Interregional Migration in Spain:
A Semiparametric Analysis

Adolfo Maza

Department of Economics, University of Cantabria, Av. Los Castros, s/n,
39005 Santander, e-mail: mazaaj@unican.es

José Villaverde

Department of Economics, University of Cantabria, Av. Los Castros, s/n,
39005 Santander, e-mail: villavej@unican.es

Abstract

This paper analyses the determinants of internal migration in Spain between 1995 and 2002. After a brief descriptive study, we present an analytical model of internal migration flows. Subsequently, we estimate this model by applying semiparametric techniques. The general conclusion to which we come is that net migration rates are influenced mainly by income and climatic condition differentials between the regions of origin and destination; in addition, unemployment and housing price differentials seem to have a much weaker effect while variables such as aggregate unemployment, on the one hand, and human capital and population density differentials, on the other, do not affect net migration rates.

Keywords: Migration; Spanish region; Unemployment; Income

1. INTRODUCTION

One of the most disturbing aspects of the Spanish economy in recent decades has been, and indeed continues to be, the deficient functioning of its labour market. In an economic context such as the present, with Spain fully integrated in the European Monetary Union, with per capita income levels converging slowly but steadily towards the European average and, by historic standards, a low inflation rate, the labour market is still a very interesting research topic. Although it is true that the situation has improved somewhat, it is still far from what would be desirable. The deficiencies in this market are both many and varied; the persistence of high aggregate unemployment rates and regional differentials, however, is without doubt one of its most worrying features.[1]

This paper analyses one of the reasons usually given to explain the persistence of regional differences in unemployment rates in Spain: the low level of interregional net labour mobility,[2] which has been somewhat neglected in the past. This same phenomenon of persistence in structural imbalances has occurred in other countries, mostly in Europe (see, for instance, Layard, Nickell, and Jackman 1991; Partridge and Rickman 1997), casting doubts upon the ability of migration to reduce and equalize unemployment rates across regions. From the Spanish point of view, different studies have already examined the questions for a persistent high aggregate unemployment rate and persistent high regional unemployment differentials, either directly or indirectly (Ahn, Jimeno, and García 2002; Bentolila 1997), concluding that most of it is attributed to the low mobility of people (workers) between regions.

This current paper follows this same line of analysis. Its aim is to try to explain population movements across Spanish regions,[3] its major contribution being the use of relatively novel techniques for the study of internal migration. Indeed, we employ semi-parametric estimation methods. The main reason for this is that although parametric techniques allow us to explore some nonlinearities (e.g., quadratics, cubes, etc.), semi-parametric methods are more flexible and illustrative, allowing us to distinguish the influence of some exogenous variables on the endogenous one according to the formers' values.

The data employed in this study originate from different sources (the Spanish Savings Banks Foundation [FUNCAS], the Spanish National Statistics Institute [INE], the Valencian Institute of Economic Research [IVIE-BANCAJA], the Ministry for Development and the Spanish Meteorological Institute) and refer to the 17 Spanish Autonomous Com-

---

[1]An analysis of the situation of the labour market in Spain is carried out in Villaverde and Maza (2002). The persistence of the effects of a shock in the Spanish regions is addressed in Jimeno and Bentolila (1998) and Maza and Villaverde (2005).

[2]Greenwood (1985) points out that net migration of people causes both regional labour supply and demand to change, thus affecting regional unemployment.

[3]Following Decressin (1994) and also due to limitations in data availability, this paper uses population migration data instead of labour migration data.

munities (regions).[4] In order to ensure homogeneity in the data series under analysis, the sample period goes from 1995 to 2002; this is due to the fact that there are no homogeneous data previous to 1995 for some variables (mainly GDP).[5] At the same time, 1995 can be considered to a certain extent as the initial year of massive foreign migration into Spain, which has greatly affected interregional migratory flows. Given the reduced timescale, the conclusions to which we must come must be treated with some caution, and only an extension of the series looked at would permit these conclusions to be confirmed or qualified.

The remainder of this paper is divided into four sections. In Section 2, we carry out a descriptive analysis of the patterns and current situation of internal migration in Spain. In Section 3, we provide a brief discussion of the determinants of migration according to the relevant theoretical literature and present a synthetic model. In order to test this model, Section 4 proposes and estimates – using semiparametric methods − various regression equations that allow us to precisely identify the influence of the aforementioned determinants. As is customary, in the final section we outline the most significant conclusions.

2. INTERREGIONAL MIGRATION IN SPAIN: STYLISED FACTS

The aim of this section is to give a brief overview of the stylised facts that have characterised the process of interregional migration in Spain. During the last four decades, Spain has witnessed dramatic changes in its internal migration flows. It is a well known fact that in the 1960s and first half of the 1970s migratory movements in Spain grew in strength; internal migration was very intense (Bover and Velilla 2002), contributing significantly to the actual pattern of regional distribution of the Spanish population and to reducing regional inequalities in income levels and unemployment rates. In a similar way to what happened in countries like the United States (Greenwood 1985) and Italy (Carillo and Marselli 2003), the flows were generally unidirectional; consequently the net flows were very high. During these years most of the internal migration took place from the rural underdeveloped southern regions to the more urban[6] and industrial northeastern regions (plus Madrid).[7]

For a decade following the mid-1970s internal migratory flows slowed somewhat, notwithstanding existing remarkable differences in economic and non-economic factors between regions. Later on – and despite consistently high and rising aggregate and

---

[4]FUNCAS: "Regional Economic Balance (Autonomous Regions and Provinces), Years 1995-2002"; INE: "Survey of residential variations"; IVIE and BANCAJA: "Human capital and Economic Activity"; Ministry for Development: "Statistical Bulletin"; Spanish Meteorological Institute: www.inm.es.

[5]There is a breakdown in the GDP series provided by FUNCAS in 1995. Previous to this year, the estimates were made by using the European Accounting System-79 (ESA-79); afterwards, the estimates were made by using the new ESA-95.

[6]The influence of urbanization on migration flows is considered, for instance, in Glaeser et al. (1992).

[7]During this time unemployment rates were very low both at the national and regional levels.

regional unemployment rates − interregional migration started to grow again, until in the 1990s migration approached the levels last seen in the early 1960s. Nevertheless, the pattern of these new migratory flows was totally different from that of earlier decades, and net migration was very low (Antolin and Bover 1997). This regional shift implied that in addition to the traditional flows, there were now flows from rich to poor regions and from regions of low unemployment to regions of very high unemployment. These migratory movements, in flagrant contradiction to conventional economic theory, have become known as *inverse* migration. (Both life-cycle and economic considerations[8] can help to explain this result.)

In view of the above changes in the traditional patterns of internal migration, it is instructive to take a look at the developments that have occurred over the last few years. A simple description of migratory flows during the period under analysis (1995-2002) is shown in Figure 1, which presents gross interregional migration rates for each year.[9] It is noticeable in this Figure that the aforementioned rate falls in the first year, but from then on recovers (apart from year 2001), reaching 10.25 per 1000 in 2002.

Similarly, the new migration pattern is clearly shown in Figure 2, which reports both in- and out-migration. As can be seen, internal migration is very balanced: most regions are close to the diagonal, which indicates that their net migration is close to zero.[10] The rest of this paper tries to better understand the main factors affecting these migratory flows.

3. A THEORETICAL FRAMEWORK OF INTERREGIONAL NET MIGRATION

Although there are different models trying to explain the reasons for people moving from one region to another, the neoclassical framework − assuming that the individual's goal is to maximize lifetime expected utility/income − is one of the most interesting,[11] either in its version of the potential migrant as a supplier of labour or as an investor in human capital (Sjaastad 1962; Shields and Shields 1989). Accordingly, and in order to derive migration flows, it is necessary to first consider the decision to migrate. The idea behind this decision is easy to understand: being rational, an individual will migrate if this

---

[8] Reduced disparities across regions on employment opportunities and GDP per head, compensating differentials on housing, prices, and quality of life, the expansion of the welfare state, etc.

[9] $Gross\ Interregional\ Migration\ Rate = \dfrac{\sum entries_t = \sum departures_t}{Total\ population_{t-1}} * 1000$.

[10] It should be pointed out, however, that gross movement of people varies significantly between regions, with some of them − such as Madrid and Andalusia − experiencing continual and substantial numbers of entries and departures while others − La Rioja and Navarre − experience very little movement of people.

[11] A completely different line of reasoning is based on the job-matching approach. In this case, individuals migrate after getting a job in the receiving region while in the traditional (neoclassical approach) individuals migrate before having found a job in the destination region. (See, for instance, Jackman and Savouri 1992.)

160

improves his welfare (Pissarides and McMaster 1990). This means that the individual needs to compare the expected income he would obtain should he stay in his home region (*i*) with the expected income he would gain in an alternative region (*j*), taking into consideration the money and non-money costs involved when leaving the home region (Sjaastad 1962).

The expected income from staying in the region of residence (E_{ii}) depends on the wage rate (W_i) and the probability of being employed (P_i) (Harris and Todaro 1970), which is a function of the home unemployment rate (U_i) and a set of potential variables related both to economic and non-economic factors (S_i); among these, his accumulated human capital (K_i) might play a vital role. In the same manner, the expected income from moving to an alternative market (E_{ij}) depends on its wage rate (W_j) and the probability of being employed (P_j), which is a function of the aggregate unemployment

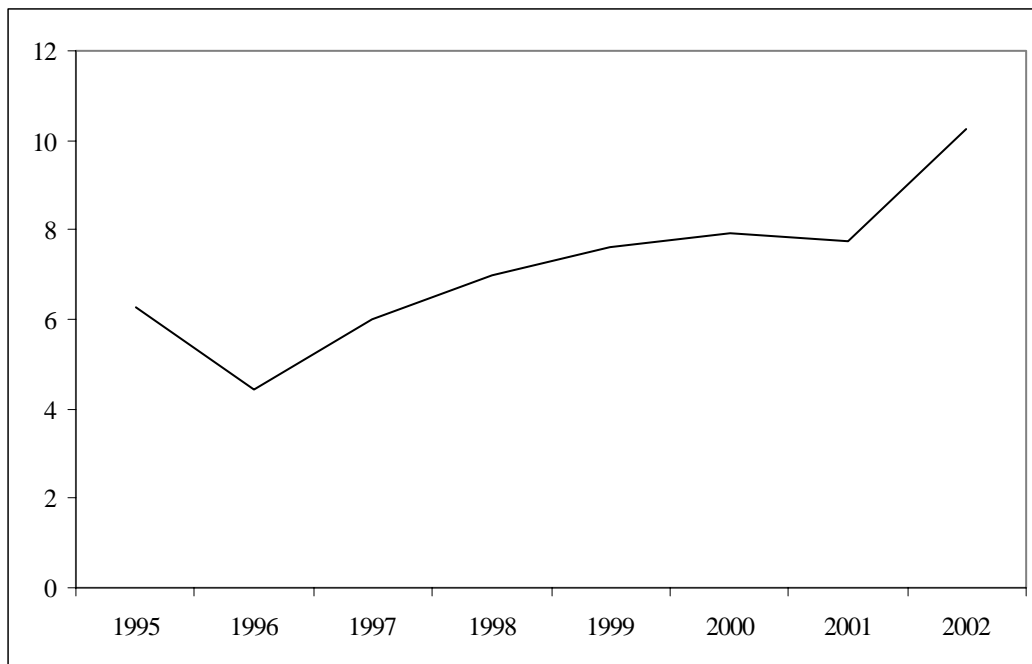FIGURE 1

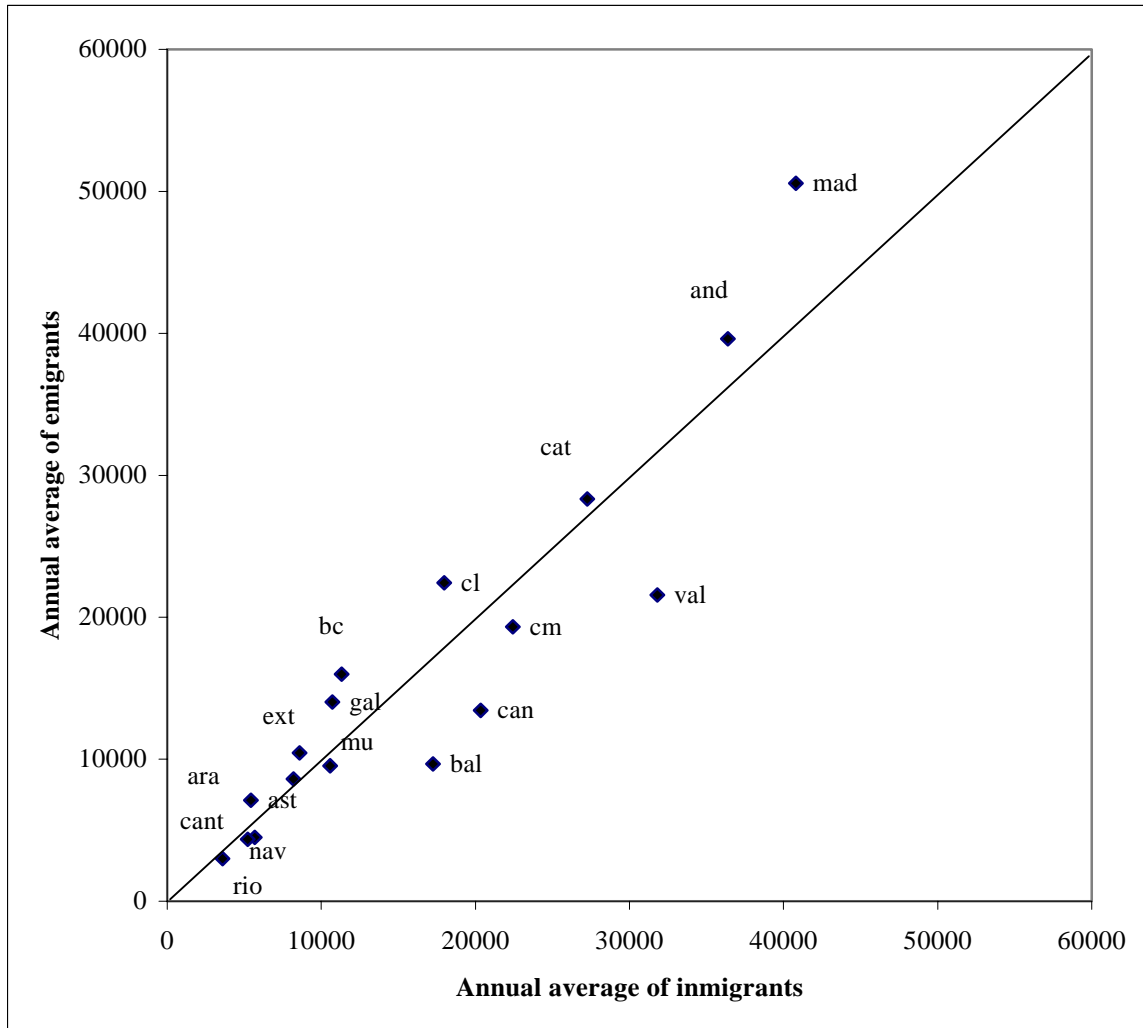Interregional Migration Rate

FIGURE 2

Interregional Migration (1995-2002)

Legend: and = Andalusia; ara = Aragón; ast = Asturias; bal = Balearic Islands; can = The Canary Islands; cant = Cantabria; cl = Castile-León; cm = Castile-La Mancha; cat = Catalonia; val = Valencian C.; ext = Extremadura; gal = Galicia; mad = Madrid; mu = Murcia; nav = Navarre; bc = Basque.

rate (U); the unemployment rate in the destination region (U_j);[12] and, once again, a set of other variables related both to economic and non-economic factors (S_j). Finally, the cost of moving (C_{ij}) also depends on both economic (housing prices, unemployment benefits, etc.) and non-economic variables, mainly related to social factors (friendship, kinship, etc.) and amenities (climate, population density, environment, infrastructures, etc.).[13] In consequence, an individual will migrate from region i to region j if:

(1) $E_{ii} \leq E_{ij} - C_{ij}$

where

(2) $E_{ii} = P_i\big[U_i, S_i(K_i)\big] * W_i$

(3) $E_{ij} = P_j\big[U, U_j, S_j(K_i, K_j)\big] * W_j$

and

(4) $C_{ij} = C\big(H_{i(j)}, UB_{i(j)}, F_{i(j)}, Ks_{i(j)}, Cl_{i(j)}, Pd_{i(j)}\big)$

where H is the housing price in region $i(j)$, UB refers to the unemployment benefits, F is the friendship variable, Ks is the kinship, Cl denotes the climatic conditions variable measured as the average temperature (Aronsson et al. 2001),[14] and Pd stands for the population density.

Thus, using equations (1) to (4), the net migration between region i and j (NM_{ij}[15]) is given by equation (5).

---

[12] Pissarides and McMaster (1990) explain that the employment probability in a region is affected both by its unemployment rate − workers are more prone to moving out than employed ones "because the unemployed have less to give up than the employed when they move" (p. 184) − and the aggregate unemployment rate − because "if unemployment is higher everywhere the employed may feel more secure where they are (…) The unemployed may also be discouraged from moving" (p. 184).

[13] As Greenwood (1985) notes, the values of these amenities may be partly reflected in labour (incomes) and land (housing prices) markets. Population density is included as a proxy of agglomeration; this is important because, as is shown in Glaeser et al. (1992), the role of technological (knowledge) spillovers in generating economic growth – and, thus, attracting people − is particularly effective in cities.

[14] Aronsson et al. (2001) also stress the role played by factors such as the initial fiscal structures of the regions and some national policies designed to affect regional performance.

[15] $NM_{ij,t} = Inmigration_{ij,t} - Outmigration_{ij,t}$

(5) $NM_{ij} = f\left(U, U_{i,(j)}, W_{i,(j)}, K_{i,(j)}, UB_{i,(j)}, F_{i,(j)} Ks_{i,(j)}, Cl_{i,(j)}, A_{i,(j)}, Pd_{i,(j)}\right)$

In order to test the validity of this model for the Spanish case, two different specifications of equation (5) are estimated in the next section.

4. INTERREGIONAL MIGRATION IN SPAIN: A SEMIPARAMETRIC ANALYSIS

According to the above discussed model, net migration rates depend on unemployment (both regional and aggregate rates) and regional wages plus a set of other regional variables such as human capital, the cost of housing, amenities, and so on. Taking into consideration that data about some variables are the same for all regions (e.g., unemployment benefits) and that other variables are of qualitative nature (friendship, kinship, etc.),[16] a possible specification of the regression equation is given by equation (6).

(6) $$MR_{ij,t} = \alpha_i + \beta_1 U_{t-1} + \beta_2\left(U_i/U_j\right)_{t-1} + \beta_3\left(Y_i/Y_j\right)_{t-1} + \beta_4\left(H_i/H_j\right)_{t-1} + \beta_5\left(K_i/K_j\right)_{t-1}$$
$$+ \beta_6\left(Pd_i/Pd_j\right)_{t-1} + \beta_7\left(Cl_i/Cl_j\right)_{t-1} + \varepsilon_{ij,t}$$

where $MR_{ij,t}$ denotes the net migration rate between regions i and j in period t,[17] Y is the per capita GDP used as a proxy for wages,[18] and all other variables have their previously mentioned meaning.[19] As can be seen in equation (6), and in order to take into consideration differences between home and destination regions, we have used relative values for most of the variables. Table 1 presents some descriptive statistics and average regional differences for these variables.

---

[16] The role of these factors is addressed by the so-called "network theory" (Parikh and Van Leuvensteijn 2002)

[17] $MR_{ij,t} = \left(NM_{ij,t}/Population_{t-1}\right)*1000$.

Prior to carrying out this estimation we built an origin-destination migration matrix, which means we work with $17 * 16 * 7 = 1904$ observations; by working with the net interregional flows of each of the regions *vis a vis* the others we sought to gain in informational content and precision.

[18] As far as data on wages are concerned we have opted to use GDP per capita as a proxy because the regional dispersion of wages is very low (thus not having a discriminating effect on people) and because GDP per capita can also be considered as a proxy for other exogenous variables mainly related to amenities (hospitals, infrastructures, etc.).

[19] Human capital (K) is defined as the proportion of the population of working age over total population with secondary or higher studies.

TABLE 1

Sample means and standard deviations of variables

Regions	MR	U	Y	K	H	Pd	Cl
Andalusia	-0.56	156.38	73.83	90.92	75.46	104.27	137.78
Aragón	-0.37	58.31	106.89	101.55	82.54	31.26	111.11
Asturias	-1.55	116.14	84.45	99.77	87.68	127.57	95.56
Balearic Islands	9.35	58.92	130.26	102.45	112.47	207.04	118.52
The Canary Islands	4.21	105.08	90.60	94.19	98.70	283.86	157.78
Cantabria	2.27	105.52	91.48	107.26	98.58	124.93	104.44
Cast.-La Mancha	2.13	94.06	83.49	90.13	60.61	27.28	114.07
Cast.-León	-2.02	95.04	93.40	96.74	89.70	33.04	80.74
Catalonia	-0.18	77.51	121.47	105.80	124.92	242.72	114.81
Valencian C.	2.51	96.28	100.99	103.38	72.18	220.33	131.85
Extremadura	-1.74	129.98	70.02	86.33	52.52	32.17	122.96
Galicia	-1.21	85.75	83.75	85.20	75.72	115.64	106.67
Madrid	-1.89	80.28	128.95	112.60	155.54	808.61	104.44
Murcia	0.92	108.06	82.47	97.07	60.64	126.28	126.67
Navarre	1.66	59.08	124.05	107.28	105.47	64.96	92.59
Basque Country	-2.17	109.61	115.65	110.42	147.47	363.28	105.93
La Rioja	2.25	61.03	117.24	95.22	87.18	66.29	137.78
Standard deviation	2.94	27.06	19.78	8.20	28.99	190.24	18.76

Notes: Exogenous variables are given taking the Spanish national average equal to 100.
Sources: INE, FUNCAS, IVIE, Development Ministry, and own elaboration.

Parametric estimation techniques are traditionally employed to carry out this type of analysis. The main characteristic of this approach is that it considers that there is a known functional form (generally linear) between the explanatory variables and the dependent variable. However, there is often no apparent reason (either economic or otherwise) to assume that the relation is in fact of this type; on the contrary, in many cases one can guess that the relation is nonlinear, or at least that the functional form linking the endogenous variable with the exogenous variables is unknown, as is the case here. Then it becomes necessary to use more flexible estimation techniques than the parametric method.

In view of this, the main innovation of the current study lies precisely in the technique of analysis it employs, which is a semiparametric estimation with panel data. This implies the estimation of an equation in which no strong restrictions are imposed on the functional form of some of its components; it is simply assumed that it is a *smooth* function – i.e., continuous and with a certain degree of differentiability – whose form is unknown.

As its name implies, the semiparametric estimation consists of two elements: the first one is estimated nonparametrically, while the second provides an estimation of a group of parameters. The general form of this model is as follows.

(7) $Z = \beta^T X + m(T) + \varepsilon$

where X is the vector of explanatory variables that has a linear influence on the endogenous variable (Z); β is the vector of parameters associated with those variables; $m(T)$ is an unknown function of the vector T, which represents the group of explanatory variables whose influence is – or might be – nonlinear; and ε is the error term, with $E(\varepsilon/X,T)=0$ and $V(\varepsilon/X,T)=\sigma^2..$

The estimation process carried out in this paper is based on that of Li and Stengos (1996) in which they combine semiparametric estimation techniques with the use of panel data. Assuming that the relationship between MR_{ij} and $\left(U_i/U_j\right)$ is non-linear,[20] the equation that reflects this assumption would the following.

$$
(8) \quad
\begin{aligned}
MR_{ij,t} = \alpha_i + m\left(U_i/U_j\right)_{t-1} + \beta_1\left(Y_i/Y_j\right)_{t-1} + \beta_2\left(H_i/H_j\right)_{t-1} + \beta_3\left(K_i/K_j\right)_{t-1} \\
+ \beta_4\left(Pd_i/Pd_j\right)_{t-1} + \beta_5\left(Cl_i/Cl_j\right)_{t-1} + \varepsilon_{ij,t}
\end{aligned}
$$

The results obtained are shown in the first two columns of Table 2 and Figure 3. The most relevant conclusions from this analysis are as follows.

1. Aggregate unemployment does not seem to affect net migration rates. Two explanations for this result are possible. On the one hand, it could be because many workers who move between regions emigrate with a job-contract or their main objective for moving is not to find employment. On the other hand, this result might derive from the fact that the changes in unemployment rates were evenly distributed across regions making no region worse off than others.

2. Relative unemployment rates have a negative effect on net migration rates (Figure 3). It also appears that the higher the level of unemployment in the destination region the lower the net migratory rate – since it diminishes the likelihood of finding work in the destination region.

---

[20] This nonlinear relationship is demonstrated by the fact that a simple neglected nonlinearity test (conditioned on differences between unemployment rates) rejects the null hypothesis of no neglected nonlinearity. A Fan and Ullah (1999) test has been utilized in which the conditional expectation of the residuals took the form: $E\left(\varepsilon_{ijt}\left|\left(U_i/U_j\right)_{t-1}\right.\right)=m\left(\left(U_i/U_j\right)_{t-1}\right)$, where m(.) was estimated using a Nadaraya-Watson estimator (Gaussian Kernel). The Fan-Ullah (t-*test*) statistic is 8.37, which clearly surpasses the 5 percent critical value of 1.96.

TABLE 2

Net Interregional Flows (1995-2002): Equations

Dependent variable: $MR_{ij,t}$	Equation 8		Equation 9	
	Coefficient	**"t" Stat.**	**Coefficient**	**"t" Stat.**
U_{t-1}	0.000	0.08	-0.002	-0.77
$\left(u_i / u_j\right)_{t-1}$	n.p.v.		-0.134*	-3.52
$\left(Y_i / Y_j\right)_{t-1}$	0.455*	4.37	n.p.v.	
$\left(H_i / H_j\right)_{t-1}$	-0.247*	-6.13	-0.241*	-6.35
$\left(K_i / K_j\right)_{t-1}$	0.023	0.17	0.131	1.04
$\left(Pd_i / Pd_j\right)_{t-1}$	-0.004	-1.18	-0.008**	-2.36
$\left(Cl_i / Cl_j\right)_{t-1}$	0.454*	9.42	0.489*	10.47
Fixed Effects				
Andalusia	-0.46*	-2.94	-0.26	-1.54
Aragón	-0.53*	-3.42	-0.41*	-2.60
Asturias	-0.41*	-2.74	-0.28	-1.81
Balearic Islands	0.04	0.23	0.25	1.57
The Canary Islands	-0.24	-1.46	-0.10	-0.61
Cantabria	-0.18	-1.14	-0.09	-0.55
Cast.-La Mancha	-0.30**	-2.05	-0.15	-1.02
Cast.-León	-0.44*	-3.11	-0.30**	-2.01
Catalonia	-0.45*	-2.85	-0.29	-1.75
Valencian C.	-0.40**	-2.46	-0.23	-1.40
Extremadura	-0.55*	-3.78	-0.38**	-2.49
Galicia	-0.46*	-3.32	-0.33**	-2.31
Madrid	-0.46*	-2.95	-0.32**	-1.97
Murcia	-0.43*	-2.77	-0.30	-1.84
Navarra	-0.37**	-2.40	-0.19	-1.23
Basque Countryo	-0.44*	-2.75	-0.28	-1.66
La Rioja	-0.36*	-2.55	-0.15	-1.01

Notes: 1. (*) Significant   99%; (**) Significant 95%. 2. "n.p.v" denotes the nonparametric variable in each case.
Sources: INE, FUNCAS, IVIE, Development Ministry and own elaboration.

FIGURE 3

Nonparametric variable Equation-8 $-m\left(\dfrac{U_i}{U_j}\right)_{t-1}$ -

[Unemployment rate (home region)/Unemployment rate (destination region)] (t-1)
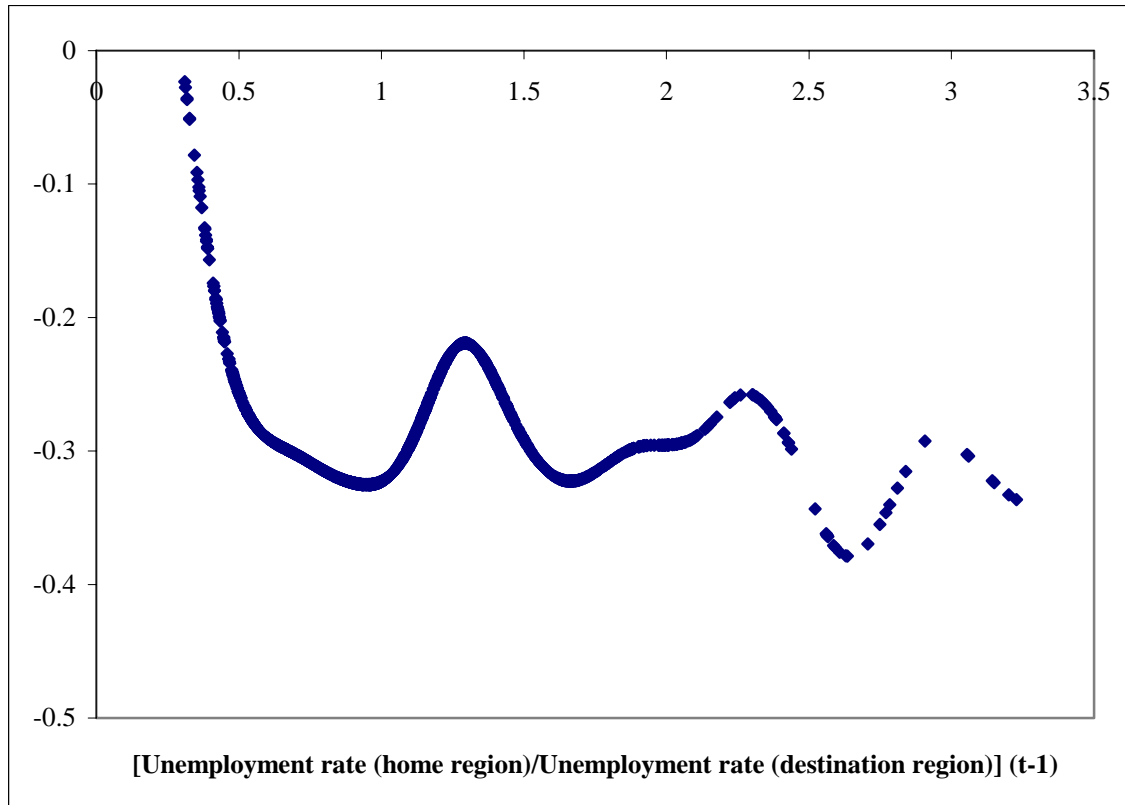
3. Differences in income levels do exert a strong influence on internal migration in Spain. An increase in GDP per capita relative to another region seems to encourage migratory flows. To be precise, an increase of 1 percent in GDP per capita relative increases net migration rate by 0.455 percentage points.

4. Another factor that appears to be behind net interregional migration in Spain is housing cost differentials; the coefficient associated with this variable is statistically significant, its value being -0.247. Hence, a rise in the cost of housing in the destination region discourages migratory flows to it.

5. Relative human capital does not appear to exert any effect on net migratory flows.[21] As human capital affects both outflows and inflows, this result suggests

---

[21] This result changes if the gross migration rate is considered to be the dependent variable. In this case, the estimation reveals, as is usually assumed, that the most qualified people tend to emigrate more.

that they tend to compensate each other, thus having a negligible effect on net migration.

6. In the same way, population density differences do not seem to have any impact on net migratory flows.

7. The coefficient on climate differences (0.454) is statistically significant, meaning that individuals tend to migrate to regions with better climatic conditions than in their home region. This result makes it clear that location-specific amenities do matter (see, for example, Treyz et al. 1993).

8. Finally, the fixed effects of each region, which represent all those other factors that differentiate them from other regions and which scarcely change over time, are in many cases (14) statistically significant. This indicates that along with the more traditional factors determining net migration rates there are others whose influence is difficult to quantify.

Previous results show that the variable having a more powerful influence on net migration rates seems to be regional differences in GDP per capita. Thus, we opted to estimate equation (8) again but with an important change: we associated a coefficient to the variable for regional unemployment differentials, and we allowed the influence on each region's net migration rate of the variable for per capita GDP differentials (which is, in this case, the nonparametric variable) to be nonlinear.[22] In this way, the equation is estimated as follows.

$$
\begin{aligned}
(9) \quad MR_{ij,t} = \delta_i &+ \pi_1 U_{t-1} + \pi_2 \left(U_i \big/ U_j \right)_{t-1} + m \left(Y_i \big/ Y_j \right)_{t-1} + \pi_3 \left(H_i \big/ H_j \right)_{t-1} + \pi_4 \left(K_i \big/ K_j \right)_{t-1} \\
&+ \pi_5 \left(Pd_i \big/ Pd_j \right)_{t-1} + \pi_6 \left(Cl_i \big/ Cl_j \right)_{t-1} + u_{ij,t}
\end{aligned}
$$

The results obtained are shown in Table 2 (third and fourth columns) and Figure 4. The additional information we obtain shows the following.

1. The parametric coefficient on relative unemployment rates is statistically significant, although quite low. In particular, an increase of 1 percent in the relative unemployment rate decreases the net migration rate by 0.134 percentage points. This fact could be explained because, as indicated in our model, migration is costly for the individual.

2. Concerning the effect of GDP per capita differences, Figure 4 shows it is especially intense when these differences are very important (more than 50 percent). Only then does a higher per capita GDP act as a magnet for immigrants.


[22] The Fan-Ullah statistic in this case is 11.88.

3. Finally, there are now only five fixed effects that are statistically significant.

5. CONCLUSIONS

Starting from a descriptive analysis of interregional migration in Spain, which shows that net flows were very low between 1995 and 2002, the paper presents a theoretical framework trying to capture the main factors that affect internal migration.

FIGURE 4

Nonparametric Variable Equation-9 $- m \left(\frac{Y_i}{Y_j} \right)_{t-1}$ -

[GDPpc (home region) / GDPpc (destination region)] (t-1)
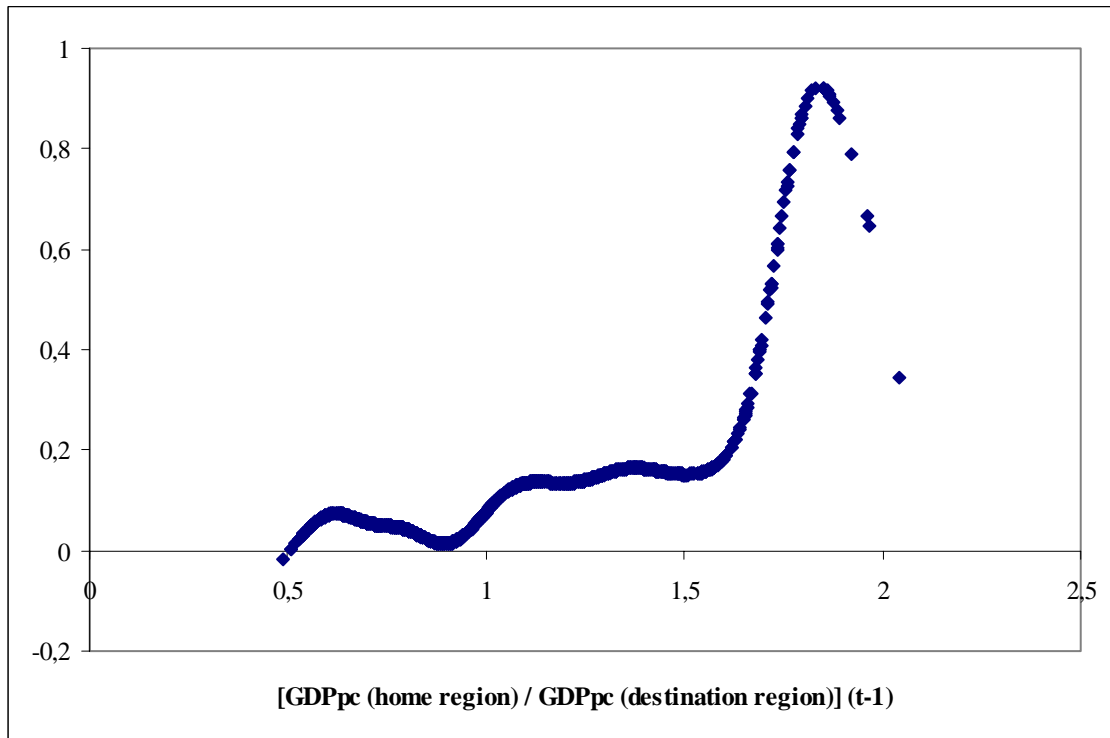
After this, we estimate this model by computing various regression equations using semiparametric techniques. The results show that the variables that mainly affect migration are differentials in income levels and climatic conditions between home and destination regions. Likewise, we find that differentials in unemployment and housing costs also appear to explain net migration rates, although to a lesser extent. On the other hand, neither the aggregate unemployment rate nor human capital and population density differentials greatly affect net migratory rates.

In view of the above conclusions and as was suggested at the beginning of this paper, we might ask whether migratory flows can contribute to resolving the problems of the labour market in Spain and particularly to reducing the persistently high aggregate unemployment rate and regional differences. These results – which tend to confirm those found previously in the literature – do not allow us to be very optimistic on this point since they show that the influence of both aggregate and relative unemployment is not very high and that income level differentials are of particular relevance only when they are very great. Only if the migratory flows were very high and they followed patterns predicted in economic theory would the movement of people help to improve the situation of the labour market in this country.[23]

REFERENCES

Ahn, N., J.F. Jimeno, and E. García, 2002. "Migration Willingness in Spain: Analysis of Temporal and Regional Differences," Working Paper 2002-21, Fundación de Estudios de Economía Aplicada.

Antolín, P. and O. Bover, 1997. "Regional Migration in Spain: The Effect of Personal Characteristics and of Unemployment, Wage and House Price Differentials Using Pooled Cross-Sections," *Oxford Bulletin of Economics and Statistics* 59(2), 215-235.

Aronsson, T., J. Lundberg, and M. Wikström, 2001. "Regional Income Growth and Net Migration in Sweden 1970-1995," *Regional Studies* 35(9), 823-830.

Bentolila, S., 1997. "Sticky Labor in Spanish Regions," *European Economic Review* 41(3-5), 591-598.

Bover, O. and P. Velilla, 2002. "Migrations in Spain: Historical Background and Current Trends," in K. Zimmermann (ed.), *European Migration: What Do We Know?* CEPR and Oxford University Press.

Carillo, M.R. and R. Marselli, 2003. "Internal Migration and Search Cost in Italy: The Role of the Regional Production System," XVII Congress of the European Society of Population Economics, New York.

Decressin, J., 1994. "Internal Migration in West Germany and Implications for East-West Salary Convergence," *Weltwirtschaftliches Archiv* 130, 231-257.

Fan, Y. and A. Ullah, 1999. "Asymptotic Normality of a Combined Regression Estimator," *Journal of Multivariate Analysis* 71, 191-240.

Glaeser, E.L., H.D. Kallal, J.A. Scheinkman, and A. Shleifer, 1992. "Growth in Cities," *Journal of Political Economy* 100, 1126-1152.

Greenwood, M.J., 1985. "Human Migration: Theory, Models, and Empirical Studies," *Journal of Regional Science* 25(4), 521-544.

Harris, J.R. and M.P. Todaro, 1970. "Migration, Unemployment and Development: A Two-Sector Analysis," *American Economic Review* 60, 126-142.

Jackman, R. and S. Savouri, 1992. "Regional Migration in Britain: An Analysis of Gross Flows Using NHS Central Register Data," *The Economic Journal* 102(415), 1433-1450.

---

[23]Nevertheless, Partridge and Rickman (1997) explain that even with high and increasing mobility rates it would be difficult to completely eliminate dispersion in regional unemployment rates.

Jimeno, J.F. and S. Bentolila, 1998. "Regional Unemployment Persistence (Spain, 1976-1994)," *Labour Economics* 5, 25-51.

Layard, R., S. Nickell, and R. Jackman, 1991. *Unemployment: Macroeconomic Performance and the Labour Market,* Oxford University Press, Oxford.

Li, Q. and T. Stengos, 1996. "Semiparametric Estimation of Partially Linear Panel Data Models," *Journal of Econometrics* 71, 389-397.

Maza, A. and J. Villaverde, 2005. "On Regional Shocks in the Spanish Economy," *Review of Urban and Regional Development Studies* 17 (1), 51-67.

Parikh, A. and M. Van Leuvensteijn, 2002. "Internal Migration in Regions of Germany: A Panel Data Analysis," Working Paper 12, European Network of Economic Policy Research Institutes.

Partridge, M.D. and D.S. Rickman, 1997. "The Dispersion of U.S. State Unemployment Rates: The Role of Market and Non-Market Equilibrium Factors," *Regional Studies* 31(6), 593-606.

Pissarides, C. and I. McMaster, 1990. "Regional Migration, Wages and Unemployment: Empirical Evidence and Implications for Policy," *Oxford Economic Papers* 42, 812-831.

Shields, G.M. and M.P. Shields, 1989. "The Emergence of Migration Theory and a Suggested New Direction," *Journal of Economic Surveys* 3(4), 277-304.

Sjaastad, L.A., 1962. "The Costs and Returns of Human Migration," *Journal of Political Economy* 70, 80-93.

Treyz, G.I., D.S. Rickman, G.L. Hunt, and M.J. Greenwood, 1993. "The Dynamics of U.S. Internal Migration," *The Review of Economics and Statistics* 75(2), 209-214.

Villaverde, J. and A. Maza, 2002. "Salarios y Desempleo en las Regiones Españolas," *Papeles de Economía Española* 93, 182-194.