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Education level and the distance-income migration trade-off

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Abstract

Most research in the field of migration demonstrates that the level of education functions as one of its major determinants. Such research focuses on the finding that spatial mobility is more frequent, and wages greater, the higher the level of studies. Nevertheless, these results are quite sensitive to the estimation method, as well as to the selection of the geographic area variable measuring spatial mobility. By considering "internal migration" within France of young French workers, between the labor market in the locality where they finished their studies in 1998 and the labor market where they were employed three years after leaving the educational system, we propose to estimate the impact of spatial mobility on wages, as a result of the costs-benefits migration trade-off based on the distance covered during the relocation. We observe that the most highly-skilled youths do not receive a positive wage return from migration, demonstrating concomitantly that these young workers must contend with the national labor market. However, the opposite situation is observed for less-skilled young workers who obtain positive wage returns from migration. Another noteworthy result is that benefit from migration is transformed into the distance-income migration trade-off as a function of territorial characteristics.

Key words: labor markets, labor-market entry, returns to education, spatial mobility

JEL classification: C34, C35, J24, J31, J61, I21, R23

SOMMAIRE

INTRODUCTION

Most people are aware of advantages that can come from migration. They are conscious of the positive impact it may have on their professional career and/or personal life (better environment, increased earnings, better work conditions…). However there are many factors that can reduce the attraction of migration, such as the cost of transportation, the fear of losing social networks or the support of family and friends. Thus, the greater the constraints on the migration decision, the lower the willingness to move will be. Nevertheless, within the total population, young people continue to be the most mobile (Long 1988). This higher propensity to migrate may be explained by less important bondages, such as fewer family ties, or a lower local psychic attachment due to a shorter lifespan on a given territory (Da Vanzo 1983). Moreover young people are not generally homeowners, and it is well-known that homeowners are less mobile than non-homeowners (Debrand and Taffin 2005). In addition, their brief work experience in the labor market is the cause of lower specific human capital, resulting in greater adaptability to new job opportunities. Bound by the loosest constraints on migration, young people may view spatial mobility as means of social integration, as an employment strategy to accede to better opportunities when entering the French labor market (Drapier 2001). By relocating from one geographical area to another, young workers can effectuate their transition from school to work; and the weaker their constraints, the more willing they are to move.

However, according to official figures on mobility, it must be borne in mind that youth migration in the first place should be viewed in a context of relatively reduced spatial scales. In point of fact, only between 3% and 6% of French young university graduates obtain their first employment abroad.[1] This rate rises to 10% and 12% for science graduates and for graduates from the selective French Grandes Écoles system, while from 1% to as much as 4% still work abroad four years after ending their studies.[2] On the other hand, if we consider only internal migration within the French territory and, more precisely, a spatial partition that reflects local labor markets, the propensity to migrate greatly increases. By using the data from the French "Generation 98 Survey",[3] which enables us to observe the spatial mobility of young people during the first three years of their working life, we observe that almost half of them take employment in a local labor market that is different from the one in which they finished their studies. The French local labor markets involved are called "Zones d'Emploi", translated here as "Employment Zones" and abbreviated EZ.

Moreover, by considering the distance covered by migrants between EZs, we are able to observe that the less-skilled workers sometimes cross over long distances, even though they are less numerous to move. This observation greatly encourages us to employ distance covered as an variable in the analysis since most microeconomic migration studies do not, or only rarely do so. Indeed, it is well to keep in mind that the migration studies that do take into consideration distance covered can be divided into two subgroups. One analyzes the migration flows between geographical areas, while the other focuses on the individual decision process of migration. These two frameworks are closely linked since migration flows are the result of individual decisions. Yet, it is the first framework that accounts for most studies ever since the famous Ravenstein laws (1885, 1889), postulating that migration flows diminish with distance. Beginning in the 60s, the aggregate models underwent an important metamorphose through gravity models, also based on the fundamental hypothesis that migration between two different areas diminishes with the distance covered (Stewart 1941; Zipf 1946, Isard 1960). Here, the geographic distance reflects several parameters of the migration process. First, the quality of information decreases with distance (Hägerstrand 1965). This factor thus reduces the proportion of long-distance migrations since people do not have sufficient information to make migration decisions or because they may consider the risk of error too great. Moreover, according to the intervening opportunities theory (Stouffer 1940, 1960, Fotheringham and O'Kelly 1989), the greater the distance between two areas, the higher will be the probability that the migrant will find a satisfactory solution to his search (a better job for instance) at an intermediate site along the way. Finally, migration distance is linked to migration costs. Graasland (2005) reminds us that migration costs are proportional to

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1 We refer here to studies carried out by French secondary schools, European studies by Eurostat, and the "Generation 98 Survey" (*Enquête Génération 98*) by the French Center for Research on Education, Training and Employment (CEREQ).
2 European means are respectively between 4 % and 3 %.
3 The CEREQ's "Generation 98 Survey", contains monthly observations over a three-year period of more than 55,000 young people, which is a representative sample of youths who left the French educational system in 1998.

distance since greater distance increases both the psychic cost of being far away from one's origins and the cost of visiting family and friends left behind. These different considerations converge on the idea that migration is inversely proportional to distance, a conclusion that is also effectively confirmed in most of empirical studies using aggregate models.

When turning to microeconomic analysis, one would anticipate finding results such as these; that is, we would expect distance to play an important role in micro-migration decision analysis. However, even though distance is often mentioned as an important determinant, it is usually absent from empirical estimates. Indeed, among studies of individuals' migration decisions, many authors do indicate that distance is linked to migration cost (Schwartz 1973, Da Vanzo 1983, Clark and Cosgrove 1991, Greenwood 1997…), but only a few of them integrate this measure in their estimates (Sjaastad 1962, Galaway et al. 1968, Lemistre and Moreau 2008). The founding work of Sjaastad for the United States shows that a migrant might choose indifferently between two different destinations if a supplemental 146 miles to travel were compensated by an amount of $106 (in 1947-1949). The finding of a significant link between income and distance led Sjaastad to call this cost-benefit trade-off the "the income-distance trade-off".

One reason that explains such infrequent use of distance in microeconomic models is inherent to the accessibility to these data. Gravity models observe a set of relations between geographic areas, and then distance is generally measured from the centroids of departure and arrival areas. However, in microeconomic models it seems more dubious to associate a migration of an individual with an approximation of distance between relatively large areas. It would be more appropriate to use a measure of the distance covered by each individual when relocating. Yet, these data are rarely available. In their absence, some authors attempt to distinguish migration between neighboring areas or within a same area from migration between areas that are far apart. Since we have at our disposal the geographic coordinates of the towns in the areas of departure and arrival in our sample, we propose to make use of the actual geographic distance in order to evaluate its impact on the migration process in the income-distance trade-off framework.

However, the main idea in our study is not to make use of distance in isolation but to consider jointly both the distance covered and the migration between local labor markets. Indeed, we assume that distance is consubstantial with spatial displacement. Models that evaluate returns to migration only with respect to a move between territories make the implicit hypothesis that the costs of migration are uniform, regardless of the distance covered. These models generally estimate returns to migration by calculating an average migration cost derived from the territorial move alone. On the contrary, the previous discussion suggests that the choice to relocate from one territory to another is simultaneously linked to the choice of a distance to cover. In other words, the decision to migrate and the choice of a specific distance to cover are two consubstantial elements that are rather difficult to separate (Lemistre and Magrini 2008). This is the reason why we propose to integrate distance into our migration variable. In this way, we endeavor to account for migration costs, and then we propose a new point of view on the microeconomic study of spatial mobility.

Then, since we consider only young workers, we propose to develop an original model based on the job-search model that incorporates distance as a proxy for the job-search effort or "intensity" of the migration decision. Migration choice is viewed as the appropriation of a job opportunity that compensates the relocation costs, which are proportional to distance covered. In other words, expecting positive returns to migration is not sufficient to make the migration effective. The returns must exceed the amount necessary to compensate for migration costs. Thus, taking distance covered into consideration enables us to characterize both the intensity of migration and the migration's returns in empirical estimations.

To conclude this introduction, we wish to be more specific about an additional important hypothesis, which is that migration behavior is not the same at the different levels of education. The interactions between the return to education and the amplitude of migration has recently been examined, using French data that are comparable to the data exploited here by associating distance covered and years of study (Lemistre and Moreau 2008). This study brings to the fore the simultaneous impact of different variables (family background, geographical variables) on the educational level and the migration between the areas at the end of education and at the very first employment. The essential result is the finding that returns to the initial training are quite clearly influenced by migration.

Nevertheless, the educational level in this research is represented by a unique continuous variable,4 which supposes similar reasoning for migration for all educational levels. For this reason, we intend to divide the sample into groups of differing educational levels to highlight the various effects of the constraints and incentives in migration decisions, and finally the differing returns to migration. A first attempt along these lines has already been done on French data by Détang-Dessendre et al. (2004), but the educational levels selected were fewer, and especially, the geographic areas were relatively vast (the French department). The authors concluded in this research in an absence of wage impact from migration for the least-qualified workers. We demonstrate here that taking into account the distance covered and using more reduced geographic areas will in particular call this result into question.

This article is organized as follows. In the first section, we present an income-distance trade-off model. This is a matter of accounting for the impact of distance in a "spatialized" job-search model. Its empirical specification is the subject of section two. We explain how and why using the distance covered as a proxy for migration costs makes possible a better treatment of the auto-selection bias problem mentioned in all migration studies; we then introduce our empirical specification. In the third part, we present data and some statistics on the propensity to migrate with the purpose of describing migration behavior using groups of education levels. We present our results in the following section and examine some observable determinants of migration by considering characteristics of individuals and territories; we also lay bare diverse returns to migration according to the identified determinants of the migration decision based on migration distance covered, controlling for the unobservable effects (auto-selection bias).

1. THE MODEL

The heterogeneity of migration distances covered emphasizes that all migrants do not have to support the same migration costs, particularly when the spatial scale is reduced. As a result, the estimate of migration returns (linked to job opportunities) should depend on the distance covered. However, while migrants receive positive returns for migration, we ought to question whether they might have been able to obtain better wages even if they had not migrated. Thus, some unobservable heterogeneity may introduce a bias into the estimation of wage returns to migration, which must be treated. We will show how the distance variable can help us deal with this problem.

1.1. The Spatial Job-Search Process

In a classical job-search model, the value a person attributes to each job offer v is a function of its individual characteristics X and those of the employment in question Y (the employment variables should be understood in a broad sense, and often include geographic specificities). The introduction of space into the job-search model leads to taking into consideration that some individuals are able to access job offers in a labor market that is external, relative to their market of origin.

Even so, it is difficult to determine which individuals carry out a broadened spatial job search. Indeed, the individuals who do not have an extended spatial field of exploration may nevertheless have access to external job offers by means of diverse information channels. Similarly, an individual who has accepted employment in his home labor market may have explored other markets. From this viewpoint, the effect of the costs of spatial job search on the reserve job value remains indeterminate. On one hand, the cost of the job search diminishes the value of what is considered acceptable employment. On the other, broadening the spatial field of exploration may reduce the duration of the search, offsetting the costs associated with the extended exploration, thus, increases the value of acceptable employment. Furthermore, while the rise in the

4 This was of course a necessity due to technical constraints. Similarly, the reference to the first employment - and not to the post held after three years retained here – was made necessary by the simultaneous use of the education and distance variables as instruments. The restrictions on the instruments, given the purpose of the study, were moreover more numerous than in this research in which we have been able to mobilize other instruments with respect to the proposed theoretical model.

cost of prospecting increases the number of job offers obtained, this higher cost may also lead the individual to be more demanding in choosing among them. Taken together, these elements result in an indeterminate effect of the spatial job-search costs on the value of acceptable employment and also on the migration distance covered that is connected to these costs.

For this reason, Détang-Dessendre et al. (2004) considered a single global distribution of job offers of the home and external labor markets taken together, and thus, with a single reserve job value, regardless of the spatial job-search strategy. This hypothesis leads therefore to considering a sole global distribution of job offers that includes external labor markets as well as the home market, with a single employment reserve value V_g*, whatever the spatial job-search strategy employed.

While the costs of job prospecting remain indeterminate; on the other hand, the costs of migration, based here on a unique employment reserve value, play a determinant role because they clearly govern the trade-off in the decision to migrate. Indeed, in the theory of human capital, it is above all the arbitrage between these costs and the advantage in salary associated with the relocation that leads to migration or not (Sjaastad 1962). The distance covered is then partly associated with the cost of migration, and the migration occurs if and only if the wage gain is superior to this cost (Falaris 1988).

Thus, an individual will migrate only if he covers his migration costs. Let us say that he accepts the offer of employment v_{gi}, originating from the global distribution, only if it exceeds his reserve employment value and exceeds his migration costs c_i : $v_{gi} > V_{gi}*+c_i$.

The surplus wage that is derived from migration alone is written: $v_i = v_{gi} - V_{gi}*$. It is composed of migration costs and of supplemental utility, or net surplus.

If it is supposed that the total supplemental utility can be expressed entirely in terms of salary ceteris paribus, the employment reserve salary w associated with the global value of the employment with characteristics Y, anticipated by an individual with characteristics X, may then be written:

$$w_i^* = W(X_i, Y_i, v_i) \qquad (1)$$

The migration costs are associated with certain individual variables x, which may or may not explain the salary (some, but not all, x are in common with Xi), variables among which figures the educational level. The costs are also associated with certain geographic variables z, which may be characteristics of the zone of departure inducing the individual to migrate (high local unemployment rate, sparse qualified employment, few amenities, etc.) or differences between certain characteristics of the desired and original zones (Nakosteen and Zimmer 1980). These are what are called push and pull effects (Greenwood 1997). We obtain then:

$$c_i = \gamma_0 + \gamma_1 x_i + \gamma_1 z_i + \theta_i \qquad (2)$$

The individual carries out the migration uniquely if he obtains a net surplus, which may be considered proportional to the cost of migration. We may in particular invoke the argument according to which individuals' risk aversion will lead them to expect returns to migration that are all the greater, the greater the expenses incurred to migrate (Gordon and Vickerman 1982). We obtain then:

$$v_i = \lambda_i c_i \text{ with } \lambda_i > 1 \qquad (3)$$

The proportion of potential gain may correspond to an average surplus, or $\lambda_i = \overline{\lambda}$, for every i. Nevertheless, it would seem more probable that the net surplus should also depend on individual and geographic characteristics thusly:

$$\lambda_i = \kappa_0 + \kappa_1 x_i + \kappa_2 z_i + \mu_i \qquad (4)$$

Numerous arguments justify this dependence on individual and geographic variables. First of all, individuals' risk aversion may be differentiated according to personal characteristics. Then, for Gibbs (1994), salaried workers from a rural milieu are less demanding than urban salaried workers. For Stark (1991), the unemployed in a poor region are less demanding than the unemployed in a rich region. As for the individual variables, the participation of women in the labor market cannot be explained in the same way as for men, which may cause, through this dissimilarity, differences in remuneration affecting the profitability of migration (Keith and McWilliams 1999). Lastly, as we mentioned in the introduction, the returns to migrations are tightly linked to the level of education.

The equations (2), (3) and (4) may be written:

$$v_i^* = \beta_0 + \beta_1 y_i + \beta_2 x_i + \phi_i \quad (5a)$$

The associated employment reserve salary is:

$$w_i{}^* = \delta_0 + \delta_1 X_i + \delta_2 Y_i + \delta_3 v_i{}^* + \varepsilon_i \quad (6a)$$

1.2. An Income-Distance Trade-Off Model

Neither the global value of the employment, nor the employment reserve salary is observable. Only the ex post salary w_i has been observed, just as neither the surplus utility linked to migration nor its components (the migration costs and the net surplus) have been measured.

The proposed model is usually estimated with the selection of an estimated latent variable related to the change in territory alone as a proxy for the utility derived from migration (Raphaël and Riker 1999, Gabriel and Schmitz 1995, Falaris 1988). An important limitation of these estimations is that they only account for an average effect of migration with two unique states: migrants vs. non-migrants (M = 0, 1 for the migration variable M), assuming this effect to be similar, regardless of the amplitude of migration. In other words, there would be identity between a migrant covering 20 km and another covering 1000 km. Numerous research studies are attempts to circumvent this difficulty in evaluating the impact of migration and its determinants between different zones of mobility and in limiting the frontier effects. Here, we have actual distances covered at our disposal, which enables us to precisely specify the model by taking into account the consubstantial nature of the choice of migration and the migration distance covered, in addition to the previously explained close link between this distance and migration costs.

As mentioned in the introduction, for many authors the distances covered are linked to relocation costs, which are a determining factor in the migration decision. In the first place, distance reflects the transportation costs of migration rather well, and Combes and Lafourcade (2005) have evaluated a correlation coefficient of 0.97 between Euclidian distances and general transportation costs in France. Secondly, distances also indicate increasing psychic costs linked to separation from social capital and the environment of origin.5 Seen from this standpoint, the decision to migrate is made only if the benefits are greater than the costs endured. In other words, the wage return to migration must be positive, and it must be at least as great as the rising costs when the migration constraints tighten. This costs-benefits trade-off of migration refers to “the income-distance trade-off” (Sjaastad 1962) since distance is a proxy for migration costs.

The amplitude of the migration expressed by the distance covered is considered then as a proxy for the total surplus v_i , keeping in mind that it will not be possible to disassociate here its two components: migration costs and net surplus.

Moreover, the distance is closely linked to different variables, and in particular to migration costs. Taking into account this tight link, and since decreasing marginal cost is assumed, marginal returns to migration decline with distance: $\frac{\partial w(d)}{\partial d} > 0$ and $\frac{\partial^2 w(d)}{\partial d^2} < 0$. Just such results have been confirmed by Da Vanzo (1983) and Falaris (1988) who recommended using the logarithm of the distance. In addition, it may also be supposed that the returns in terms of net surplus are marginally decreasing with the distance covered, the risk aversion barely evolving beyond certain distances. Moreover, if the hypothesis is made of tightly linked migration costs and distance covered, the distance – and thus the cost of migration – reduces the dissemination of information and can deteriorate its quality. Yet, the difficulties in dealing with information according to the distance to cover are accentuated in function of the level of education (Hägerstrand 1965).

5 For a more detailed discussion of the link between distance and migration costs, see Magrini (2006) and Lemistre and Magrini (2008).

Thus, the dependence between the cost of migration and the educational levels is all the more justified that the latter are assimilated to the distance covered. Since the log of zero does not exist, the non-migrants are assumed to have moved a minimal distance of 1 km. Equation (5a) then becomes:

$$\ln d_i^* = \beta_0 + \beta_1 x_i + \beta_2 z_i + \phi_i \qquad (5b)$$

The earnings functions are habitually expressed in log form, notably because this specification makes possible direct reading of the returns to each variable. Thus:

$$\ln w_i^* = \delta_0 + \delta_1 X_i + \delta_2 Y_i + \delta_3 \ln d_i^* + \varepsilon_i \qquad (6b)$$

The earnings function is directly associated with the theory of human capital, which is also often the case for the decision to migrate. However, in the theoretical framework of human capital, the only determinants of salary are the individual characteristics that constitute, or influence, the level of human capital belonging to each individual. Yet, the earnings functions usually employed to estimate the effects of migration ceteris paribus are not identical to the function Mincer uses, in the sense that in the specification appear employment variables, among which geographic variables. Such an approach is justified on the theoretical level. Indeed, the job-search model is inspired not only by the theory of human capital but also by the job-competition model, or queuing model of Thurow (1975). In this analytical framework, the salary depends not only on individual characteristics but also, and especially, on job attributes. Since employment is assumed to be rationed, a waiting line exists to attain the various positions. The addition of the spatial dimension to the job-competition model makes it possible to consider that in moving from the local labor market, the individual switches between waiting lines to improve his professional integration.

The principal determinant of the place in the queue, nevertheless, remains the educational level. The initial training plays the role of an entry permit for employment by signaling the individual's employability, the adaptability to the job supposedly increasing with the level of education. An entrance per educational level is therefore justified once again.

2. EMPIRICAL SPECIFICATION AND SELECTION BIAS

The decision to relocate and to migrate over a given distance is taken if the utility this decision yields is positive, which is to say if $\ln d_i^* > 0$; more precisely, if there exists a linear combination threshold of x_i and z_i beyond which the decision to migrate dominates the decision to remain sedentary (equation 5b). Thus, $k_i\gamma$ is that linear combination.

This decision rule is not deterministic, and it is appropriate to estimate jointly here the probability of relocating and of migrating over a given distance. We only observe the distance covered by individual migrants. The likelihood estimation of this model employs a simple censored Tobit model, adapted to the truncated nature of the migration variable.

A migration is actually observed as the distance covered at the time of changing territories (M = ln(d) / 0). The point of censoring corresponds to individuals who are sedentary. The log-likelihood of the Tobit model is written then as:

$$\ln L(k,\gamma,\sigma_\theta) = \sum_{i:D_{i=0}} \ln\left[1-\Phi\left(\frac{k_i\gamma}{\sigma_\phi}\right)\right] - \frac{N_1}{2}\ln(2\pi\sigma_\phi{}^2) - \frac{1}{2\sigma_\phi{}^2}\sum_{i:D_i>0}\left(\ln d_i - k_i\gamma\right)^2 \qquad (7)$$

with N_1 designating the number of observations for which $\ln d_i > 0$.

So as to assure the concavity of the function in the optimization process, the estimation must use a numerical optimization procedure, through the reformulation of the log-likelihood function according to the method of Olsen (1978).

The estimated earnings function is the following equation:

$$\ln w_i = \delta_0 + \delta_1 X_i + \delta_2 Y_i + \delta_3 \ln d_i + \varepsilon_i \qquad (6c)$$

in which it is appropriate to deal with the endogeneity bias of the variable $\ln d_i$. This endogeneity bias results in a correlation between the error terms of the Tobit estimation of the distance ϕ (equation 5b estimated via equation 7) and the estimation of the earnings function ε (Maddala 1983). The correlation signifies here that the individual non-observed variables in ki are correlated with the non-observed variables in Xi. This is the auto-selection problem in the migration trade-off: some unobservable effects can bias the returns to migration. In their model, Détang-Dessendre et al. (2004) actually do point out that wage returns to migration may be biased because of some unobservable factors influencing both wages and migration decisions. The consequence is the emergence of an auto-selection effect (Nakosteen and Zimmer 1980, Yankow 2003). Migrants may in fact be characterized by some favorable intrinsic unobservable factors (not appearing among the Xi) that facilitate the migration decision, such as greater motivation or superior ability to process information, etc. Yet, these qualities could also positively influence wages, and thus also create a positive auto-selection for the migrants as compared to similar people who do not migrate, when based on observable characteristics. On the other hand, it is possible to imagine that the migrants might be characterized by unobservable negative intrinsic factors that reduce their wages, then leading them to extend spatial exploration to find a better job. Relative to observable factors, the auto-selection of the migrants here appears to be negative in comparison to similar non-migrants. Therefore, the question is to determine whether the wage returns to migration are the consequence of unobservable characteristics or whether they are due to the migration process alone (the migration costs-benefits trade-off).

Taking distance into account as a proxy for migration costs enables us to distinguish much more clearly between wages variations due to unobservable characteristics and wage differences that are part of returns to migration. Indeed, if a migrant profits from a wage surplus, it may be either linked to unobservable favorable quality effects, or it might simply be justified by compensation for migration costs, or finally, it may be explained by both these reasons at once. In particular, the positive effect of migration costs on wages can generate a positive auto-selection for migrants, unlike those who are characterized by unknown unfavorable factors. In this case, it can lead to the attribution of a negative auto-selection effect for the non-migrants because they possess unobservable favorable characteristics. This last remark has been put forward by Détang-Dessendre et al. (2004), who explained that since migrants do not control migration costs, these costs can generate an auto-selection bias: "agents facing unknown higher migration costs have lower migration probabilities, and they are prepared to accept lower wages to stay at home. In other words, differences in migration costs should produce negative auto-selection effects for non-migrants".6 On the other hand, agents facing lower migration costs that can easily be compensated by wages have higher migration probabilities. Consequently, these migrants are characterized by a positive auto-selection effect due to migration costs, over and beyond the unknown characteristics effect. Therefore, introducing the migration distance covered as a proxy for migration costs enables us to differentiate much more clearly the effect of migration proper from the effect of unknown characteristics.

Thus, when the correlation between the error terms of the Tobit estimation and the error terms of the estimation of the salary equation is negative, the geographically mobile youth have unobserved characteristics that act negatively on salary. They may not, for example, be the "best" ceteris paribus (Xi and Yi). In this case, the return to the endogenous distance is superior to the return estimated by OLS, which captures the negative effect of "unobservables". In this way, we obtain the return to migration proper.

The treatment of this endogeneity bias is carried out according to the method of Nelson-Olsen (1978). To do this, we apply the principle of instrumental-variable (IV) estimation. Let us recall that because of the specificity of the Tobit model (used to estimate the migration equation), the instrumental-variable procedure does not directly correspond to two-stage least squares (2SLS), which applies to continuous quantitative variables, but to the method proposed by Nelson and Olsen. According to the terminology given in Maddala (1983), this instrumentation technique based on the Tobit model is described as T2SLS. As a result of this instrumentation, we obtain the effect that is specific to migration, independently from the unobservables in the in the earnings function.

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6 Détang-Dessendre *et al.* 2004, p. 671.

All this allows us to envisage that the return to spatial mobility should be positive, ceteris paribus. However, the average return to migration sometimes proves to be negative, null and/or statistically insignificant (Krieg 1997, Falaris 1988). Here, an explanation is frequently invoked: it may not be the "best" youth who migrate, but those of "average quality" - the reason being the following: the most capable youth obtain the best jobs in their own labor pool, which obliges other youth to migrate so as to capture the more numerous opportunities in other labor pools. Thus, a finding of positive salary return to migration is not a matter of course - so much the migration decision is constrained and not always desired.

Moreover, as we have already mentioned, the return to migration aggregates two sets of effects on salary: unobservable and observable effects, explaining the act of migration. However, these two effects may be opposed. In this case, the average return may be null, while in reality there is a negative effect of unobservable and a positive effect of observable characteristics. The first effect may correspond to the fact that migrants are, for example, less productive than sedentary workers when all other "measurable" attributes are held constant. On the other hand, the fact that some or all observable characteristics are better paid, on the average, for migrants than for non-migrants, expresses the acceptation by migrants of only those job offers associated with a better employment distribution and that make it possible to compensate for the migration costs.

Migration costs are therefore capable of explaining the diversity of findings in the empirical literature on migration. In fact, the findings on the effect of selection and/or on the average returns to migration are far from establishing a general consensus in favor of a positive or negative effect of unobservable characteristics, even if these findings may be significant. Notably, in a same study, while the effect of selection may be strongly significant for one group, it may be only slightly so for another. This opposing effect is not detected by research that does not take into consideration the amplitude of migration, expressed through the migration distance covered that partially reflects the costs of migration. It therefore seems to us important to reconsider jointly the estimations of selection bias and the returns to mobility in our sample by integrating a variable that is more representative of the decision to migrate: the migration distance.

As for the level of education, given its influence on the act of migration, this variable figures simultaneously among the explanatory variables of the earnings function (Xi) and of migration (xi). One way to account for these interactions is to instrument simultaneously the migration distance covered and the educational level (Lemistre and Moreau, 2008). This is not the option selected here for the reasons mentioned previously; the method we apply consists in examining the returns to education according to educational levels.

3. DATA

3.1. Sample Selection and Descriptive Statistics

We have exploited data in the Céreq's[7] "Generation 98" survey in which 55,000 youths who left the French educational system with an initial education in 1998 are observed over a three-year period. They are representative of the whole generation of those leaving school (700,000). Spatial mobility of young people is observed as a move from the local labor market (the "Employment Zone", abbreviated "EZ"), occurring between the end of their studies in 1998 and the job occupied in 2001, three years after leaving the French educational system. The sample so defined is composed of 44,327 young men and women[8] who were employed in 2001. Migration distance is also taken into account in order to elucidate the heterogeneity of mobility behavior. In addition, since we focus on individuals all of whom leave the educational system in 1998, we avoid the traditional cohort effect problems and pitfalls related to work experience.[9]

7 *Céreq*: the French Center for Research on Education, Training and Employment.

8 Several reasons led us to decide not to include young people who left for abroad at the end of their studies or were working abroad in 2001. Furthermore, young people from Corsica were not included since their mobility may be specific because of the natural barrier the sea represents for an island population.

9 See Card and Lemieux (2001) for a clear account of cohort effects. See Abraham and Medof (1981) for problems related to job experience in earnings functions.

Turning to the levels of study, they are seven in number. In a first stage, the estimations were carried out for each of the seven levels. Then, the first three and the following three were grouped because the results were adjacent insofar as the determinants of migration are concerned as well as for its impact on salary. Findings are therefore presented for three levels: non-qualified or youth holding a diploma less than or equal to the French Baccalauréat (designated "Bac", the terminal secondary school diploma10), holders of a Bac-level diploma + 2 years to Bac + 4 years of study (bachelor's degree), and Bac + 5 years (master's degree and higher).

To study spatial mobility, it is necessary to define its temporal framework. The specificity of the population we have studied led us to observe mobility between two key moments in the beginning of working life: when the youths left the educational system in 1998 and when they occupied their last job three years later - which corresponds to the end of the transition from school to work for most authors. Several reasons justify this instrumental hypothesis.

To begin with, the study of the transition from school to work for the Céreq's "Generation 98" survey reveals that most young people have held several jobs by the end of the three-year period (Céreq 2002). For instance, the job held in 2001 corresponded to the first job for less than one third of the youths, which shows an important instability in employment trajectories in the beginning of working life. Then, the observation of the job held in 2001 has been preferred as more representative of a form of employment stabilization than the first job. In addition, two thirds of the youths declare being satisfied with their last job and not searching for other employment.

Secondly, the study of their spatial mobility shows that these acts of migration are more numerous after leaving the first job than initially. This finding may lead us to suppose that young workers progressively enlarge their spatial job search area. In particular, the first job may be just a "temporary job", before finding a more appropriate one. After one or more job experience, the youth acquires a better knowledge of both his competencies and the labor market, and can then more easily select a better post (Johnson 1978). This job and spatial learning process reinforces our decision to observe mobility between the residential area at the end of studies and the area at the time of the job held three years later. In our opinion, the location of the job is more determining in the migration effort than the location of previous residence. Therefore, we have preferred the observation relating to the place of employment in 2001.

At this point, we may speculate as to what spatial partition is most suitable for counting these moves.

Concerning the spatial scale of analysis, the "Employment Zone" (EZ) is a relevant spatial partition to represent local labor markets. Beaumert (1992) reminds us that a local labor market is defined as a geographical area in which an individual lives and in which he may take a job without having to move from home. From another standpoint, it contains the potential workers firms can attract first. Thus, the EZ constitutes an excellent spatial scale to adjust job demand to job supply for a residential population.

3.2. Descriptive Statistics

Moreover, we may observe that the number of professional relocations is greatly increased when the Employment Zone is the spatial partition rather than the regional territory, the division more frequently used in this kind of study. In particular, it takes better account of the migration of low-skilled young workers. In fact, while the relocation between EZs concerns more than half of the superior (EZ moves: 65% vs. regional moves: 38%) and intermediate levels (54% as opposed to 24%), 36% of the lower-skilled workers have also moved from the EZ in which they had studied. We remark that when using the regional scale, mobility is half as great, and by far less for the least-skilled (moves between regions: 15%), who are generally considered to be workers with low mobility. Thus, when we use the EZ scale, the propensity to migrate of the low-skilled workers can no longer go overlooked. This phenomenon becomes far more interesting when we also take into account the actual migration distances since some low-skilled workers can migrate over very great distances.

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10 More precisely, the French *Baccalauréat*, designated "Bac", is the national diploma sanctioning the studies completed in the French national secondary school system (*Lycée and Collège)*, which corresponds to an American high school diploma + a variable amount of American university credits obtainable via "Advanced Placement" examinations.

Indeed, the introduction of Euclidian distance[11] into the analysis of spatial mobility reveals some remarkable differences in mobility behavior. In particular, including distance means that previous findings should be understood relative to the present results because relocations between EZs can correspond to different distances covered, and consequently to different migration efforts. For instance, one individual may be considered a migrant even though he has only crossed a border, unlike another who may have covered a distance ten times as great. These differences are more obvious in a reduced spatial scale (EZ) as shown in Table 1.

Table 1

Distances Covered in Spatial Mobility between End of the Studies and Job Held Three Years later

	Mean km	Median km	Less than 20 km	Between 20 and 50 km	Between 50 and 100 km	Between 100 and 300 km	Over 300km
Change in EZ							
Bac+5	220	150	15%	15%	10%	26%	34%
Bac+2 to +4	170	80	14%	24%	17%	24%	21%
<= Bac	145	45	25%	27%	13%	16%	19%
All the above	170	70	20%	24%	14%	21%	21%
Change in Region							
Bac+5	350	330	0,1%	1%	4%	38%	56%
Bac+2 to +4	310	275	2%	4%	8%	40%	46%
<= Bac	305	275	6%	7%	9%	31%	47%
All the above	315	290	3%	5%	7%	37%	48%

Note: percentages are a function of the total number of the group of migrant workers considered. EZ: Employment Zone.

We remark that 42% of relocations between Employment Zones are associated with distances covered of over 100 km, which is twice as much as the percentage of moves between regions. As a result, the variability of migration distances is greater for moves between EZs than between regions. Thus, the more spatial scale is reduced, the more migration distances are accounted for – with the aim of highlighting the great heterogeneity of mobility behavior.

Then finally, the discovery that the lesser-skilled workers among the migrants are not the least numerous to migrate over great distances is particularly noteworthy. For instance, the proportion of migrants covering over 300 km is practically the same for workers of both average and low skill in the case of either EZ or regional relocations. Thus, including actual distances covered in the analysis enables us to re-evaluate some widely-held views, such as the unwillingness of low-skilled workers to migrate. Nevertheless, we observe that only 3% of relocations between regions involve distances less than 20 km, unlike the percentage that rises to more than 20% for migrations between EZs. Thus, since distances less than 20km are much more likely to be considered commuting rather than real migration, we will henceforth assimilate such moves to non-migration.[12]

Now, we are able to refer to the distance-income trade-off and to propose a job-search model in space to explain the mobility behavior described above.

11 The distance covered between the EZ of studies in 1998 and the EZ of work in 2001 has been calculated "as the crow flies" between the centroids of the towns of departure and the arrival. In (x,y) space representing the geographic coordinates of points, the distance between two points A and B is: $d(A, B) = \sqrt{(x_b - x_a)^2 + (y_b - y_a)^2}$.

12 In fact, 75% of the employed young people in 2001 commute daily over a distance less than 20 km.

4. RESULTS

4.1. The Determinants of the Decision to Migrate

In a first step, we determine the different effects of individual and territorial determinants of the choice to relocate between EZs and to migrate over a given distance, according to the educational level of the youth.13 We estimate two version of the migration equation (5b) to capture the determinants of the distance covered during a relocation between EZs. Each specification refers to the mechanism of the rule to migrate or not, in conformity with the principles established in the previous section. One equation refers to the hypothesis that the determinants of mobility are above all linked to the individual's characteristics with respect to his initial situation; equation (5b1) only includes the data in vector x. The other equation proposes to integrate, in addition, territorial characteristics of the Employment Zone of arrival with respect to those of the EZ of departure gap variables) to evaluate their impact on the choice to migrate at the end of studies; equation (5b2) includes vectors x and z (Nakosteen and Zimmer 1980).

The comparison of the results generated by these two equations will enable us later on to better elucidate the cost-benefit arbitrage mechanism in the decision to migrate. The results of these two equations for the whole sample and for the subgroups by educational level are presented in Table 2. The comparison of the results of the two equations indicates that parameters are relative stable. The addition of territorial gap variables in fact only marginally modifies the estimated coefficients of the other variables and does not change their interpretation.

First, we remark that the probability of migrating and of covering great distances is lower for women. Let us specify that while the median distance covered by women and men is quite close (111 km and 114 respectively); women who changed between EZs are slightly less numerous (35% of women, compared to 37% of men). As for the educational level, it also confirms the results of the descriptive statistics: the higher the level of studies, the greater the probability of migrating and the greater the distances covered. In addition, age tends to reduce mobility. The impact of age is all the more pronounced that the educational level is high, and the impact seems to have no effect for levels that are inferior to the Bac. Beyond these principal determinants customarily selected in research on migration, other individual characteristics play a non-negligible role.

To begin with, while the spouse's educational level has a significant favorable influence for the whole of the sample, this effect is no longer significant for the Bac+5 level. For these youths, it is possible that the spouse's level of education enters into conflict in the migration choice because of separate career logics. Indeed, since the educational levels of the spouses are relatively close, it may be supposed that two career logics explain this phenomenon – even though at the other levels, the other spouse's educational level encourages migration. For these levels, the professional career logics are less binding. Thus, the relocation choice quite often belongs to the husband in France (Pailhé and Solaz 2008), the wife's educational level only facilitating this choice to find work again. A contrario, at the Bac+5 level, the professional career of one of the spouses may hinder the decision to migrate.

13 Let us note that the Sargan test for the validity of instruments is significant for most of the variables employed in the migration equation that are not included in the gains function. This test consists in regressing the residuals from the estimation of the second stage (the residuals from the T2SLS) on all the explanatory variables and the instruments to test the null hypothesis that the error terms are not correlated with the instruments. Most of the variables not appearing in the specification of the gains function are non-significant in the auxiliary regression of the residuals. When this test did turn out to be significant, the variable was nevertheless selected as an instrument if its effect was much more significant for migration than for salary. The choice of instruments according to the "inclusion-exclusion" principle is always delicate. This is particularly true for certain variables such as the spouse's educational level, the number of children, even some terms characterizing the youths' parents, which also seem to be significant in the gains function for certain groups. However, the combination of these significant terms differs from one group to another under consideration, which did not allow us to pass judgment on a notable significant effect of these variables for the set of all youths. Therefore, this weak level of influence, very unequally characterized from one group to another, led us to retain these variables in the selected equation in which they are clearly more significant. As for the gap variables of the territorial characteristics, they seem to be good instruments for all groups. This discussion demonstrates the difficulty in finding the "true" instrumental variables since the interactions among variables in a same process may be multiple, as Puhani (2000) exposed.

In terms of family constraints, having children reduces the probability of migrating for all working youth, whatever their educational level. A complementary estimation carried out in function of the children's age led to a negative effect, regardless of the age of the children.

Table 2

Reduced-Form Equation for Distance Covered

Education level	Whole sample			Bac+5			Bac+2, 3 or 4			<= Bac		
Intercept	2.895	***	(0.368)	8.116	***	(0.661)	3.088	***	(0.505)	-4.169	***	(0.578)
Women	-0.685	***	(0.071)	-0.814	***	(0.175)	-0.694	***	(0.106)	-0.807	***	(0.119)
Education level												
Unskilled	-4.859	***	(0.156)							-1.446	***	(0.149)
First level of professional certification (Cap, Bep)	-4.327	***	(0.138)							-1.038	***	(0.122)
Bac	-3.046	***	(0.113)									
Bac+2	-1.532	***	(0.103)				-0.910	***	(0.100)			
Bac+3	-1.029	***	(0.145)				-0.429	***	(0.136)			
Bac+4	-0.563	***	(0.116)									
Age in 1998	-0.098	***	(0.014)	-0.267	***	(0.025)	-0.115	***	(0.020)	0.041		(0.026)
Education level masculine spouse	0.165	***	(0.021)	0.009		(0.040)	0.130	***	(0.026)	0.410	***	(0.050)
Education level feminine spouse	0.100	***	(0.021)	-0.030		(0.035)	0.079	***	(0.030)	0.226	***	(0.046)
Number of children	-0.783	***	(0.071)	-0.501	***	(0.109)	-0.706	***	(0.106)	-0.756	***	(0.144)
Rural area at the end of schooling	1.310	***	(0.078)	1.875	***	(0.271)	1.231	***	(0.125)	1.427	***	(0.117)
Fathers profession												
Farmer	0.443	***	(0.138)	0.954	***	(0.345)	0.478	***	(0.192)	0.099		(0.242)
Corporate managers	0.255	***	(0.099)	0.172		(0.244)	0.407	***	(0.143)	0.040		(0.167)
Professionals	0.478	***	(0.085)	0.065		(0.179)	0.219	*	(0.118)	1.227	***	(0.172)
Technicians and similar professionals	0.401	***	(0.105)	0.317		(0.248)	0.206		(0.144)	0.505	***	(0.191)
Clerks	0.375	***	(0.074)	0.043		(0.217)	0.211	*	(0.113)	0.565	***	(0.116)
Workers and elementary occupations												
Unknown	1.296	*	(0.716)	1.863		(1.870)	-0.072		(1.786)	1.514		(0.968)
Father is unemployed 1998	-0.603	***	(0.180)	0.163		(0.472)	-0.766	***	(0.291)	-0.729	***	(0.276)
Territorial characteristic gap (between EZ 98 and EZ 2001)												
Population density gap *1000	0.174	***	(0.000)	0.103	***	(0.000)	0.182	***	(0.000)	0.237	***	(0.000)
Unemployment rate gap	-0.193	***	(0.012)	-0.249	***	(0.023)	-0.210	***	(0.017)	-0.129	***	(0.024)
Share of students gap	-7.588	***	(0.776)	-20.652	***	(1.605)	-12.687	***	(1.049)	5.196	***	(1.471)

Concerning social origin, over the whole sample, migration is the least frequent when the father is from the working class; and inversely, mobility is the highest when the father is a corporate manager. Nevertheless, these results should be qualified when we distinguish among the different levels of education. For the most highly trained, there is no significant difference in the influence of differing socio-professional categories – except that having a father who is a farmer incites those with higher diplomas to greater mobility. On the contrary, the influence of the father's profession is pronounced for the other two groups of educational levels. Thus, for the least trained, the presence of a father who is a manager, belongs to an intermediary profession or is an office worker, encourages migration over greater distances. The father's employment status reinforces the effect of his profession: youths whose fathers are unemployed are always the least mobile.

The level of parents' income determines whether they assume the cost of relocation in whole or in part, which may be an explanation of all the results above. Next, according to their profession, the parents – and the father particularly – may have better information, increasing job offers. Thus, they can mobilize networks that support their children since parents with a highly qualified profession have access to networks of professional and personal contacts, which increase the employment offers, and hence the employment reserve salary when prospecting for a job (Montgomery 1991, Mortensen and Vishwanath 1994).

Territorial characteristics are also capable of influencing the decision to migrate. First, youths situated in a predominantly rural area are more inclined to mobility. The sparse demographic density associated with this type of area reduces the probability of finding employment and increases de facto the probability of leaving. Three principal territorial characteristics of the Employment Zones were constructed from the data generated by the INSEE's[14] General Population Census (1999): the demographic density, the unemployment rate and the level of education. We took into consideration the divergence of these characteristics between the EZs of arrival and departure so as to account for the actor's decision-making process, founded on a comparison between territories (migration equation 5b2).

Since the population density also reflects the job offers in the local labor market, it is not surprising that the professional relocation takes place more frequently in the direction of zones with high population densities, which a priori offer more numerous employment or re-employment possibilities. This finding is reinforced by the observation that the youths are less inclined to migrate to EZs that have higher unemployment rates than the zone of departure.

Finally, since this analysis is done by educational levels, it seemed interesting to integrate a characteristic reflecting the territorial level of human capital: we chose the proportion of the population over 15 years of age currently studying. In addition, it is possible to hypothesize that this ratio indicates the level of local cultural and leisure amenities. This indicator turns out to be attractive for youth with educational levels lower than the Bac, and unattractive for youth with levels above the Bac. For the latter, this finding may seem fairly surprising, but it can be understandable since many of these youths were trained in an EZ already having a youth study ratio among the highest (particularly in the Paris area), and seemingly, the concentration of training tracks above the Bac exceeds the offer of employment corresponding to the EZ and leads them to migrate. Consequently, the divergence of this indicator between the EZ of arrival and departure being generally negative, the observed relation is negative for the superior educational levels.

The individual arbitrages leading to these relocations remain to be elucidated. The determinant examined here is the existence of an eventual gain in salary supposedly reflecting the cost-benefit arbitrage of the migrations analyzed by means of these observable determinants.

4.2. Wage Returns to Spatial Mobility

The characterization of the wage equation corresponds to the determinants usually selected (equation 6c in Table A1). The estimation of the determinants in the earnings function is presented in the tables in annex. More precisely, the Table A1 presents the results from the OLS estimation before treatment for the

14 French National Institute of Statistics and Economic Studies (*Institut National de la Statistique et des Études Économiques*: INSEE)

endogeneity of the migration variable (represented by the logarithm of the distance covered at the moment of the change between EZs), while Table A2 reports the estimation resulting from the T2SLS procedure in which the migration variable has been instrumented by the migration equation 5b2 from the preceding section. The earnings function estimated with the migration variable instrumented by the migration equation 5b1 is not reproduced because the other salary parameters only vary marginally.

As reported in Table 3, the returns to mobility have been calculated from the coefficient of the migration variable that was estimated before and after instrumentation of the earnings function, corresponding respectively to the OLS and T2SLS columns in the table. Concerning the instrumentation, the two migration equations estimated, 5b1 and 5b2, were used (respectively Mig. Eq. 1 and Mig. Eq. 2 in Table 3).

The OLS model corresponds to an ordinary least squares estimation of the coefficient of the migration variable in the earnings function. The associated results for differing distances covered during relocation seem to follow common sense, according to which the migration effort should be rewarded (positive yields), and all the more so when the distance covered is great. Thus, as a function of the levels of the distance covered, the lowest yield to migration appears to be 1.1% for the youths at the Bac+5 level who had covered 50 km; whereas, the youth at intermediate educational levels who had crossed over 900 km obtained the highest yields of 6.3%. It is the most highly trained who derive the least benefit from the mobility effort. Their lower relative cost of migration may explain this finding, although it might also be a reflection of the fact that the group must confront a national labor market. Along these lines, for these highly-trained individuals, geographic mobility is an expected consequence that does not require compensation for the costs attached to relocation. Nevertheless, the finding deserves to be understood relative to other results because we are dealing here with yields rather than absolute increases in earnings. The comparison of absolute values between educational levels might reveal a reversed trend.

As previously explained, unobserved factors exist that can explain the decision to migrate and influence the salary at the same time, contributing to the endogeneity of the migration variable. This phenomenon is confirmed by endogeneity tests that are significant for all educational levels, regardless of the migration equation employed. Part of these returns is therefore a priori attributed erroneously to the role of migration alone, which is why the earnings function was estimated by instrumenting the migration variable, as described previously. Two major results stand out from these IV estimations: (1) First, the effect of unobserved characteristics biases differently, to the up side or to the down side, the returns to migration according the educational level. (2) Furthermore, the differences in returns to relocation obtained using the two migration equations demonstrate the existence of a "territorial arbitrage" within the cost-benefice arbitrage in the decision to migrate.

For the youths with a Bac+5 educational level, the coefficient of the migration distance turns out to be considerably overestimated since it becomes negative (seen by comparing the OLS and T2SLS columns, Migration equation 1 in Table 3). In other words, the remuneration obtained through the relocation only corresponds to the effect of unobserved characteristics.

Table 3

Returns to Migration with Distances Covered Included in the Estimation

	Whole sample			Bac+5			Bac+2, 3 or 4			<= Bac		
	OLS	**2TSLS Mig. Eq. 1**	**2TSLS Mig. Eq. 2**	**OLS**	**2TSLS Mig. Eq. 1**	**2TSLS Mig. Eq. 2**	**OLS**	**2TSLS Mig. Eq. 1**	**2TSLS Mig. Eq. 2**	**OLS**	**2TSLS Mig. Eq. 1**	**2TSLS Mig. Eq. 2**
ln (distance 98 - 2001)	0.0071	0.0022	0.0018	0.0032	-0.0779	-0.0068	0.009	0.0113	0.0071	0.0066	0.0093	0.0056
	(0.0005)	(0.0024)	(0.0012)	(0.0015)	(0.0093)	(0.0027)	(0.0008)	(0.0045)	(0.0019)	(0.0008)	(0.0022)	(0.0015)
LAMDA		0.00016	0.00017		0.0799	0.0097		-0.0075	-0.0022		-0.0076	-0.0035
		(0.0016)	(0.0001)		(0.0093)	(0.0029)		(0.0042)	(0.0014)		(0.0022)	(0.0015)
Kilometers												
50 km	2.5%	0.8%	0.6%	1.1%	-23.3%	-2.3%	3.1%	3.9%	2.4%	2.3%	3.2%	1.9%
100 km	3.2%	1.0%	0.8%	1.4%	-28.9%	-2.9%	4.0%	5.1%	3.1%	2.9%	4.1%	2.5%
300 km	4.1%	1.3%	1.0%	1.8%	-35.5%	-3.8%	5.2%	6.6%	4.1%	3.8%	5.4%	3.2%
600 km	4.6%	1.4%	1.1%	2.0%	-39.1%	-4.2%	5.9%	7.5%	4.6%	4.3%	6.1%	3.6%
900 km	4.9%	1.5%	1.2%	2.2%	-41.1%	-4.5%	6.3%	8.0%	4.9%	4.6%	6.5%	3.8%
Returns median distance	3.3%	1.0%	0.8%	1.7%	-33.6%	-3.5%	4.1%	5.2%	3.2%	2.8%	4.0%	2.4%
Median distance			115 km			210 km			110 km			90 km
R^2	61%			45%			45%			46%		

Note: Log wage equation variables reported in tables A1 and A2. LAMBDA is the Maddala endogeneity test: correlation between Tobit error term for distance ϕ (equation 5b) and Log wage equation error ε (equation 6c).

This result confirms the existence of a positive auto-selection bias for the Bac+5 migrants. For the other levels of training, on the contrary, the returns to relocation prove to be underestimated. Thus, even though these individuals suffer from unfavorable characteristics that probably compel them to broaden the spatial field of their job search, it may be supposed that they would accept external employment only if it compensates the cost of the relocation in whole or in part. The migrants with educational level Bac+2, +3 or +4 obtain higher returns to relocation than the youth with a level lower than the Bac. These differences reflect differentiated migration costs between these educational levels, but also the tighter spread of the remuneration bracket for less-trained youth.

These rates of return are far from being negligible. For the Bac+2, +3 or +4 level, relocating over more than 600 km generates a return that corresponds or exceeds the returns to an additional year of study. For the levels lower than the Bac, such distances covered in migration represent a return of from one to two extra years of study.

The rates of return we have just interpreted were obtained with respect to observable factors explaining the migration variable: the determinants in the migration equation (i.e. the instruments) and marginal determinants in the earnings function. These yields refer to the cost-benefit arbitrage of the decision to migrate. To be more precise, a variable that reinforces migration reduces its returns to the same degree because it makes the relocation less costly. Conversely, a variable that inhibits the decision to migration makes this choice more costly, and therefore, necessitates a salary that is that much greater for the migration decision to be reached. Consequently, the returns to migration are variable according to identifiable determinants; that is, the cost-benefit arbitrage of migration varies.

By similar logic, the introduction of gap variables for territorial characteristics, which are significant in the migration equation 5b2, significantly modifies the returns to migration. Unquestionably, when they are introduced into the migration equation, the returns to all educational levels change (compare the columns T2SLS Migration equation 1 with Migration equation 2 in Table 3). More precisely, for the levels inferior to the Bac and the levels Bac+2, +3 or +4, the returns diminish; and for the level Bac+5, the negative returns approach nullity. These results are explained then by the migrants' internalization of the "comparative advantage" associated to the new territory, which partially compensates migration costs as revealed through the migration equation 5b1, and therefore reduces the returns required for relocation. In particular, the act of turning to a territory with a greater population density and a lower unemployment rate than the site of departure indicates that the probability of finding another employment are higher in the event of a mismatched job found through migrating. The risk assumed by accepting a distant employment, for which the risk of evaluation error is greater, is therefore lesser and de facto less remunerated. Such territorial characteristics also probably ensure more advantageous professional advancement, and thus, partly compensate in this way for the cost associated with the acceptance of relocating to a distant site. Hence, territorial characteristics contribute considerably in defining the cost-benefit arbitrage in the decision to migrate.

Lastly, let us add that the returns to the change in Employment Zones alone have been evaluated for the purposes of comparison. Its estimation only produces an average effect that is much higher than the effect evaluated with the migration distance. On one hand, this average effect overestimates the returns to short relocation distances. On the other hand, it does not account for the decreasing marginal cost of migration, which reduces the returns to long distances. In other words, a dichotomous variable hardly reflects the diversity of migration costs as opposed to the precision of the migration distance. The double finding of the variability of the returns to migration as a function of the distance covered and the unmasking of unobservable effects by using precise distances thus reinforces the choice of an estimation methods based on distance covered for evaluating the returns to spatial mobility.

CONCLUSION

Geographic mobility is often considered to be an attribute of the most qualified workers. Yet, the use of an infra-regional scale in the analysis shows that the least qualified may also be quite mobile. Moreover, taking into account the migration distance considerably enriches the evaluation of the wage impact of geographic mobility. It makes it possible to better elucidate the cost-benefit arbitrage of the decision to migrate, while at the same time controlling for the effect of unobservable characteristics in the process of migration for professional reasons of the whole set of youth, including those with a low level of training.

Among the determinants of the cost of relocation between Employment Zones, captured by means of the migration distance between the place of residence at the end of studies in 1998 and the place of employment in 2001, are the educational level of the individual, the education level of the spouse, the number of children, the social origin and characteristics of the zones, which have proven to be significant for all of the youth – with non-negligible variations from one educational level to another. In particular, financial assistance from professionally qualified parents can limit the cost of relocation for the youth. Moreover, the information possessed by these parents also makes it possible to increase the offers of employment, including from outside the home labor market. One of the eventual means of increasing these offers via senior family members is the recourse to professional networks.

Concerning the returns to the migration, two types of determinants are distinguishable. The first category is linked to the cost of the job search, and the second to the cost of relocation. As for the job-search costs, an increase in employment offers increases the employment reserve salary. However, this rise may be linked to the direct costs of job search, which diminish this same employment reserve salary (travel, advertisement, etc.) in the same way as the rise in opportunity costs. The effect of geographic job-search costs on the salary therefore remains relatively indeterminate since the growth in employment offers may compensate for all costs; or on the contrary, the costs can greatly exceed the positive effect on the salary. The results of our investigation did not permit a total dissipation of this indetermination. It turned out that unobservable individual aptitudes - at least unobservable though available variables - have either a positive or negative effect on the salary, according to the educational level considered. The major finding is that this effect is differentiated within the educational levels superior to the Bac, while previous migration research generally grouped them together with a positive effect. Thus, all else held constant, if the salary reflects the contribution to production, migrants are not necessarily the most capable, even for the educational levels superior to the Bac. Nevertheless, these youths receive a positive return to migration, and we may therefore think that they are not the "best" who migrate, but those youth of "average value" who did not have sufficient aptitudes to capture the local opportunities. These lesser aptitudes may have increased the opportunity costs of the relocation, and therefore driven these youths to accept the relatively less remunerated job offers ceteris paribus, which still make compensation possible for the migration costs.

In the end, the estimations carried out by educational levels reveal clearly differentiated results, which lead us to assume the existence of different scales for the labor market according to educational levels. The returns to migration of the most qualified (in France, Bac+5 and more) correspond only in fact to the remuneration of favorable unobservable qualities. We can therefore infer that these youths are confronted with a national labor market, and that consequently, their effort of spatial mobility does not require further compensation for the costs of relocation beyond the remuneration of their intrinsic qualities. The other educational levels obtain, on the contrary, positive returns to migration in spite of the unfavorable effects of unobservable characteristics. The returns obtained are relatively high - for the low levels of training as well. Unlike the most qualified, these youths are confronted with a multitude of local labor markets (the EZs), and the passage from one to another necessitates remuneration for the migration costs borne, in function of the migration distance covered and of the characteristics of the individual and his family. This wage surplus is however more or less compensated by the "comparative advantage" associated with the territory of arrival in comparison with the territory of departure, which in this way causes the returns to migration to be variable in function of territorial characteristics.

We were able to obtain these findings by using an infra-regional scale that is more representative of local labor markets than the regional scale that is habitually used in this type of research; they are due to the use of migration distance, a key concept in economic theories accounting for the role of space. The significant impact of distances covered in the evaluation of the returns to migration open the way to important research in a domain where available studies are relatively rare.

Table A1

Log Wage Equation with Ordinary Least Squares SLS

	Whole sample		**Bac+5**		**Bac+2-3-4**		**<= Bac**	
Intercept	7.229***	(0.018)	7.056***	(0.051)	7.035***	(0.030)	6.857***	(0.020)
Education level								
Unskilled	-0.408***	(0.007)					-0.050***	(0.005)
first level of professional certification (Cap, Bep)	-0.392***	(0.006)					-0.025***	(0.004)
Bac	-0.375***	(0.005)					ref.	
Bac+2	-0.255***	(0.005)			-0.040***	(0.005)		
Bac+3	-0.305***	(0.007)			-0.081***	(0.007)		
Bac+4	-0.211***	(0.005)			ref.			
Bac+5	ref.							
Women	-0.073***	(0.003)	-0.073***	(0.008)	-0.062***	(0.004)	-0.081***	(0.004)
Age in 1998	0.016***	(0.001)	0.026***	(0.002)	0.015***	(0.001)	0.014***	(0.001)
Number of months unemployed	-0.006***	(0.000)	-0.017***	(0.001)	-0.010***	(0.000)	-0.004***	(0.000)
Area at end of schooling								
Urban	ref.		ref.		ref.		ref.	
Suburban area	-0.022***	(0.004)	-0.044**	(0.019)	-0.026***	(0.008)	-0.016***	(0.005)
"Multi-polar" area	-0.016***	(0.007)	0.013	(0.034)	-0.026**	(0.013)	-0.014*	(0.008)
Rural area	-0.023***	(0.004)	-0.004	(0.017)	-0.036***	(0.006)	-0.018***	(0.004)
Region								
Paris	ref.		ref.		ref.		ref.	
Parisian region	-0.106***	(0.004)	-0.101***	(0.013)	-0.132***	(0.007)	-0.078***	(0.005)
North	-0.106***	(0.006)	-0.132***	(0.018)	-0.124***	(0.009)	-0.087***	(0.008)
East	-0.074***	(0.005)	-0.121***	(0.016)	-0.099***	(0.008)	-0.042***	(0.006)
West	-0.115***	(0.004)	-0.114***	(0.014)	-0.148***	(0.007)	-0.080***	(0.006)
Southwest	-0.137***	(0.005)	-0.125***	(0.015)	-0.170***	(0.008)	-0.106***	(0.006)
Centre-East	-0.099***	(0.004)	-0.108***	(0.013)	-0.121***	(0.007)	-0.068***	(0.006)
Mediterranean	-0.118***	(0.004)	-0.124***	(0.013)	-0.148***	(0.007)	-0.086***	(0.006)
ln (distance EZ 98 EZ 01)	0.007***	(0.001)	0.003**	(0.001)	0.009***	(0.001)	0.007***	(0.001)

Notes: Asymptotic standard errors in parentheses. Other regressors are sectors, functions, type of employment contract, monthly working hours. Significance levels of 10%, 5% and 1% are denoted *, ** and *** respectively.

Table A2

Log Wage Equation with Tobit Double Least Squares SLS T2SLS (Migration Equation 2)

	Whole sample		**Bac+5**		**Bac+2-3-4**		**<= Bac**	
Intercept	7.250***	(0.018)	7.142***	(0.056)	7.039***	(0.032)	6.886***	(0.021)
Education level								
Unskilled	-0.413***	(0.009)					-0.045***	(0.005)
First level of professional certification (Cap, Bep)	-0.397***	(0.008)					-0.021***	(0.004)
Bac	-0.379***	(0.006)					ref.	
Bac+2	-0.258***	(0.005)			-0.038***	(0.005)		
Bac+3	-0.306***	(0.007)			-0.081***	(0.007)		
Bac+4	-0.213***	(0.006)			ref.			
Bac+5	ref.							
Women	-0.074***	(0.003)	-0.078***	(0.008)	-0.060***	(0.005)	-0.079***	(0.004)
Age in 1998	0.016***	(0.001)	0.023***	(0.002)	0.016***	(0.001)	0.014***	(0.001)
Number of months unemployed	-0.006***	(0.000)	-0.016***	(0.001)	-0.010***	(0.000)	-0.004***	(0.000)
Area at end of schooling								
Urban	ref.		ref.		ref.		ref.	
Suburban area	-0.022***	(0.004)	-0.035*	(0.019)	-0.028***	(0.008)	-0.018***	(0.005)
“Multi-polar” area	-0.015**	(0.007)	0.032	(0.035)	-0.028**	(0.013)	-0.015*	(0.008)
Rural area	-0.022***	(0.004)	0.012	(0.017)	-0.040***	(0.007)	-0.024***	(0.005)
Region								
Paris	ref.		ref.		ref.		ref.	
Parisian region	-0.107***	(0.004)	-0.095***	(0.013)	-0.132***	(0.007)	-0.078***	(0.005)
North	-0.109***	(0.006)	-0.137***	(0.018)	-0.122***	(0.010)	-0.083***	(0.008)
East	-0.077***	(0.005)	-0.120***	(0.016)	-0.098***	(0.008)	-0.040***	(0.006)
West	-0.116***	(0.004)	-0.111***	(0.014)	-0.148***	(0.007)	-0.081***	(0.006)
Southwest	-0.138***	(0.005)	-0.126***	(0.015)	-0.169***	(0.008)	-0.108***	(0.006)
Centre-East	-0.100***	(0.004)	-0.108***	(0.013)	-0.121***	(0.008)	-0.066***	(0.006)
Mediterranean	-0.120***	(0.005)	-0.128***	(0.013)	-0.145***	(0.008)	-0.084***	(0.006)
ln (distance EZ 98 EZ 01)	0.002	(0.001)	-0.007**	(0.003)	0.007***	(0.002)	0.006***	(0.001)

Notes: Asymptotic standard errors in parentheses. Other regressors are sectors, functions, type of employment contract, monthly working hours. Significance levels of 10%, 5% and 1% are denoted *, ** and *** respectively.

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