the work of Iammarino and Marinelli (2015), it is true only in some geographical areas of the Italian territory.

Some recent papers consider spatial mobility at different levels. In particular, Di Paolo et al. (2017) examine mobility at a very local level: they focus on the effect of job accessibility on job-education mismatch in the metropolitan area of Barcelona. The results obtained from a joint model for car ownership, employment selectivity and mismatch confirm that having access to private vehicles reduces the risk of job-education mismatch. Private transport is not the only factor that matters since it is shown that public transport job accessibility has a direct effect on this mismatch problem. Venhorst and Cörvers (2018) estimate the impact of internal migration on job-match quality for university and college graduates in the Netherlands. Using an instrumental variables approach to control for the self-selection of migrants, they find a positive effect of migration on the likelihood of achieving a vertical education match and giving positive subjective evaluations of the quality of the job-match. No effect is evidenced on the likelihood of achieving a horizontal match. Most recently, Ghosh and Grassi (2020) have evaluated the effects of international mobility on the education-job mismatch of Italian PhD graduates. Controlling for self-selection into cross-border mobility, they highlight that migration to foreign countries reduces significantly the risk of overeducation.

The various works reveal contrasted effects depending on the scale of the spatial mobility considered. Effects of migration on the risk of overeducation are generally significant for long distances within a country or for international migrations. At the country level, migrations

to some regions may appear to be favourable while they are unfavourable to some others. In addition, these effects also depend on individual characteristics. For example, migration is likely to be more useful for some levels of education. This work contributes to the existing literature by examining, in the French case, the links between inter-regional mobility and job-education mismatch, and by distinguishing individuals on the basis of their education level.

2 Data and variables

2.1 Data

This work is based on data from the *Génération 2010* survey conducted by Céreq in Spring 2013. This survey documents the entry and the trajectories during the first years on the French labour market of 33547 individuals who left school for the first time between October 2009 and October 2010. These data are based on random sampling to ensure that they are representative at the regional level and for each educational level. They provide socio-demographic information about individuals (gender, age, cohabitation status), as long as detailed information about their education (highest degree obtained, field of study). We also have information about the successive labour market positions (occupation, size of the firm, business sector) of these individuals between their graduation and the time at which they were interrogated.

We choose to focus on higher education graduates. Indeed, workers with lower education are less likely to be overeducated, or even cannot be overeducated for the lowest degrees. We divide our sample into three levels of education, based on the number of years of study after the baccalaureate: the 2-year university graduates, the 3- and 4-year university graduates, and the long-cycle higher education graduates corresponding to those who have studied five years or more. We exclude from our sample self-employed workers. Finally, with these restrictions, our sample is composed of 15865 individuals interrogated between 28 and 45 months after their graduation. We focus on the labour market position at the time of the interrogation, because it is the only one for which we have information about the place of residence, needed to determine spatial mobility. Moreover, some other variables, as the cohabitation status, are only observed at the time of the survey.

2.2 Variables

2.2.1 Dependent variable: the risk of overeducation

In this work, we are interested in the risk of overeducation for young graduates. The literature proposes three main ways to measure this phenomenon:

- using an objective measure, which defines what should be the “normal” matches between education and occupations, based on the skills requirements for each occupation (Rumberger, 1981);
- using subjective measures, based on workers’ self-assessments about which degree is required to do or to get their job (Duncan & Hoffman, 1981);
- using statistical measures, based on statistical characteristics of the distribution of education for each occupation, such as the mean (Verdugo & Verdugo, 1989) or the mode (Croce & Ghignoni, 2012; Davia et al., 2017).

Our data allow us to use two measures of mismatch, a subjective one and a statistical one. Therefore, we can explore the feeling of being overeducated and the actual situation of overeducation, respectively.

As for the subjective measure, respondents are asked in the *Génération* survey if they are employed above, below or at their level of skills². However, the answer to this question may reflect skill mismatch, *i.e.* overskilling, more than educational mismatch, *i.e.* overeducation. The former refers to an underutilisation of the skills possessed by the workers, the latter refers to a difference between the acquired level of schooling and the one required for the job they occupy. Allen and Van der Velden (2001) showed that these two dimensions of mismatch do not systematically overlap. It is actually quite complicated to know precisely which of these dimensions respondents consider when answering the survey. To avoid any confusion, we will refer to subjective mismatch in the following. In our study, individuals are considered as subjectively mismatched if they state that they are employed below their level of skills (our dependent variable takes the value 1 in this case and 0 otherwise).

There is no ambiguity between overeducation and overskilling in the use of the statistical measure. We rely on a bi-modal measure: individuals are considered statistically overeducated if their educational level is above the higher of the two most common levels for their particular occupation. We choose to use two modes rather than only one because of the wide range of educational levels that we consider, and because we have to rely on large occupational

²The following question is asked: "About this job, would you say you are used: At your skill level (1); Below your skill level (2); Above your skill level (3)?"

groups to ensure a sufficient sample size. Thus, in a same occupational group, occupations may require different levels of education. In order to determine which degrees are “normal” for each occupation, we do not restrict ourselves to the sample of young workers. Indeed, since they are more likely to be overeducated than older workers, this may alter the distribution of education by occupation. Therefore, we mobilize the 2013 French Labour Force Survey (LFS) *Enquête Emploi* from Insee (*Institut National de la Statistique et des Études Économiques*, French National Institute of Statistics and Economic Studies), 2013 being the year when respondents were surveyed for *Génération 2010*. This data set provides us individual information on workers of all ages. In particular, it contains information about the educational levels and occupations at a detailed level, which allow us to determine quite precisely the correspondence between them. The classifications of educational and occupation levels, as well as the aforementioned education-occupation correspondence, are reported in Appendix A.

To check for the robustness of our results, we use an alternative measure of statistical overeducation, based on the median and quartiles of the distribution. We consider that there is an educational mismatch for the levels farthest from the median. Therefore, an individual is considered as overeducated if his or her level of schooling is higher than the third quartile of the distribution of education in his or her particular occupation. Results for our main estimated models are presented in Appendix D.

2.2.2 Independent variables

The *Génération 2010* survey provides us a large set of explanatory variables, about individuals’ socio-economic characteristics, education, and labour market positions. In order to explain the risk of educational mismatch, we retain various information about the young graduates and the job they occupy.

Concerning individual characteristics, we consider the gender and the age at the time of graduation. In addition, we create binary variables indicating if individuals live with a partner or with their parents (the reference being living alone) and if they have children (and if so, the number of children). We create some dummies for the level of education and the field of study. Indeed, graduating in some fields leads to a higher risk of mismatch than in others (Meroni & Vera-Toscano, 2017). As for the educational level, the effect on overeducation remains theoretically ambiguous. On the one hand, having a higher degree may reflect higher skills and knowledge, providing a relative protection against overeducation. On the other hand,

higher degrees are above the standard for a larger share of occupations, which can lead to more recurrent mismatches.

Concerning the labour market position of the individuals, we include information about the employer and the characteristics of the job. Firstly, we include dummies for the sector of the firm, as there is more overeducation in some sectors than in others (Nauze-Fichet & Tomasini, 2002). Secondly, we include binary variables for full-time work and permanent jobs. Indeed, young workers may be less selective in the choice of a temporary job than for a permanent one. Thus, they may accept a job for which they are overeducated if they see it as a transitory position. This is what would predict the career mobility theory (Sicherman & Galor, 1990).

In this work, we argue that one of the main factors determining the risk of overeducation is the spatial mobility of graduates. By examining the regions where young people have obtained their last degree and where they actually live at the time of the survey, we are able to determine if they have known a spatial mobility. Concretely, we create a dummy variable taking the value 1 if the graduate has changed of region between his or her last degree and the region where she or he lives three years later, and 0 otherwise. First of all, we consider all inter-regional migrations, whatever the region of arrival of the migrants. Then, we focus on migrations to Paris region exclusively. Because it is a region that polarises a large part of job opportunities and workers and that concentrates high levels of wages and qualifications (Combes et al., 2015), we believe that it must be distinguished from other regions. We retain an administrative definition of French regions³. Its geography is presented in Appendix B.

3 Descriptive statistics

We provide descriptive statistics about our sample in Table 1. First, we observe that there are slightly more female than male in our sample (about 56% against 44%, respectively). About half of the individuals live with a partner, and more than 30% live alone. The rest of the individuals still live with their parents at the time of the survey. A large majority of individuals in the sample does not have children. It is not surprising as it represents young people who have recently completed their studies. When they have children, it is generally only one and rarely two (respectively 10% and 3% in the sample).

Concerning educational levels, 3- and 4-year degrees are under-represented in comparison

³We use the definition of the regions at the time of the survey, that is to say before a French territorial reform implemented in 2015. This definition corresponds to the NUTS2 geographical divisions from Eurostat.

with both shorter and longer tertiary degrees. This can be explain by the purpose of these degrees: 3- and 4-year degrees are transitory levels, designed to give access to longer studies. On the contrary, 2- and 5-year degrees are supposed to allow direct integration into the labour market. All fields of study are represented in the same proportions, with the exception of agriculture (under-represented) and health (over-represented).

Three years after graduation, 81.7% of the individuals were employed. Services and public sectors workers represent a large share of our sample (more than 75%). Concerning the job characteristics, a majority of the individuals are working full-time (more than 85%), but it must be noted that about a third of our sample (30%) have temporary contracts. It is a rather high proportion of temporary contracts for workers on the French labour market ⁴. However, young people are generally confronted to this kind of jobs due to their lack of experience when they leave the school system. If residential migration is not a predominant behaviour, it is not marginal either. Indeed, 38.4% of the workers have moved since graduation, among which about a quarter to Paris.

There are slightly more individuals who are statistically overeducated (27.5%) than subjectively mismatched (25.1%). However, when crossing the two situations (Table 2), we observe that about 30% of the workers are mismatched in only one of the dimensions (around 13% are only subjectively mismatched, more than 15% are only statistically overeducated). This confirms these two situations do not systematically overlap, either because of the difference between overeducation and overskilling or because there is a difference between the feeling of being overeducated and the fact of actually being mismatched. The situation is similar among the individuals who have migrated, although the share of mismatched workers (either in one or both dimensions) is lower for this sub-population. Although it seems that it exists a relationship between the fact of having migrated and overeducation, an econometric analysis is needed in order to establish whether or not there is a causal relationship.

⁴According to the French National Institute of Statistics and Economic Studies (Insee), in 2013, 86.5% of workers had a permanent contract.

Table 1: Descriptive statistics

	Whole sample		Employed		Migrant		Stat. overed.		Subj. mismatch	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Employed	0.817	0.003			0.834	0.004				
Migration	0.375	0.003	0.383	0.004			0.343	0.007	0.361	0.008
Migration to Paris	0.089	0.002	0.095	0.003	0.238	0.005	0.071	0.004	0.094	0.005
Statistically overeducated			0.275	0.004	0.205	0.005			0.483	0.009
Subjectively mismatched			0.251	0.004	0.197	0.005	0.440	0.008		
<i>Individual characteristics</i>										
Male	0.441	0.003	0.439	0.004	0.462	0.006	0.466	0.008	0.475	0.008
Age	24.29	0.024	24.28	0.025	24.38	0.036	23.49	0.044	24.35	0.053
Without children	0.866	0.002	0.869	0.003	0.884	0.004	0.907	0.004	0.865	0.006
One child	0.098	0.002	0.098	0.002	0.086	0.003	0.071	0.004	0.097	0.005
Two children	0.030	0.001	0.028	0.001	0.026	0.002	0.019	0.002	0.032	0.003
Three children and more	0.005	0.001	0.004	0.001	0.003	0.001	0.002	0.001	0.005	0.001
<i>Residential status</i>										
Living alone	0.338	0.003	0.342	0.004	0.418	0.006	0.326	0.008	0.323	0.008
Living with a partner	0.492	0.004	0.515	0.004	0.491	0.006	0.435	0.008	0.484	0.008
Living with their parents	0.169	0.003	0.142	0.003	0.090	0.004	0.239	0.007	0.192	0.007
<i>Educational level</i>										
2-year degree	0.362	0.004	0.378	0.004	0.276	0.006	0.252	0.007	0.288	0.007
3- or 4- year degree	0.223	0.003	0.204	0.003	0.210	0.005	0.396	0.008	0.285	0.007
5-year degree or more	0.415	0.003	0.417	0.004	0.513	0.006	0.351	0.008	0.427	0.008
<i>Field of study</i>										
Education	0.004	0.001	0.004	0.001	0.003	0.001	0.003	0.001	0.004	0.001
Humanities	0.122	0.002	0.106	0.003	0.105	0.004	0.141	0.006	0.156	0.006
Economics, business and law	0.166	0.003	0.160	0.003	0.140	0.005	0.255	0.007	0.206	0.007
Science	0.159	0.002	0.160	0.003	0.197	0.005	0.119	0.005	0.158	0.006
Industry	0.150	0.003	0.157	0.003	0.176	0.005	0.200	0.007	0.172	0.006
Agriculture	0.024	0.001	0.022	0.001	0.030	0.002	0.045	0.003	0.025	0.003
Health	0.223	0.003	0.246	0.003	0.200	0.005	0.034	0.003	0.099	0.005
Services	0.149	0.003	0.142	0.003	0.147	0.005	0.198	0.007	0.177	0.007
<i>Business sector</i>										
Public sector			0.339	0.004			0.170	0.006	0.281	0.007
Agriculture			0.007	0.001			0.019	0.002	0.006	0.001
Sales			0.099	0.003			0.212	0.007	0.171	0.007
Construction			0.024	0.001			0.024	0.003	0.022	0.003
Industry			0.095	0.003			0.136	0.006	0.117	0.006
Services			0.434	0.004			0.427	0.008	0.401	0.008
<i>Job characteristics</i>										
Working full-time			0.863	0.003			0.834	0.006	0.843	0.006
Permanent job			0.695	0.004			0.658	0.007	0.679	0.008
<i>N</i>	15 865		12 968		5 961		3 570		3 254	

Source: Authors' calculation based on *Génération 2010* data.

Table 2: Correspondence between statistical overeducation and subjective mismatch

		Subjective mismatch	
		Matched	Overeducated
<i>Employed</i> ($N = 12968$)			
Statistical overeducation	Matched	7 715 (59.5%)	1 683 (13%)
	Overeducated	1 999 (15.4%)	1 571 (12.1%)
<i>Migrant</i> ($N = 5961$)			
Statistical overeducation	Matched	4080 (68.4%)	656 (11%)
	Overeducated	706 (11.8%)	519 (8.7%)

Source: Author's calculation based on *Génération 2010* data.

4 Estimation strategy

This work examines the links between migration (or spatial mobility) and overeducation for French young workers. However, the existence of a causal effect must be assessed in a regression framework controlling for possible sample selection bias and endogeneity of migration decisions.

First, the estimated results may suffer from a sample selection problem as the educational mismatch is observable only for the graduates who actually works. Analysing the risk of overeducation while restricting our sample to the young workers could lead to biased results. It would be the case if the probability of being mismatched, before the decision to accept a job offer, differs between individuals who decide to work and those who decide not to. For instance, one can consider that inactivity or unemployment is a situation chosen by some young people in order to avoid mismatch, and then those least likely to accept a job could be the most likely to be overeducated. One can also consider that some young people prefer to be mismatched rather than to be without a job. In this case, the aversion to unemployment risk is likely to increase the chances of accepting a mismatched job. Whatever the strategy retained, it reflects the fact that some unobserved characteristics affecting the probability of being in employment could be related to the risk of mismatch.

We deal with this selection bias by using the standard two-step Heckman correction procedure (Heckman, 1979). Technically, we first specify an employment selection equation, which explains the probability of being employed (using a probit specification) as a function of individuals' socio-economic characteristics. The equation is written as follows:

$$E = \beta_0 + \beta_1 X + \beta_2 Z + \epsilon \quad (1)$$

$$\text{Where: } E = \begin{cases} 1 & \text{if } E^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

In Equation (1), E represents the employment situation (being in employment or not), X is a vector of various socio-economics characteristics that are likely to explain the probability of employment for the young people. We consider the age, gender and family status of the young. We include variables for the educational level and the field of study. Dummy variables for regions of residence are also included to control for some unobserved heterogeneity between territories or local labour markets⁵. The identification of our model explaining the risk of overeducation, with the sample selection, requires at least one selection variable (Z) that is correlated with access to employment but unrelated to this risk. The finding of such variables, defined as exclusion restrictions, with observational data is often a difficult task. Our choice was driven by data availability and choices made in previous empirical works. In this work, we retain the family structure, in particular the number of children, as an exclusion restriction for the employment equation. We assume that it is likely to explain the likelihood of accepting a job offer, whereas it should not have a direct influence on overeducation once we control for socio-economic characteristics, job-specific characteristics and local variables. This strategy is in line with various works which used the number of members in the household to ensure identification of the model (Devillanova, 2013; Di Paolo et al., 2017; Meliciani & Radicchia, 2016). Appendix C presents the estimated coefficients for the selection equation. In particular, it confirms the significant effect of the number of children on the probability of being employed.

Once we have taken into account the sample selection problem, we may consider the effect of migration on the risk of overeducation by estimating the following linear probability model:

$$O = \beta_0 + \beta_1 X + \beta_2 \text{Mobility} + \epsilon \quad (2)$$

$$\text{Where: } O = \begin{cases} 1 & \text{if } O^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

In Equation (2), O represents the fact of being overeducated or not. It must be noted that overeducation is measured in two ways (with the statistical and the subjective measures). In

⁵*i.e.* the French administrative regions. See Appendix B for more details.

both cases, the vector of observable characteristics X does not vary. It includes the same set of variables defined for Equation (1) plus some job characteristics: the type of contract (permanent or not, full-time or part-time job) and activity sector (public, agricultural, industrial, construction, services, etc.). We recall that we also consider two kinds of spatial mobility. In one case, the mobility corresponds to a migration from one region to another between graduation and the current job occupied. In the other case, it corresponds to a migration to Paris exclusively.

A further econometric problem could arise from the endogeneity of the migration choice. It is likely that it exists a potential correlation between overeducation and some unobserved factors, influencing the decision to migrate or to relocate to get a job. For example, risk-averse people might accept jobs that do not match perfectly their skills in order not to incur the costs and risks of migration. It means that, in Equation (2), the spatial mobility decision is likely to be associated with unobservable individual characteristics correlated with the error term, leading to biased estimates. We deal with this problem by using instrumental variables method.

Previous works dealing with this endogeneity problem have used lagged unemployment rate in the area where the mover comes from (Croce & Ghignoni, 2015). However, this strategy has been criticised because the underlying assumption that the lagged unemployment rate in one area has no influence on current overeducation in the same area is questionable, given the high persistence of unemployment at the local level. For this reason, some authors have retained housing tenure (Devillanova, 2013; Meliciani & Radicchia, 2016). The argument is that it should be correlated to migration, as renters can move more easily than homeowners, but it is not directly correlated with the degree of overeducation. Because we do not have information on housing tenure status, we retain information on past mobility as in Venhorst and Cörvers (2018). Practically, we define a dichotomous variable that takes the value 1 if young people have migrated between the moment when they obtained their baccalaureate and their last degree (*i.e.* if they have changed of region of residence during or for university studies), and 0 otherwise. This instrument, by informing on spatial mobility during education, is likely to capture some unobservable characteristics that may influence overeducation as the risk aversion. Finally, Equation (2) is estimated by the two-stage least squares (2SLS) procedure. We mobilise a linear probability model to explain the migration decision by the same set of variables than before plus our instrumental variable. Appendix C also shows results for the first stage of the 2SLS. It confirms that past migration is significantly and positively associated to recent migrations.

Moreover, we also implement the weak instrument test of Olea and Pflueger (2013) to check for the validity of our instrument. Our F-test values, always over the critical value reported by Stock and Yogo (2005), indicate that we have a strong instrument.

Finally, we estimate the probability of being overeducated with three different econometric strategies. Firstly, it is estimated without any control for the selection into employment nor the endogeneity of migration decision; secondly, by controlling only for the selection into employment; and thirdly, by controlling for both biases. In addition, we first estimate baseline models where individuals' educational level is distinguished through dummy variables to check whether they face a different risk of overeducation. Then, we proceed by performing separate estimations depending on the educational level of the graduates.

5 Results

5.1 Effects of migration on overeducation

The results of our models are reported in Table 3 (statistical overeducation) and Table 4 (subjective mismatch). The first column presents the baseline model without any correction for selection and endogeneity biases. The two others present respectively results with correction for selection bias (column 2) and for selection plus endogeneity bias (column 3). We only comment the last one because it represents the most complete and robust model. On the whole, we find different effects for several variables depending on the type of mismatch we consider.

First, coefficients and significance for the inverse Mills ratio demonstrate the necessity to take into account the selection into employment in our analysis of the determinants of overeducation. In accordance with Devillanova (2013), it confirms the intuition that the probability of being overeducated is positively correlated with the probability of being unemployed. On the whole, Tables 3 and 4 also reveal that self-selection has no influence on the coefficients of interest.

Concerning individual characteristics, we find that men are statistically less overeducated than women. It can be related to some difficulties to find a "good" job for women or to some discrimination experienced during the job search process. Consequently, when women are hired, they are hired for less skilled jobs. On the contrary, there is no significant gender differences for subjective mismatch. Men and women have the same perception of the mismatch between their skills and those required for the job. The age at the time of graduation has a negative effect on statistical overeducation, but a (small) positive effect on subjective mismatch. In the

first case, it can be argued that experience and requirement of individuals increase with age, which tends to decrease the risk of being overeducated. We find a significant positive effect of living with parents on statistical overeducation, which is not present on subjective mismatch. This suggests that these individuals do not feel overeducated while they actually are. Following Chevalier (2003), this may reflect lower abilities or a lower motivation, that affect both the decision of living with parents and the labour market positions. On the contrary, we do not observe any significant effect for young people living with a partner. This result is somewhat surprising as one can consider that an individual is more likely to accept a job in order to follow his or her spouse.

We observe that the educational level has a strong effect on statistical overeducation, but none on subjective mismatch. In comparison to young people with a 2-year degree, those with more years of education are more likely to be overeducated. It is quite normal because it is less frequent to have a job below his level of study, if the latter is not very high. Nevertheless, the risk of overeducation is the most important for 3 or 4-year degree graduates. It might be due to the fact that these degrees represent transitory levels, designed to give access to longer studies. There is no real demand for this educational level on the French labour market. This is especially the case for 4-year degrees that are insufficient for jobs requiring a Master's degree and who are then preferred for jobs that require a lower level of education (for example, those asking for a Bachelor's degree). Moreover, we find a negative effect of graduating in health on both dimensions of mismatch. While the field of study do not seem to affect subjective mismatch, our results show that graduates in Economics, business and law and Agriculture face a higher risk of statistical overeducation, and that graduates in Science are significantly less overeducated.

When we look at the job characteristics, we find that the public sector seems to be the only one to be preserved from overeducation. This may be due to the fact that most jobs in public services are allocated via formal entrance examinations that reduce the risk of being hired in a job that do not match one's education. However, individuals do not feel less subjectively mismatched. Agriculture and Construction are the two sectors where the risk of overeducation is the highest. It represents sectors where manual work may be important. However, such jobs rarely require high qualifications from workers.

The estimated coefficient for the variable "working full-time" reveals that this situation is related to a lower risk of statistical overeducation. One potential explanation is that young workers are selective in the choice of their job, and accept being overeducated only for (transi-

Table 3: Linear probability models for statistical overeducation

	OLS	Heckman	Heckman + IV
Constant	0.749*** (0.045)	0.708*** (0.046)	0.742*** (0.121)
Migration	-0.036*** (0.009)	-0.036*** (0.009)	-0.061*** (0.017)
Male	-0.059*** (0.006)	-0.056*** (0.006)	-0.056*** (0.007)
Age	-0.015*** (0.002)	-0.016*** (0.002)	-0.016*** (0.002)
<i>Residential status (Ref: Living alone)</i>			
Living with a partner	0.001 (0.006)	0.008 (0.006)	0.006 (0.009)
Living with their parents	0.114*** (0.013)	0.074*** (0.026)	0.071*** (0.022)
<i>Educational level (Ref: 2-year degree)</i>			
3- or 4- year degree	0.248*** (0.020)	0.232*** (0.024)	0.236*** (0.014)
5-year degree or more	0.061*** (0.018)	0.056*** (0.019)	0.062*** (0.013)
<i>Field of study (Ref: Services)</i>			
Education	-0.102 (0.067)	-0.069 (0.067)	-0.069 (0.055)
Humanities	-0.013 (0.023)	-0.029 (0.021)	-0.029* (0.016)
Economics, business and law	0.059*** (0.014)	0.061*** (0.014)	0.060*** (0.013)
Science	-0.088*** (0.017)	-0.080*** (0.019)	-0.079*** (0.013)
Industry	-0.025* (0.015)	-0.005 (0.021)	-0.004 (0.016)
Agriculture	0.101*** (0.031)	0.096*** (0.030)	0.099*** (0.026)
Health	-0.224*** (0.021)	-0.198*** (0.027)	-0.197*** (0.018)
<i>Business sector (Ref: Services)</i>			
Public sector	-0.079*** (0.009)	-0.080*** (0.009)	-0.079*** (0.008)
Agriculture	0.312*** (0.052)	0.312*** (0.052)	0.313*** (0.042)
Sales	0.221*** (0.013)	0.221*** (0.013)	0.220*** (0.012)
Construction	0.062* (0.037)	0.062* (0.037)	0.061*** (0.023)
Industry	0.073*** (0.019)	0.073*** (0.018)	0.073*** (0.013)
Working full-time	-0.052*** (0.011)	-0.050*** (0.011)	-0.049*** (0.011)
Permanent job	-0.055*** (0.009)	-0.056*** (0.009)	-0.056*** (0.008)
Inverse Mills ratio		0.187** (0.096)	0.179** (0.090)
Region fixed effects	Yes	Yes	Yes
R-squared	0.247	0.248	0.247
<i>N</i>	12 968	12 962	12 962

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.

tory) part time jobs. The negative sign associated to permanent contracts in Table 3 confirms this view, and is consistent with results of Baert and Verhaest (2019), who claimed that overeducation can be an acceptable strategy only for temporary positions.

When we look at the subjective mismatch, one can imagine that the wage offered for the job is an important omitted variable. Individuals are indeed more likely to feel mismatched

Table 4: Linear probability models for subjective mismatch

	OLS	Heckman	Heckman + IV
Constant	0.204*** (0.054)	0.152** (0.056)	0.197 (0.131)
Migration	-0.013 (0.011)	-0.012 (0.011)	-0.046** (0.019)
Male	-0.009 (0.008)	-0.006 (0.008)	-0.006 (0.008)
Age	0.006*** (0.001)	0.004*** (0.001)	0.004** (0.002)
<i>Residential status (Ref : Living alone)</i>			
Living with a partner	0.011 (0.007)	0.020*** (0.007)	0.017* (0.009)
Living with their parents	0.077*** (0.019)	0.025 (0.029)	0.020 (0.024)
<i>Educational level (Ref : 2-year degree)</i>			
3- or 4- year degree	0.035** (0.014)	0.014 (0.016)	0.019 (0.015)
5-year degree or more	-0.025* (0.015)	-0.032** (0.014)	-0.024* (0.014)
<i>Field of study (Ref : Services)</i>			
Education	-0.068* (0.038)	-0.025 (0.036)	-0.026 (0.059)
Humanities	0.047* (0.024)	0.026 (0.028)	0.025 (0.018)
Economics, business and law	0.006 (0.014)	0.007 (0.014)	0.007 (0.014)
Science	-0.035** (0.016)	-0.026 (0.016)	-0.025* (0.015)
Industry	-0.026 (0.023)	0.001 (0.024)	0.001 (0.017)
Agriculture	-0.030 (0.033)	-0.043 (0.034)	-0.039 (0.028)
Health	-0.190*** (0.015)	-0.156*** (0.017)	-0.155*** (0.020)
<i>Business sector (Ref : Services)</i>			
Public sector	0.001 (0.009)	0.001 (0.009)	0.001 (0.009)
Agriculture	-0.041 (0.042)	-0.041 (0.042)	-0.040 (0.045)
Sales	0.159*** (0.013)	0.159*** (0.014)	0.158*** (0.013)
Construction	-0.025 (0.035)	-0.025 (0.036)	-0.025 (0.025)
Industry	0.058** (0.024)	0.058** (0.024)	0.058*** (0.014)
Working full-time	-0.049*** (0.014)	-0.047*** (0.014)	-0.046*** (0.012)
Permanent job	-0.009 (0.011)	-0.010 (0.011)	-0.011 (0.008)
Inverse Mills ratio		0.243*** (0.079)	0.232** (0.097)
Region fixed effects	Yes	Yes	Yes
R-squared	0.069	0.070	0.068
N	12 968	12 962	12 962

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.

for low-paid jobs than those well-paid. It might be a source of bias if we consider that it is correlated to some other explanatory variables of our model. We make the choice to not include this information in our baseline model as it is not well documented in the *Génération 2010* survey. For robustness checks, estimations with wages are nevertheless presented in Appendix D. While it has no consequence on the significance of the effect of migration on statistical overeducation, it has one on subjective mismatch. It then confirms the necessity to be cautious

when interpreting results of estimations that do not control for wages offered. Overall, the divergent results between the two types of mismatch may illustrate both the differences on what they actually measure and the bias in subjective approaches. Indeed, respondents might mistake educational or skill mismatch with other elements, such as a lower wage, as suggested by Hartog (2000).

Our main interest is about the effect of migration (or spatial mobility) on overeducation. Our results are shown in Table 3 and 4. On the whole, we find a significant and negative effect of migration on both dimensions of mismatch, although the effect is stronger on statistical overeducation than on subjective mismatch. This tends to confirm that increasing the job search radius and look for a job on a national (rather than a local) market can be a strategy for young workers to avoid overeducation. This finding partially contradicts the work of Devillanova (2013) who does not evidence significant effect of migration on the risk of overeducation for Italian workers, when controlling for selection and endogeneity biases. The author nevertheless shows that commuting increases the quality of the education-job match. Meliciani and Radicchia (2016) also observe no effect of migration, except for some geographical areas of the Italian territory. On the contrary, it is in accordance with Jauhiainen (2011) or Ramos and Sanromá (2013), respectively on Finnish and Spanish data, who observe that moving to another region decreases the risk of overeducation for workers. Also on Spanish data, Romani et al. (2016) confirm the link between spatial mobility and overeducation only for some specific groups as the highly educated, while Croce and Ghignoni (2015) show a negative impact of commuting on the risk of educational mismatch for Italian upper-secondary graduates, as well as a negative impact of migration for university graduates. Such result then plead for an analysis distinguishing education level, as it is made in Table 6 below.

5.2 Differentiation by migration and educational level

Tables 5 and 6 report the effects, for our variable of interest, by distinguishing between migration to all regions and migration to Paris. This is done for the whole population (Table 5) and for different levels of education (Table 6)⁶.

Results of our different estimated models reveal that the coefficients for the migration to Paris are about six times higher than for global migration. It tends to confirm that the Paris region is a truly advantageous destination for young people searching for a job well suited to

⁶For sake of clarity and because the effects of the other variables are similar to those obtained in Tables 3 and 4, we only report the coefficients for migration in the table. Full tables are available upon request.

their level of skills. It is likely that the job density and the various job opportunities allow individuals to search more efficiently for the “good” job. In addition, Combes et al. (2012) have shown that wages are 24% higher in the Paris region relative to the rest of France and that greater skills of Parisian workers account for an important part of this difference. The successful matching between skills offered and required for a job might then be reflected in these higher wages. Moreover, because it has been shown that the highly qualified are less likely to be overeducated and that Paris attracts and gathers the most skilled individuals among them, it is quite logical that we find such a strong effect. Works of Büchel and van Ham (2003), Jauhiainen (2011) or even Ramos and Sanromá (2013) lead to similar conclusions. Indeed, they show that living in large labour markets is profitable as it decreases the probability of overeducation. More generally, some previous researches have also confirmed that differences may emerge when looking at the destination of migration. It is the case for Meliciani and Radicchia (2016) or Iammarino and Marinelli (2015) who highlight contrasted effects for Italian workers migrating to the north or south of the country.

Table 5: Linear probability models - Effects of migration

Statistical overeducation						
	All migrations			Migrations to Paris		
	OLS	Heck.	Heck. + IV	OLS	Heck.	Heck. + IV
Coefficient	-0,036***	-0,036***	-0,061***	-0,019***	-0,019***	-0,385***
Std error	(0,009)	(0,009)	(0,018)	(0,005)	(0,005)	(0,114)
Ind. characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.247	0.248	0.247	0.246	0.246	0.207
Subjective mismatch						
	All migrations			Migrations to Paris		
	OLS	Heck.	Heck. + IV	OLS	Heck.	Heck. + IV
Coefficient	-0,013	-0,012	-0,046**	0,010**	0,011**	-0,287**
Std error	(0,011)	(0,011)	(0,019)	(0,005)	(0,005)	(0,122)
Ind. characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.069	0.070	0.068	0.069	0.069	0.042
Observations	12 968	12 962	12 962	12 968	12 962	12 962

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.

Finally, Table 6 gathers the effects of spatial mobility on overeducation by educational level and migration destination. We find that the negative effect observed for the whole sample hides strong variations depending on the educational level. Individuals with at least a 5-year degree are less likely to be statistically overeducated when they migrate. However, we do not find any significant effect of residential migration on subjective mismatch. This may illustrate that spatial mobility allows workers to find better matched jobs, but that the costs induced by migration leads them to understate its benefits, and thus to self-assess as mismatched. Venhorst

Table 6: Linear probability models - Effects of migration by educational level

Statistical overeducation						
Degree	All migrations			Migrations to Paris		
	2-year	3-year or more	5-year or more	2-year	3-year or more	5-year or more
Coefficient	-0,023	-0,080***	-0,079**	-0,332	-0,381***	-0,327**
Std error	(0,021)	(0,027)	(0,032)	(0,306)	(0,129)	(0,137)
Ind. characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.327	0.208	0.160	0.307	0.164	0.111
Subjective mismatch						
Degree	All migrations			Migrations to Paris		
	2-year	3-year or more	5-year or more	2-year	3-year or more	5-year or more
Coefficient	-0,008	-0,062**	-0,040	-0,110	-0,292**	-0,165
Std error	(0,024)	(0,028)	(0,035)	(0,353)	(0,136)	(0,148)
Ind. characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.106	0.043	0.042	0.106	0.009	0.027
Observations	4 903	8 059	5 410	4 903	8 059	5 410

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Estimated coefficients correspond those obtained with Heckman procedure and IV method. Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.

and Cörvers (2018) also reveal that effects of spatial mobility on subjective evaluations may differ according to the educational level. The authors show that, for college graduates, subjective job-match measures are affected negatively by migration. On the contrary, they rather find a positive effect of migration on subjective evaluations of the job-match quality, for university graduates. If we confirm some differentiated effects, our analysis contradicts their conclusion as we do not evidence any effect of migration for the most educated, neither the “least” educated. We only report some negative effect on the risk of subjective mismatch for the 3-year university graduates. Contrasted economic and institutional contexts in Netherlands and France might explain such differences.

In addition, we evidence that 2-year university graduates do not seem to benefit from migration in any dimension of mismatch. On the contrary, we find significant negative effects of spatial mobility (both national migration and migration to Paris) for individuals with intermediate tertiary education (3- and 4-year degrees). This result is in accordance with Croce and Ghignoni (2015) on Italian data, who find that moving (by relocation) decreases the risk of a wrong match for more educated graduates, but has little or no effect on the least educated ones. Only commuting time appears to be helpful for this latter category. In the same way, in the Spanish case, Romaní et al. (2016) evidence that migration has no effect on overeducation, with the sole exception of male workers with a university degree. On Dutch data, Venhorst and Cörvers (2018) find positive effect of internal migration on the likelihood of obtaining a

horizontal match both for college and university graduates. However, the authors consider at the same time movers on short and long distances. In fact, the mean distance moved is between 20 km and 30 km according to the population studied. It is therefore difficult to compare these mobilities with inter-regional migrations that take place over several hundred kilometers (as it is the case for France, Italy or Spain).

Because overeducation can be related to a lack of job opportunities, it may seem logical that this problem mainly concerns the highly educated. Indeed, they may need to be close to large metropolitan areas (like Paris) in order to find suitable jobs. On the contrary, jobs corresponding to shorter university education may be less concentrated on the territory, reducing the importance of being mobile to find a matched job. For the less educated, increasing daily commutes might then be sufficient to avoid being overeducated.

6 Conclusion

The aim of this work was to study the effect of spatial mobility of young workers on overeducation. Especially, we investigate the impact of residential migration on their risk of being mismatched in their job, with a particular interest in the migration to Paris and educational level of individuals. To this end, we mobilise the *Génération 2010* data from Céreq, that allow us to explore both statistical overeducation and subjective mismatch. Technically, we use the Heckman procedure to control for self-selection into employment and an instrumental variables approach to take into account the endogeneity of migration. Our results are globally robust to the consideration of these two problems.

We show that individuals who have changed their region of residence between graduation and their current job (observed three years later) are less likely to be overeducated, using both the statistical and the subjective definitions of mismatch. We find that this negative effect is particularly strong for those who move to Paris, confirming the attractiveness of this area, which concentrates a large amount of job opportunities. In addition, we evidence that spatial mobility is not advantageous for all profiles of young workers. Indeed, it does not seem to reduce the probability of being overeducated for the 2-year university graduates. On the contrary, the 3- and 4-year university graduates have their risk significantly reduced after migration.

In terms of public policy recommendations, these results plead for measures or programs improving workers' mobility. In fact, because inter-regional migrations of young people are associated to a lower probability of being mismatched, it seems efficient to encourage or promote

their spatial mobility. It is particularly relevant for this category as the costs associated to migrations might be limited compared to some others. Young people are indeed more often tenants of their housing, single and without children (or with young children), which facilitates residential relocation. For other categories, financial and psychological costs might be too high and then discourage mobility.

It must be also considered that individuals' migrations are often realised with the aim to be closer to job opportunities. Therefore, it could be useful to develop regions or territories that are suffering from a lack of such opportunities. Increasing attractiveness (for firms or activities) of places where workers are is therefore a way to facilitate matching quality on the local labour markets. This recommendation is in line with the literature on agglomeration effects developed by Duranton and Puga (2004) and some recent works as the one of Berlingieri (2018). In this work, the authors show that workers in large cities are both less likely to be overqualified for their job and to work in a different field than the one for which they trained. This question, in the French context, should nevertheless be examined in order to convince of the necessity of such a policy. It must be the issue for future researches on qualification and educational mismatches.

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Appendices

Appendix A: Statistical overeducation measure

Table 7: Correspondence of educational levels between classifications

Educational levels	Isced	RNCP
5-year tertiary degree and higher	Isced 7 & 8	RNCP 7 & 8
3- or 4-year tertiary degree	Isced 6	RNCP 6
2-year tertiary degree	Isced 5	RNCP 5
General high school	Isced 3 (General) & 4	RNCP 4
Vocational high school	Isced 3 (Vocational)	RNCP 4
Short vocational high school	Isced 3 (Vocational)	RNCP 3
No degree	Isced 0, 1 & 2	-

Isced: International standard classification of education

RNCP: *Répertoire national des certifications professionnelles*, French classification of education and degrees

Table 8: Correspondence of occupational levels between classifications

PCS	Isco	Occupations
32	Isco 2 except 24 & 25	Science, health, teaching and cultural professionals
36	Isco 1, 24 & 25	Managers & Business and administration professionals
41	Isco 32	Health and teaching associate professionals
46	Isco 33, 34 & 35	Business and administration associate professionals
47 & 48	Isco 31	Technicians
51	Isco 4* & 5*	Public sector workers
54 & 55	Isco 4 & 52	Clerical support and sales workers
56	Isco 51, 53 & 54	Personal service workers
61	Isco 7 & 8	Blue-collar skilled workers
66	Isco 9	Blue-collar unskilled workers
69	Isco 6	Agricultural workers

Isco: International standard classification of occupations

* Occupations in PCS 51 are the similar to those in PCS 54, 55 & 56, but in the public sector.

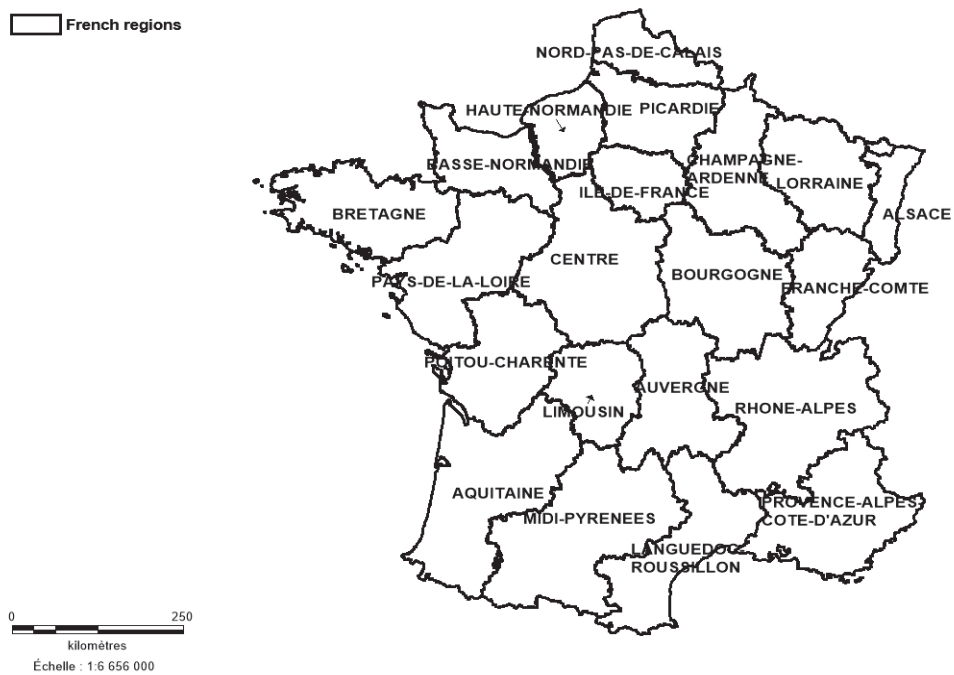
Table 9: Occupation-degree correspondence grid - Statistical overeducation

	32	36	41	46	47-48	51	54-55	56	61	66	69
5-year tertiary degree and higher	N	N	OE	OE	OE	OE	OE	OE	OE	OE	OE
3- and 4-year tertiary degree	N	N	N	OE	OE	OE	OE	OE	OE	OE	OE
2-year tertiary degree	N	N	N	N	N	OE	OE	OE	OE	OE	OE
General high school	N	N	N	N	N	OE	OE	OE	OE	OE	OE
Vocational high school	N	N	N	N	N	OE	OE	OE	OE	OE	OE
Short vocational high school	N	N	N	N	N	N	N	N	N	N	N
No degree	N	N	N	N	N	N	N	N	N	N	N

OE stands for overeducation, N for normal. Undereducation is labelled here as normal.

Appendix B: The geography of French regions

Figure 1: French regions



Appendix C: Selection equation and first stage regression for 2SLS

Table 10: Employment equation and IV estimation (first stage)

	Employment	Migration IV (first stage)
Constant	2.746*** (0.145)	1.916*** (0.159)
Male	0.043* (0.025)	0.005 (0.006)
Age	-0.001 (0.004)	-0.021*** (0.003)
<i>Residential status (Ref: Living alone)</i>		
Living with a partner	0.168*** (0.027)	-0.059*** (0.009)
Living with their parents	-0.484*** (0.047)	-0.139*** (0.028)
<i>Educational level (Ref: 2-year degree)</i>		
3- or 4- year degree	-0.220*** (0.043)	0.080*** (0.020)
5-year degree or more	-0.099** (0.048)	0.149*** (0.023)
<i>Field of study (Ref: Services)</i>		
Education	0.536* (0.280)	0.449*** (0.119)
Humanities	-0.189*** (0.035)	0.371*** (0.070)
Economics, business and law	0.016 (0.040)	0.376*** (0.089)
Science	0.101** (0.044)	0.419*** (0.083)
Industry	0.289*** (0.046)	0.421*** (0.090)
Agriculture	-0.112 (0.089)	0.459*** (0.096)
Health	0.419*** (0.081)	0.454*** (0.083)
<i>Number of children (Ref: 2 children)</i>		
No child	0.402*** (0.076)	
1 child	0.196*** (0.076)	
3 children or more	-0.314* (0.190)	
Migration during studies		0.418*** (0.051)
Region fixed effects	Yes	Yes
F-test for instruments		2 757.96
N	12 337	12 337

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.

Appendix D: Alternative estimations

Table 11: Linear probability models for an alternative measure of statistical overeducation

	OLS	Heckman	Heckman + IV
Constant	0.541*** (0.055)	0.538*** (0.054)	0.561*** (0.130)
Migration	-0.022*** (0.010)	-0.021*** (0.010)	-0.047*** (0.016)
Male	-0.039*** (0.006)	-0.035*** (0.006)	-0.035*** (0.007)
Age	-0.012*** (0.001)	-0.013*** (0.001)	-0.013*** (0.001)
<i>Residential status (Ref: Living alone)</i>			
Living with a partner	-0.010 (0.007)	0.001 (0.006)	-0.003 (0.008)
Living with their parents	0.087*** (0.011)	0.038 (0.023)	0.035 (0.020)
<i>Educational level (Ref: 2-year degree)</i>			
3- or 4- year degree	0.115*** (0.011)	0.096*** (0.014)	0.099*** (0.013)
5-year degree or more	0.224*** (0.016)	0.218*** (0.016)	0.224*** (0.011)
<i>Field of study (Ref: Services)</i>			
Education	0.021 (0.072)	0.015 (0.072)	0.026 (0.090)
Humanities	0.084 (0.043)	0.018 (0.050)	0.029 (0.082)
Economics, business and law	0.002 (0.047)	-0.043 (0.051)	-0.033 (0.079)
Science	-0.054 (0.044)	-0.091 (0.046)	-0.079 (0.079)
Industry	-0.033 (0.042)	-0.055 (0.043)	-0.043 (0.078)
Agriculture	0.153* (0.069)	0.094 (0.075)	0.109 (0.083)
Health	-0.071 (0.044)	-0.085 (0.045)	-0.073 (0.079)
<i>Business sector (Ref: Services)</i>			
Public sector	-0.037*** (0.009)	-0.038*** (0.009)	-0.038*** (0.008)
Agriculture	0.396*** (0.065)	0.396*** (0.065)	0.396*** (0.038)
Sales	0.163*** (0.011)	0.163*** (0.011)	0.162*** (0.011)
Construction	0.037 (0.027)	0.037 (0.027)	0.037 (0.021)
Industry	0.039 (0.019)	0.039 (0.019)	0.039*** (0.011)
Working full-time	-0.105*** (0.011)	-0.104*** (0.011)	-0.103*** (0.010)
Inverse Mills ratio		0.229** (0.082)	0.220** (0.080)
Region fixed effects	Yes	Yes	Yes
R-squared	0.151	0.151	0.150
N	12 968	12 962	12 962

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.

Table 12: Linear probability models including wage

	Statistical overeducation	Subjective mismatch
Constant	2.746*** (0.145)	1.916*** (0.159)
Migration	-0.053*** (0.018)	-0.034* (0.020)
Male	-0.035*** (0.008)	0.024*** (0.009)
Age	-0.013*** (0.002)	0.007*** (0.002)
<i>Residential status (Ref: Living alone)</i>		
Living with a partner	0.014 (0.010)	0.021** (0.010)
Living with their parents	0.047** (0.023)	0.010 (0.025)
<i>Educational level (Ref: 2-year degree)</i>		
3- or 4- year degree	0.249*** (0.014)	0.039** (0.016)
5-year degree or more	0.127*** (0.013)	0.043*** (0.014)
<i>Field of study (Ref: Services)</i>		
Education	-0.113** (0.055)	-0.075 (0.060)
Humanities	-0.059*** (0.016)	0.009 (0.018)
Economics, business and law	0.073*** (0.013)	0.017 (0.014)
Science	-0.066*** (0.013)	-0.022 (0.015)
Industry	0.010 (0.016)	0.008 (0.018)
Agriculture	0.093*** (0.026)	-0.041 (0.029)
Health	-0.138*** (0.019)	-0.108*** (0.021)
<i>Business sector (Ref: Services)</i>		
Public sector	-0.081*** (0.008)	-0.023** (0.009)
Agriculture	0.284*** (0.044)	-0.031 (0.048)
Sales	0.209*** (0.012)	0.140*** (0.013)
Construction	0.085*** (0.023)	-0.013 (0.025)
Industry	0.089*** (0.013)	0.064*** (0.014)
Working full-time	0.093*** (0.014)	-0.030* (0.016)
Permanent job	-0.022*** (0.008)	-0.014 (0.009)
Wage (ln)	-0.306*** (0.013)	-0.247*** (0.014)
Inverse Mills ratio	0.212** (0.090)	0.188* (0.099)
Region fixed effects	Yes	Yes
R-squared	0.281	0.101
<i>N</i>	12 337	12 337

*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Standard errors are clustered by region.

Source: Authors' calculations based on *Génération 2010* data.