

Internal migration of foreign-born migration in Spain: A Human Capital Approach*

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A relevant topic of the economic literature is the geographical mobility of workers within countries. This is due to the positive influence of labour mobility on the economic convergence of regions and on the improvement in the productivity and allocation of workers. Within this context, a relevant topic is the geographical mobility of foreign workers in the destination country. The study of this topic for the Spanish case is interesting, because Spain is one of the European countries where immigration flows have increased most noticeably for the last years. This paper is aimed, first, at studying the determinants of interprovincial geographical mobility of immigrants in Spain and, second, at obtaining consistent estimates of individual's opportunity wages as movers or stayers. Findings show that an expected wage gain exerts a positive influence on the interprovincial mobility and leads to a better allocation of resources which is consistent with the prediction of the human capital model of migration.

Keywords: Geographical mobility, immigrants, potential wage gain

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1. Introduction

Understanding the determinants of geographical mobility is a major concern of the economic literature. Among other reasons, this is due to the positive influence of it on the economic convergence of regions and on the improvement in the productivity and allocation of workers. In Spain during the sixties, a large internal flow of workers led to the development and Spanish economic growth. However, since the mid-seventies these migratory flows were under strong slowdown and this low geographical mobility of workers was considered an explanatory factor. The high rates of unemployment in the Spanish labour market since the 80s.

The Spanish economic literature has tried to explain the determinants of the internal migration from different points of view and using different datasets. In this sense, it's possible to highlight, first, the paper of Antolín and Bover (1997) who identify which regional economic factors and personal characteristics influence male interregional migration decision, using individual data from the Migration Survey, included in the Spanish Labour Force Survey (INE, 1987-1991). Second, Bover and Arellano (2002) analyse intraregional migration in Spain, combining information from the Residential Variations Data and from the Spanish Labour Force Survey for the period 1988-1992. Third, Abellán (1998) and Devillanova and García-Fontes (2004) study internal migration from a more disaggregated point of view, by analysing the migration between provinces, using the Survey of Structure, Consciousness and Biography of Classes (INE, 1991) and the information mainly provided from the records of Spanish Social Security from 1978-1992, respectively.

Within this general context, a topic of great relevancy is the geographical mobility of foreign workers in the destination country. The study of this topic for the Spanish case is interesting because Spain is one of the European countries where immigration flows have increased most noticeably. Thus, the foreign-born population living in Spain increases from 1% of the total population in 1990 to the 12% in 2009 (INE, 2009), converting Spain into the European Union country that most contributes to the increase in the immigrant population. However, not much research has been done on the Spanish labour market regarding the

geographical mobility of immigrants within Spain, except from the studies of Recaño (2002), Pajares (2009), and Hierro and Maza (2010). The first two papers use information provided by the Residential Variations Data and note that the geographical mobility of foreigners is much higher than that of the Spanish. For example, Pajares (2009) finds out that, in the year 2007, the mobility of immigrants between municipalities was four times higher than that of the Spanish. Hierro and Maza (2010) ascertain whether the internal mobility of foreign-born resident affects the economic provincial convergence in terms of per-capita income, employing several data source provided by the National Statistics Institute for the period 1996-2005 (Spanish Regional Accounts, Residential Variations Data, Municipal Register and Spanish Labour Force Survey). Their results show that foreign-born migration has a significant although weak influence on the economic provincial converge.

This paper is aimed, first, at studying the determinants of interprovincial geographical mobility of immigrants in Spain and, second, at obtaining consistent estimates of individual's opportunity wages as movers or stayers. With these estimates it is possible to obtain the potential wage gain of migration for all individuals, migrants or not, and to check if this variable has an influence on the interprovincial migration decision. Concerning the second purpose, the hypothesis to be tested is whether the internal migration of immigrants in Spain has a positive effect on their careers and wages, so that people migrate when the expected benefits of doing so outweigh the costs. In this sense, migration is described as a decision involving investment in human capital (Sjaastad, 1962).

2. The model

In this section is described a switching regression model with endogenous switching. This model has as its starting point the human capital model of Sjaastad (1962). It consists of two wage equations (one for immigrant movers between provinces in Spain and the other for stayers) as well as an equation describing the dichotomous decision of immigrants to move between provinces in Spain. The sample observations may be thought as a falling into one of

two mutually exclusive regimes, with the decision equation serving as an endogenous selectivity criterion that determines the appropriate regime (migrant versus non-migrant).

Let $\ln w_{1i}$ and $\ln w_{2i}$ would be the log wages for individual i in, for example, 1 and 2 areas, respectively:

$$\ln w_{1i} = \beta_1' X_i + u_{1i} \quad (1)$$

$$\ln w_{2i} = \beta_2' X_i + u_{2i} \quad (2)$$

where X_i is a vector that contains, first, personal characteristics (gender, country of origin, educational level, the level achieved in the Spanish language proficiency), current employment characteristics (occupation, activity sector, working time, tenure) and if they were working in their home country. β_1 and β_2 are vectors of unknown parameters, and u_{1i} and u_{2i} are disturbance terms that follow a normal distribution.

The propensity to migrate of individual i from province 1 to province 2, I^*_i is function of the difference between $\ln w_{2i}$ and $\ln w_{1i}$ and of the cost of moving from province 1 to province 2, c_i :

$$I^*_i = f(\ln w_{2i} - \ln w_{1i}, c_i) \quad (3)$$

The cost of moving is specified as:

$$c_i = \delta' Z_i + u_{ci} \quad (4)$$

where Z_i is a vector that includes as regressors some personal characteristics of the immigrant at arriving in Spain (age, marital status, if he live in a home for free). δ is a vector of unknown coefficients, and u_{ci} is an error term normally distributed.

Assuming a linear model for I^*_i :

$$I^*_i = \delta_2 (\ln w_{2i} - \ln w_{1i}) + \delta' Z_i + u_{ci} \quad (5)$$

I^*_i is an unobservable variable that determines if the immigrant i is a mover or stayer within Spain. So, it is necessary to use a dichotomous variable that takes the value 1 when the individual has migrated and 0, otherwise:

$$\begin{aligned} I_i &= 1 \text{ if } I^*_i > 0 \\ I_i &= 0 \text{ if } I^*_i \leq 0 \end{aligned} \quad (6)$$

Since w_{2i} is only observed if the individual changes from province, and w_{1i} if no changes, the selection equation structural form (5) cannot be estimated directly. However, it is possible to obtain the selection equation reduced form:

$$I^*_i = \delta_2 (\beta_2 - \beta_1)' X_i + \delta' Z_i + u_{ci} + \delta_2 u_{2i} - \delta_2 u_{1i} = \delta^{*'} Z_i^* + \varepsilon_i \quad (7)$$

where $\delta^{*'} = [\delta_2 (\beta_2 - \beta_1)', \delta']$, $Z_i^* = (X_i, Z_i)$ and $\varepsilon_i = u_{ci} + \delta_2 u_{2i} - \delta_2 u_{1i}$.

Log wage regression model, equations (1) and (2) have to be estimated on truncated samples. For movers, $I^*_i > 0$, the wage regression for (2) is:

$$E(\ln w_{2i} | X_i, I^*_i > 0) = \beta_2' X_i + E(u_{2i} | I^*_i > 0) \quad (8)$$

To opposite, for stayers for whom $I^*_i \leq 0$, the regression function is:

$$E(\ln w_{1i} | X_i, I^*_i \leq 0) = \beta_1' X_i + E(u_{1i} | I^*_i \leq 0) \quad (9)$$

Assuming normality for ε_i , u_{1i} and u_{2i} , with zero mean and non-singular covariance matrix, Σ , specified as:

$$\Sigma = \begin{bmatrix} \sigma_\varepsilon^2 & \sigma_{\varepsilon,1} & \sigma_{\varepsilon,2} \\ \sigma_{\varepsilon,1} & \sigma_1^2 & \sigma_{1,2} \\ \sigma_{\varepsilon,2} & \sigma_{1,2} & \sigma_2^2 \end{bmatrix} \quad (10)$$

Equations (8) and (9) become:

$$E(\ln w_{2i} | X_i, I_i^* > 0) = \beta_2' X_i + \frac{\sigma_{2\varepsilon}}{\sigma_\varepsilon} \lambda_{2i} \quad (11)$$

$$E(\ln w_{1i} | X_i, I_i^* \leq 0) = \beta_1' X_i + \frac{\sigma_{1\varepsilon}}{\sigma_\varepsilon} \lambda_{1i} \quad (12)$$

where λ_{2i} and λ_{1i} are the inverse Mills ratios to left censored distributions and right censored distributions, respectively.

A two-stage method to estimate the endogenous switching model would involve, first, the estimation of a probit of the criterion equation (7) with the object of predicting the inverse Mills ratios λ_{2i} and λ_{1i} . Second, these predict variables would be included in equation (11) and (12). However, this method is inefficient and requires potentially cumbersome adjustments to derive consistent standard errors, because the correct covariance matrix of the estimates is very complicated (Lee, 1978). A more efficient version of the endogenous switching model can be estimated by full information maximum likelihood (FIML) method (Greene, 2000). The FIML method simultaneously estimates the probit criterion and the wage regression equation to yield consistent errors. Given the assumption of trivariate normal distribution for the error terms, the logarithmic likelihood function for the system of equation is:

$$\begin{aligned} \ln L = \sum_i^N \left\{ I_i \left[\ln \left(F \left(\frac{\delta^* Z_i^* + \rho_{2,\varepsilon} (Y_{2i} - X_{2i}' \beta_2) / \sigma_2}{\sqrt{1 - \rho_{2,\varepsilon}^2}} \right) \right) + \ln \left(f \left((Y_{2i} - X_{2i}' \beta_2) / \sigma_2 \right) / \sigma_2 \right) \right] + \right. \\ \left. + (1 - I_i) \left[\ln \left(1 - F \left(\frac{\delta^* Z_i^* + \rho_{1,\varepsilon} (Y_{1i} - X_{1i}' \beta_1) / \sigma_1}{\sqrt{1 - \rho_{1,\varepsilon}^2}} \right) \right) + \ln \left(f \left((Y_{1i} - X_{1i}' \beta_1) / \sigma_1 \right) / \sigma_1 \right) \right] \right\} \quad (13) \end{aligned}$$

where f and F are the probability density and cumulative distribution functions of the standard normal distribution, $\rho_{2,\varepsilon}$ is the coefficient of correlation between u_{2i} and ε_i , and $\rho_{1,\varepsilon}$ is the coefficient of correlation between u_{1i} and ε_i . The signs of these correlation coefficients, $\rho_{2,\varepsilon}$ and $\rho_{1,\varepsilon}$ have economic interpretations, if they have alternative signs (positive and negative,

respectively) would imply that the decision to migrate within Spain would have a comparative advantage for workers who change or not from province, since their wages would be higher than an individual chosen randomly from the sample.

The application of FIML method corrects for the selection bias in the log-wage equations (1-2) caused because some unobserved characteristics that influence the probability of change of region also determine the wages that immigrants receive once they are employed.

The estimates of β_1 and β_2 allow estimating the wage gain of migration for all individuals:

$$\hat{WG}_i = X_i(\hat{\beta}_2 - \hat{\beta}_1) \quad (14)$$

This variable would allow obtain the influence of potential wage gain on the probability of interprovincial mobility from immigrants in Spain though, its inclusion in equation (5):

$$I^*_i = \delta_{2i} \hat{WG}_i + \delta' Z_i + \varepsilon_i^* \quad (15)$$

In this model ε_i^* is an heteroskedastic error term because:

$$\varepsilon_i^* = \varepsilon_i + \delta_{2i} (WG_i - \hat{WG}_i) \quad (16)$$

where $WG_i = (\ln w_{2i} - \ln w_{1i})$ is the true wage gain of change of province.

If δ_{2i} is a positive and statistically significant parameter, we would prove that interprovincial movements of immigrants in Spain have taken place according to a process of maximizing wage gains.

3. Data

The data set is the Spanish National Immigrant Survey (INE, 2007). The main objective of this survey is provided information on the immigrants, aged 16 years old and over, who have been in Spain longer than one year, or have the intention of doing so (15465 individuals). The information includes residential trajectory within the different municipalities in Spain and work trajectory (first and current employment situation).

As one of the main variables of the model is the wage, only we take into account wage earners immigrants¹ at the time of conducting the survey. This group, composed by 8207 individuals, represents the 53% of the initial sample (15465 individuals). Moreover, in order to control the heterogeneity of the immigrant population, we restrict the sample to individuals who arrived at Spain between 1997-2007. The Spanish National Immigrant Survey allows for two mutually exclusive choices as response of the workers about the wage, on the one hand, they can provide the exact value of their current wage or, on other hand, its location within a closed interval question. Individuals who choose the second option, i.e answer that they wage is within a certain range, represent 15% of wage earners. Following, Sanromá *et al.* (2009), in these cases, the wages have been calculated at the midpoint of the corresponding wage interval. Once eliminated the observations that do not meet the above requirements and the missing and anomalous values dropped out, the sample used in the estimates are composed by 5314 individuals. The descriptive statistics of the variables for the total sample and for the two groups, formed by individuals that change and not change of province, are shown in table 1.

Through the information provided in this table, first, it appears that the percentage of immigrants who changed of province in Spain is 16%², being the mean of the logarithm monthly wage for this group higher than the corresponding to the stayers³.

The first group of regressors that are considered as influential on the wage equation corresponds to the personal characteristics. Within this group are included the following variables: gender, country of origin, Spanish language proficiency and educational level. As more relevant results it is noteworthy, first, that the proportion of males inside the group of immigrants who realize a change of region is superior to the correspondent for those who do not change (55% versus 53%).

¹ Immigrants' wages are expressed in monthly terms and correspond to the pay received in their principal job in net terms (after deductions, contributions and other similar payments).

² Individuals who after making a change of province have returned to their starting province have been considered as stayers, because the province of origin and destination coincide.

³ After application of an independent t-test, it is statistically verified that the mean of the logarithm monthly wage is different for movers and stayers.

Table 1. Sample characteristics of variables used in the estimates

Variables	All sample		Stayers		Movers	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Logarithm monthly wage	6.81	0.41	6.80	0.42	6.83	0.40
Regressors in the wages equations						
Personal characteristics						
Gender						
Female	0.47	0.50	0.47	0.50	0.45	0.50
Male	0.53	0.50	0.53	0.50	0.55	0.50
Geographic origin						
EU-15 countries ^a	0.06	0.23	0.06	0.24	0.05	0.22
Bulgaria	0.04	0.18	0.03	0.18	0.04	0.20
Romania	0.15	0.36	0.15	0.36	0.14	0.35
Ukraine	0.02	0.16	0.02	0.16	0.03	0.16
Rest of European countries	0.05	0.22	0.06	0.23	0.04	0.20
Morocco	0.08	0.26	0.08	0.26	0.09	0.28
Rest of African countries	0.04	0.20	0.04	0.19	0.06	0.24
Asia	0.02	0.16	0.02	0.16	0.03	0.16
Argentina	0.05	0.22	0.05	0.22	0.04	0.20
Bolivia	0.05	0.22	0.05	0.22	0.04	0.20
Colombia	0.10	0.30	0.09	0.29	0.12	0.32
Ecuador	0.15	0.36	0.15	0.36	0.17	0.37
Paraguay	0.01	0.34	0.01	0.12	0.01	0.10
Rest of South-American countries	0.18	0.46	0.18	0.46	0.14	0.35
Spanish language proficiency						
Fluent	0.13	0.34	0.13	0.34	0.14	0.34
Not fluent	0.87	0.34	0.87	0.34	0.86	0.34
Educational level						
Not education	0.09	0.30	0.08	0.26	0.09	0.27
Primary	0.15	0.35	0.15	0.35	0.16	0.36
Lower secondary	0.15	0.35	0.15	0.35	0.14	0.34
Upper secondary	0.42	0.49	0.42	0.49	0.44	0.49
Short-cycle higher education	0.17	0.38	0.18	0.38	0.15	0.36
Long-cycle higher education	0.02	0.13	0.02	0.13	0.02	0.15
Current employment characteristics						
Occupation						
Managers, intellectual professionals and technicians	0.15	0.35	0.15	0.35	0.14	0.34
Professionals and administrative type employees	0.05	0.21	0.05	0.21	0.04	0.19
Catering, personal services, security and retail workers	0.20	0.10	0.20	0.40	0.20	0.40
Workers skilled in agriculture and fishing	0.01	0.11	0.01	0.11	0.01	0.07
Craftsmen and skilled manufacturing	0.20	0.40	0.20	0.40	0.23	0.42
Installation and machinery operators	0.07	0.25	0.07	0.25	0.09	0.28
Unskilled workers	0.32	0.44	0.32	0.44	0.29	0.45
Activity sector						
Agriculture and fishing	0.07	0.25	0.07	0.25	0.07	0.25
Manufacturing	0.15	0.36	0.14	0.35	0.22	0.42
Construction	0.21	0.41	0.21	0.41	0.24	0.42
Wholesale and retail trade	0.09	0.29	0.10	0.30	0.06	0.24
Hotels and restaurants	0.14	0.34	0.14	0.34	0.15	0.36
Transport	0.04	0.20	0.04	0.20	0.04	0.21
Financial intermediation, real estate, renting...	0.08	0.27	0.08	0.27	0.07	0.26
Education, health, public administration	0.05	0.22	0.05	0.22	0.04	0.21
Household activities	0.14	0.37	0.14	0.35	0.10	0.30
Other social and personal service activities	0.03	0.17	0.03	0.18	0.01	0.13
Working time						
Full-time contract	0.82	0.38	0.81	0.38	0.85	0.35
Part-time contract	0.18	0.38	0.19	0.38	0.15	0.34
Tenure (years)	2.40	1.87	2.43	1.89	2.27	1.75
Working in his home country						
Yes	0.68	0.47	0.67	0.47	0.70	0.46
No	0.32	0.47	0.33	0.47	0.30	0.46
Regressors in the model of the cost of moving (observed when the individual arrives at Spain)						
Age	29.23	8.70	29.38	8.80	28.44	8.10
Martital status						
Married	0.38	0.48	0.39	0.49	0.32	0.46
Single	0.62	0.48	0.61	0.49	0.68	0.46
Free housing						
Yes	0.20	0.40	0.17	0.37	0.33	0.47
No	0.80	0.40	0.83	0.37	0.77	0.47
Sample size	5314		4465		849	

Notes:

(a) Immigrants from the U.S and Canada are included in this group.

Source: Spanish National Immigration Survey (INE, 2007).

Second, with respect to the variable that informs about the country of birth, immigrants have been sorted among the most representative groups of foreigners in Spain. The descriptives showed that the collective more represented in all situations is South American people, being more than the half of the sample. By mobility status, it is highlights that the proportion of immigrants proceeding from Morocco, Rest of Africa countries, Ukraine, Colombia, Ecuador and Asia is higher for the people who migrate within Spain. Third, the proportion of immigrants who speak Spanish fluently is quite similar in all situations, approaching 13% of the sample. Finally, educational level predominant in both groups (movers and stayers) is upper secondary with a percentage higher than 40% of the sample of immigrants.

Regarding current employment characteristics, first, it is remarkable that the occupation variables are constructed following the National Classification of Occupations⁴ (CNO-94). The information provided by table 1 about these variables shows, on one hand, that unskilled workers are the group predominant in all situations, with a percentage close to 30%. The occupations whose weight in the group of movers exceeds to the achieved in the group of stayers are management of companies and public administration, support technicians and professionals, craftsmen and skilled manufacturing, and installation and machinery operators. Second, in relation to activity sector, the dummy variables are defined according to the National Classification of Economic Activities. The results for these variables indicate that economic activities undertaken by the community of immigrants in Spain is mainly concentrated in the following economic sectors: construction, manufacturing, hotels and restaurants, and household activities. The total count of sectors represents a percentage of 64% of the total sample. If workers are distinguished according to their attitude towards geographical mobility is observed some interesting features. For example, the percentage of employees in the manufacturing sector increases by 7 percentage points for the group of immigrants who move between provinces in Spain, while if engaged in household activities, the opposite occurs, decreasing by 4 percentage points their representation in the group of mobile workers. With respect to other

⁴ The criteria used in this classification are the type of work carried out and the qualification required.

characteristics of current employment, it is noteworthy that in all situations, more than 80% of the immigrant population has full-time jobs, being the proportion of workers with these jobs slightly higher for movers (85% *versus* 81%). Moreover, the average tenure stands at around two and half years. Finally, to end the descriptive information of the regressors included in the wage equations, it is noted that 68% of migrants living in Spain have had a previous work in their country of origin, being this percentage a bit higher for movers (70% *versus* 67%).

Concerning variables that are considered as proxies of the costs of worker mobility and that are observed when the individuals arrive at Spain, the descriptive statistics highlight first, that the average age for those reporting a change of province is a bit lower than the corresponding to those who don't change. Second, the proportion of immigrants who are married is higher for stayers than for movers (39% *versus* 31%). Finally, the percentage of people with free housing is significantly lower for workers who don't change of province (33% for movers *versus* 17% for stayers).

4. Results

The results obtained after estimating the model described are exposed in this section. First, table 2 shows the estimated coefficients of the reduced probit model that represents the migration decision of immigrants arriving in Spain.

With respect to the main outcomes reports in this table, it is noteworthy, first, that the variable gender doesn't have influence on the probability of moving. This result is similar to that obtained by Abellán (1998) when analyse the interprovincial migration in Spain. Second, variables that point out the country of origin show that people proceeding from Asia or the rest of African countries have more probability of provincial change than the corresponding to the individuals of the reference category (immigrants from the rest of South American countries). Third, speaking Spanish fluently is not a relevant variable in the reduced model that determines the probability of geographical mobility. However, this variable is a regressor included in the wage equations and, therefore, observed in 2007, which implies that there may be immigrants who, although not fluent in Spanish at the time of the provincial change if they do at present.

About the role of education on geographical mobility, economic theory provides different predictions, depending on the type of human capital acquired by individuals. On the one hand, the theory of firm-specific human capital predicts that training increases job duration and therefore inhibits job mobility (Jovanovic, 1979). On the other hand, general human capital should increase mobility in markets with imperfect information because better educated persons should be better able to collect and process information, reducing search and transaction costs (Greenwood, 1975). In this study, it is not possible to analyze directly the influence of specific human capital on wages and on the decision to immigrate, because it is a variable not included in the Spanish National Immigrant Survey (INE, 2007). In the opposite way, the effect of general human capital investment is possible to observe, because it's known the educational attainment of immigrants⁵. In particular, a set of educational dummy variables are included as regressors in order to detect nonlinearity in the effect of the education. Results in this paper are, in some way, consistent with the predictions of economic theory since long-cycle higher education attainment has a positive influence on the probability of provincial change (statistical significance at the 15%).

Regarding the variables that characterize the job currently being undertaken, it highlights the following results, on one side, full time employees and workers who currently are technicians or operators show a greater propensity to have changed from region. On other hand, those individuals employed in education, health, public administration or other social and personal service activities are more likely to be stayers. Finally, working in his home country has a positive influence on the geographical mobility.

Concerning to the regressors included in the model of the costs of moving and observed when the individual arrives at Spain, it must be noted that being married influences negatively the probability of provincial change, as pointed out by Robison and Tomes (1982), marital status affects the cost of moving, since a member of a family unit has to take into account the

⁵ For the vast majority of people in the survey, the stated educational level coincides with the one obtained in their home countries, only 5% of immigrants in the sample continued studies in Spain.

change in earnings of other family members. Finally, as expected, immigrants living in free housing, provided by relatives or by the company who hired them to come to Spain have more

Table 2. Probit estimates of the probability of interprovincial mobility (Reduced model)^a

Variables	Coefficient^b
Constant	-1.266***
Gender	
Male	-0.084
Geographic origin	
EU-15 countries	0.027
Bulgaria	0.269**
Romania	0.175**
Ukraine	0.198
Rest of European countries	-0.023
Morocco	0.255**
Rest of African countries	0.440***
Asia	0.657***
Argentina	-0.001
Bolivia	0.188*
Colombia	0.364***
Ecuador	0.355***
Paraguay	0.130
Spanish language proficiency	
Fluent	0.035
Educational level	
Primary	0.094
Lower secondary	0.034
Upper secondary	0.117
Short-cycle higher education	0.040
Long-cycle higher education	0.256 [^]
Occupation	
Managers, intellectual professionals and technicians	0.150 [^]
Professionals and administrative type employees	-0.008
Catering, personal services, security and retail workers	0.097
Workers skilled in agriculture and fishing	-0.401*
Craftsmen and skilled manufacturing	0.100
Installation and machinery operators	0.151*
Activity sector	
Agriculture and fishing	-0.089
Construction	-0.012
Wholesale and retail trade	-0.298**
Hotels and restaurants	-0.070
Transport	-0.203*
Financial intermediation, real estate, renting, and business activities	-0.103
Education, health, public administration	-0.260**
Household activities	-0.244**
Other social and personal service activities	-0.463**
Working time	
Full-time contract	0.218**
Tenure (in years)	-0.032**
Working in his home country	0.097**
Regressors in the model of the cost of moving (Observed when the individual arrives at Spain)	
Age	-0.003
Marital status	
Married	-0.077*
Free housing	
Yes	0.496***
Sample size	5314

Notes:

(a) The reference is a woman, proceeding from the group “rest of South American countries”, not fluent in Spanish language, without education, working in manufacturing sector as unskilled worker and with a part-time contract, without job in their country of origin and when he arrived in Spain was not married and did not live in a rent-free housing.

(b) (***) Significant at 1%, (**) at 5%, (*) at 10% and ([^]) at 15%.

Source: Spanish National Immigration Survey (INE, 2007).

Table 3 presents the coefficient estimates for log-wage equations and correlation coefficients that indicate the presence of sample selection. In addition, the likelihood ratio test for joint independence of the model estimated (log-wage equations and reduced probit model) is reported at the bottom of the table. The result associated with this test confirms the econometric methodology applied, since the three models (log-wage equations and reduced probit model) are not jointly independent and should not be estimated separately.

The positive sign of the estimated coefficient, $\hat{\rho}_{2,\varepsilon}$, and the negative sign of the estimated coefficient, $\hat{\rho}_{1,\varepsilon}$, would indicate that the self-selection process induced by the interprovincial mobility would increase the average wages in the regions of origin and the destination. However, as Abellán (1998) which focuses on the wage-earning population in Spain or Nakosteen and Zimmer (1981) for inter-state migration in the United States, only the coefficient of correlation $\rho_{1,\varepsilon}$ is statistically significant. Thus individuals who choose not to migrate earn higher wages than a random individual from the sample would have earned. The explanation for this result could correspond to a situation where the individuals with regional-specific human capital do not move, because if they did their wages would decrease, since their skills would be less valued in other regions.

The results obtained from the regressors included in the log-wage equation have typically been found in the literature. With respect to personal characteristics, first, there is a favourable wage differential for men in relation to women both movers and for stayers. In particular, the expected average monthly wage of males exceeds that of women around 20%⁶. Second, the geographical area of origin of immigrants is an important variable to explain the differential wage for workers. EU-15 workers are those with higher wages for both stayers and movers. For the latter group, the mean expected wage is a 17.6% higher than the corresponding to the rest of national groups. For stayers, the most disadvantaged groups are Asian workers, with a mean expected wage a 13% lesser than the omitted category. Third, concerning to human capital

⁶ Since the model is semi-logarithmic, we estimate the effect of the dummy variable by calculating the exponential of its coefficient and subtracting 1 (see Halvorsen and Palmquist, 1980).

variables, on one hand, be fluent in Spanish language has a positive influence on earnings. On other hand, returns to education are highest for individuals with higher education (long-cycle for stayers and short-cycle for stayers).

Table 3. Estimates of the log-wage equations^{a,b}

Variables	Stayers (Coefficients ^c)	Movers (Coefficients ^c)
Constant	6.161***	6.119***
Gender		
Male	0.187***	0.204***
Geographic origin		
EU-15 countries	0.065**	0.162**
Bulgaria	-0.094**	0.068
Romania	-0.032*	-0.004
Ukraine	-0.057*	0.129*
Rest of European countries	0.021	-0.007
Morocco	-0.086***	-0.047
Rest of African countries	0.021	-0.052
Asia	-0.139***	-0.067
Argentina	-0.036	0.078
Bolivia	-0.117***	0.048
Colombia	-0.067*	-0.003
Ecuador	-0.035**	0.003
Paraguay	-0.017	0.028
Spanish language proficiency		
Fluent	0.041**	0.055*
Educational level		
Primary	0.004	0.001
Lower secondary	0.019	0.020
Upper secondary	0.018	0.029
Short-cycle higher education	0.078***	0.127**
Long-cycle higher education	0.240***	0.179**
Occupation		
Managers, intellectual professionals and technicians	0.315***	0.263***
Professionals and administrative type employees	-0.219***	-0.228***
Catering, personal services, security and retail workers	0.025	-0.009
Workers skilled in agriculture and fishing	0.047	-0.001
Craftsmen and skilled manufacturing	0.080***	0.042
Installation and machinery operators	0.096***	0.094**
Activity sector		
Agriculture and fishing	-0.026	-0.020
Construction	0.116***	0.066**
Wholesale and retail trade	-0.013	-0.052
Hotels and restaurants	0.052**	0.007
Transport	0.126***	0.078
Financial intermediation, real estate, renting, and business activities	-0.015	0.001
Education, health, public administration	-0.007	0.032
Household activities	-0.114***	-0.144**
Other social and personal service activities	-0.002	-0.079
Working time		
Full-time contract	0.389***	0.395***
Tenure (in years)	0.023***	0.023***
Working in his home country	0.028**	0.041*
$\hat{\rho}_{1,\varepsilon}$	-0.743***	
$\hat{\rho}_{2,\varepsilon}$	0.109	
LR test of indep. eqns.	20.21***	
Sample size	5314	

Notes:

(a) The reference is a woman, proceeding from the group “rest of South American countries”, not fluent in Spanish language, without education, working in manufacturing sector as unskilled worker and with a part-time contract and without job in their country of origin.

(b) The model includes as regressors to the current residence region of the individual.

(c) (***) Significant at 1%, (**) at 5%, (*) at 10% and (^) at 15%.

Source: Spanish National Immigration Survey (INE, 2007).

In relation to the variables that reflect the employment characteristics, on one hand, it is observed that the technician occupations are the most paid for both stayers and movers. Thus, managers have a salary higher by more than 30% to the corresponding to unskilled. On the other hand, immigrant workers worse off in the wage distribution are those performing household activities and with part-time contracts. Finally, tenure (that is a proxy of training) has a positive a significant impact of earnings. Particularly, an increase of a year in the seniority generates an increase in salary by 2%. Finally, immigrants who have had labour experience in their home countries have higher wages than the rest.

The final step of the econometric methodology applied in this paper is estimation of the structural probit equation. In this model an individual will move from a given origin province when outside permanent income, net of moving cost, exceeds permanent income in the origin province. The estimated coefficients from the log-wage equations permit estimation of permanent income in both provinces for each individual. Thus the predicted difference in log wages are used directly in estimating the probability of moving. The estimates⁷ that are displayed in Table 4 show that the expected wage gain has a significant positive influence on the likelihood of change of province, that is, individuals choose among competing alternatives in part on the basis of anticipated incremental returns.

This result agrees with those obtained by the paper cited above, Abellán (1998) for the entire working population in Spain, Nakosteen and Zimmer (1981) in the U.S., or Robison and Tomes (1982) in Canada. Finally, with respect to the variables which approximate the costs of change region, it is noted that all are relevant and their influence on the probability of moving has the expected signs.

⁷ The standard errors of the estimates are heteroskedasticity-consistent standard errors.

**Table 4. Probability of interprovincial mobility
(Structural model)^a**

Variables	Coefficient ^b
Constant	-0.920***
Predicted differential wage	0.921***
Age	-0.006**
Marital status	
Married	-0.088**
Free housing	
Yes	0.510***
Sample size	5314

Notes:

(a) The individual of reference was not married and did not lived in a rent-free housing, when he arrived at Spain.

(b) (***) Significant at 1%, (**) at 5%.

Source: Spanish National Immigration Survey (INE, 2007).

5. Conclusions

The promotion of geographical mobility is considered in the EU countries as an important factor to increase the flexisecurity and employability of workforce. Within this context, a topic of great relevancy is the geographical mobility of foreign workers within the destination countries. This is particularly important in Spain where the foreing-born population represents the 12% in 2009.

In this sense, this paper has studied, first, the determinant of interprovincial mobility of immigrants within Spain and, second, it's tested whether the internal migration of foreign workers in Spain has a positive effect on their career and wages. The data used in this study have come from The Spanish Immigrant Survey, which was conducted by the Spanish Statistics Institute (INE, 2007).

The econometric methodology proposed consists of a switching regression model with endogenous switching. This is model is formed by three equations: two wage equations (one for immigrant movers between provinces and the other for stayers) as well as an equation describing the dichotomous decision of foreign worker to move between provinces. The estimation method applied is full information maximum likelihood method that corrects for the selection bias in the log-wage equations caused because some unobserved characteristics that influence the probability of change of province also determine the wage the immigrants receive once they are employed. Further this method yields a consistent covariance matrix of the estimates.

The main conclusions obtained from the estimates are, first, that the likelihood ratio test for joint independence confirms the hypothesis of non-random selection in the group of workers that change of province. Second, stayers have wages higher than those corresponding to individuals chosen randomly from the sample. Third, the estimates of the reduced probit model show that being married or living in a free housing have a positive influence on the geographical mobility. Fourthly, the estimates to log-wage models reflect, on one hand, the existence of positive wage differential for male, individuals from EU15 countries and with higher education. On the other hand, unskilled workers performing household activities have the highest negative wage differential. Finally, the estimates to the structural probit model reflect that the expected wage gain is a variable that exerts a positive influence on the interprovincial mobility. Therefore, it has been proved that geographical mobility of immigrants within Spain leads to a better allocation of resources in the Spanish labour market.

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