Spanish Inter-Regional Migration[1]

Alan Mulhern, John Watson and Subrata Ghatak
Kingston University, UK
School of Economics

Abstract

This paper adapts the traditional model of migration to include human capital, housing prices and a region's infrastructure in order to analyse the determinants of migration in the Spanish regions between 1998-2003. Using the Seemingly Unrelated Regression Equations [SURE] model, results indicate that regional differences in the following variables help explain the patterns of internal migration: wages, unemployment, infrastructure (health, education and transport), housing prices. Human capital is also a significant explanatory variable.

JEL Classification: R23, O15, J61.

Keywords: Regional Migration; Harris Todaro model; Spain; SURE Model

[1] Our appreciation is due to Vince Daly for helpful comments on the paper. The usual disclaimer applies.

. 1. Introduction

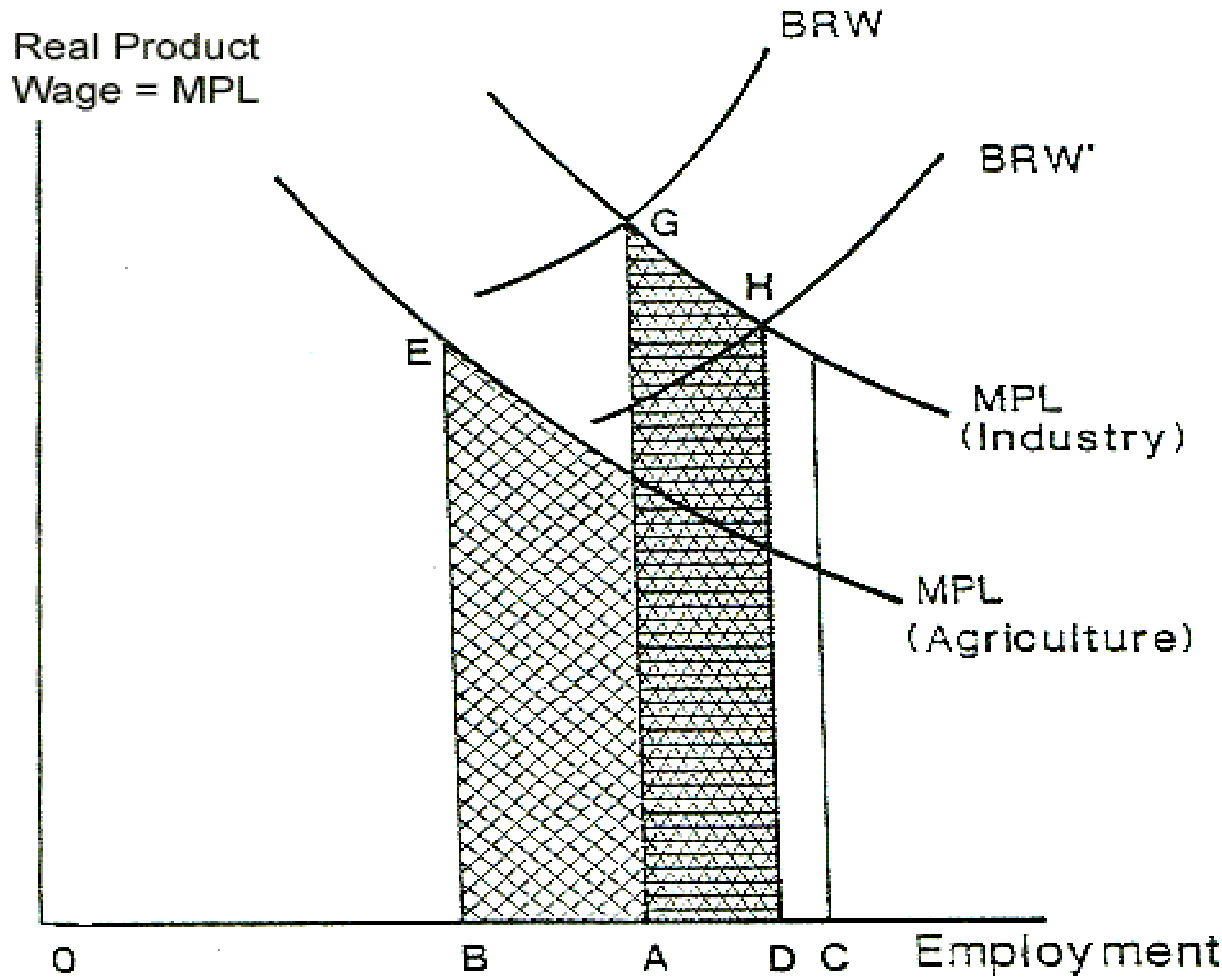
Spanish inter-regional migration has, by international comparison, been low for many decades. Many studies have shown it to be unresponsive to traditional explanatory variables, such as inter-regional disparities in wages and unemployment. The potential contribution of labour mobility, including inter-regional migration, to productivity improvements at the national level is well understood (Fonseca 2002) yet the rigidities of labour markets has sometimes proved a stumbling block (Bentolila 1997). The motivation of this paper is to explore whether regional migration within Spain continues to defy economic reasoning or, on the contrary, is indeed responsive to a range of economic incentives, extending beyond the traditional labour market variables. We do so by applying appropriate econometric modelling to contemporary data.

The rest of the paper is structured as follows. Part 2 provides the theoretical under-pinning. Part 3 summarises existing research. Part 4 gives the empirical specification and its results. Part 5 concludes.

2. Theoretical Model.

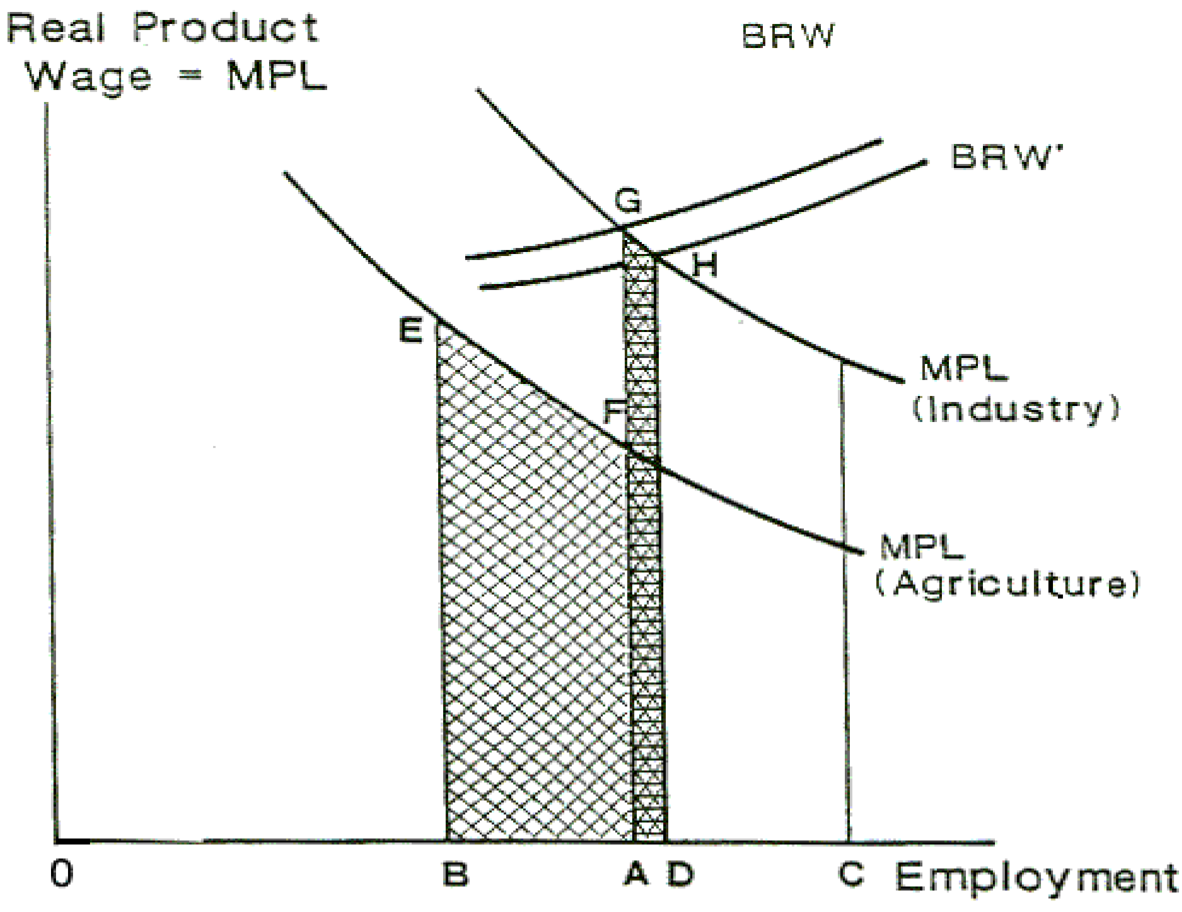
It has been observed on the basis of empirical evidence that the potential contribution of migration to greater productive national performance of Spain is well understood (Fonseca 2002) yet the rigidities of labour markets has proved a stumbling block (Bentolila 1997). The following diagrams explain the nature and size of efficiency gains [measured in terms of aggregate output] due to labour mobility within a country. We show that in theory, migration is welfare–enhancing if the real wages are flexible as net output gains are positive (see figure 1). If real wages are rigid, gains from migration could be negative due to net output losses (see figure 2).

Figure 1. Rural to Urban Migration with High Real Wage Flexibility.



The importance of real wage flexibility for migration is illustrated in figures 1 and 2. Assume for the moment that in an initial migration equilibrium the size of the workforce in the urban and rural sectors is equal (OA in the figures). Suppose that a number BA leave agriculture and migrate to the cities increasing the urban workforce by AC=BA. With some real wage flexibility the BRW curve shifts to BRW' and urban employment increases by AD<AC increasing unemployment by DC in that sector.

Figure 2. Rural to Urban Migration with Low Real Wage Flexibility.



The welfare implications of migration can be assessed by comparing the increase in urban output, area ADHG, with the drop in rural output, area BAFE (both in terms of units of industrial output). Starting from this initial migration equilibrium rural to urban migration by an increment BA is welfare enhancing if ADHG > BAFE + costs of migration as in Fig. 1.

The two figures compare the case of a relatively high degree of responsiveness of the urban real wage to unemployment (see figure 1 where migration increases welfare as net output gains are positive) with a very low degree of responsiveness (see figure 2). In the latter case (which is close to that of a fixed real wage as in HT) area ADHG < area BAFE and urban bias exists. Migration can reduce welfare in terms of net output loss as ADGH < BAFE .

In the following sections, we extend the HT type of theoretical model to incorporate the effects of the educational level of migrants and regional amenities. One of the major reasons for such an extension is to remove the well- acknowledged criticisms of the HT model that it fails to include the role of human capital and regional amenities in migration decisions. Recall that in the HT model probabilities of employment of both the educated and the uneducated are the same in the urban sector. Further, HT assume boldly that regional amenities and locational factors do not matter. Clearly, such assumptions are unrealistic. We first present the basic model and then we include the extensions.

Let there be two regions, a home region from which population can migrate to a target region. Finding employment in the target region is uncertain, thus, the expected utility of migration is given by

$$\int_0^{\infty} \left[P \cdot Ua + (1-P) \cdot Ub\right] e^{-rt} dt - C = \frac{P \cdot Ua + (1-P) \cdot Ub}{r} - C \quad , \tag{2.1}$$

where Ua is the flow rate for utility derived from employment in the formal sector of the target region and P is the probability of finding such employment. Ub is the utility of being unemployed, which can be interpreted as either the utility obtained from receiving unemployment benefits or that of being employed in the informal sector. Finally, C are the direct costs of migration. The utility of staying in the home region is

$$\int_0^{\infty} Uh \cdot e^{-rt} dt = \frac{Uh}{r}, \tag{2.2}$$

where Uh is the flow rate for utility when staying in the home region. Migration will only take place if (2.1) is greater than (2.2).

In the basic model, utilities reflect only wages / benefits (W) in their respective region and sector. Thus, Ua=Wa, Ub=Wb, Uh=Wh. As mentioned above, Wb can be interpreted as either wages in the informal sector or unemployment benefits. Migration will take place only if

$$P \cdot Wa + (1-P) \cdot Wb - rC > Wh \,. \tag{2.3}$$

The probability of finding employment, P, depends on the unemployment level in the target region and is given by

$$P = \frac{L}{Na + m \cdot Nh}\,, \tag{2.4}$$

where L is employed population, Na is total labour force in the target region, Nh is population in the home region and m is the proportion of the home population who have chosen to emigrate. L can be interpreted as the number of job vacancies available in target region by assuming that migrants can compete on equal terms with the incumbent employed population for such vacancies. As new migrants arrive, the probability of employment decreases until the expected utility of migrating equals the utility of remaining in the home region.

We assume Wa-rC>Wh and Wa>Wb. The former assumption is required for migration to take place, while the latter follows from the definition of both sectors. We also require that there is no incentive for leaving the home region for unemployment in the target region, i.e. Wb-rC<Wh. If this were not the case, the equilibrium migration rate would be 100% as any of the possible two states that migrants could face would be better than not migrating. The equilibrium extent of migration can be obtained from (2.3) and (2.4) as follows

$$m = \frac{L \cdot (Wa - Wb) + Na \cdot (Wb - rC - Wh)}{Nh \cdot (Wh - Wb + rC)} \;. \tag{2.5}$$

Therefore, for positive migration, we require that inequality (2.6) hold. It implies that the expected income in the target region prior to the arrival of migrants exceed the income in the home region by at least the costs of migration. The higher the employment rate, the higher the chances of a positive equilibrium migration rate.

$$\frac{L}{Na}Wa + \left(1 - \frac{L}{Na}\right)Wb > Wh + rC \qquad (2.6)$$

We can see the traditional results of the H-T model. Any increase in wages in the target region would increase unemployment. In addition, from (2.5) we obtain the familiar results:

$$\frac{\partial m}{\partial Wa} > 0; \frac{\partial m}{\partial Wh} < 0; \frac{\partial m}{\partial L} > 0; \frac{\partial m}{\partial C} < 0 \qquad (2.7)$$

Our extension starts with the introduction of a new assumption. In traditional H-T models the more educated have the same probability of obtaining employment as the less educated, which may not be realistic. We therefore assume that the probability of finding employment is also a function of the endowment of human capital, i.e. the level of education of migrants, HC. Therefore, we rewrite such probability as

$$P = P\left(HC, \frac{L}{Na + m \cdot Nh}\right) \quad with \quad \frac{\partial P}{\partial HC} > 0, \qquad (2.8)$$

thus the more educated have more chances of obtaining employment. Let HC be normalised to the interval (0,1), and assume a multiplicative form, then we can write (2.8) as

$$P = HC \cdot \frac{L}{Na + m \cdot Nh}. \qquad (2.9)$$

If migrants possess the minimum possible educational level, i.e. HC=0, then employment becomes impossible as P=0. If migrants possess the maximum level of education, i.e. HC=1, then P depends uniquely on the level of employment. HC is therefore the sensitivity of the probability of finding employment with respect to the level of employment.

In addition, migrants may not only value wages when making their decisions. Regional amenities, such as provision of public schooling, infrastructure, price of housing and health services may also enter migrants' utility function. We assume that they do so additively. Let Aa and Ah be vectors of regional amenities in target and home region respectively. Formally,

$$A_l = \{A_{l1}, A_{l2} ... A_{lk}\} \quad with \quad l = a, h \qquad (2.10).$$

The utility of regional amenities is given by the following functions:

$$UA_l = UA_l(A_{l1}, A_{l2} ... A_{lk}) \quad with \ l = a, h$$
$$with \quad \frac{\partial UA_l}{\partial A_{lj}} > 0 \quad \forall \ j = 1,2...k \tag{2.11}$$

Hence, we can rewrite the equilibrium condition as

$$HC \cdot \frac{L}{Na + m \cdot Nh} \cdot (Wa - Wb) + (Wb + UA_a - rC) = Wh + UA_h. \tag{2.12}$$

We still require the condition of no incentive for migration to unemployment in order to obtain an equilibrium m<1, such condition is now (Wb-Wh)+(UAa-UAh)<rC. We can obtain the equilibrium migration rate from (2.12).

$$m = \frac{HC \cdot L \cdot (Wa - Wb) + Na \cdot \left[(Wb - Wh) + (UA_a - UA_h) - rC\right]}{Nh \cdot \left[(Wh - Wb) + (UA_h - UA_a) - rC\right]} \tag{2.13}$$

A positive equilibrium migration rate requires that inequality (2.14) hold. The difference between wages in the formal sector and Wb, corrected for human capital and unemployment, must be greater than the difference in utility between staying in the home region and migrating for unemployment. Wages and unemployment gaps are therefore not definite factors explaining the direction of migration flows. No matter how high wages in the target region are, or if full employment holds, if human capital is low or amenities gap is high in favour of the home region, migration will not take place.

$$HC \cdot \frac{L}{Na} \cdot (Wa - Wb) > \left[(Wh - Wb) + (UA_a - UA_h) - rC\right] \tag{2.14}$$

We can observe the sensitivity of M with respect to all variables in the model through the following partial derivatives:

$$\frac{\partial m}{\partial HC} = \frac{L \cdot (Wa - Wb)}{Nh \cdot \left[(Wh - Wb) + (UA_h - UA_a) + rC\right]} > 0 \tag{2.15}$$

$$\frac{\partial m}{\partial A_{ak}} = \frac{HC \cdot L \cdot (Wa - Wb)}{Nh \cdot \left[(Wh - Wb) + (UA_h - UA_a) + rC\right]^2} \cdot \frac{\partial UA_a}{\partial A_{aj}} > 0 \ \forall \ j = 1,2...k \tag{2.16}$$

$$\frac{\partial m}{\partial A_{hj}} = \frac{-HC \cdot L \cdot (Wa - Wb)}{Nh \cdot \left[(Wh - Wb) + (UA_h - UA_a) + rC\right]^2} \cdot \frac{\partial UA_h}{\partial A_{hj}} < 0 \ \forall \ j = 1,2...k \tag{2.17}$$

$$\frac{\partial m}{\partial Wa} = \frac{HC \cdot L}{Nh \cdot \left[(Wh - Wb) + (UA_h - UA_a) + rC\right]} > 0 \tag{2.18}$$

$$\frac{\partial m}{\partial Wh} = \frac{-HC \cdot L}{Nh \cdot \left[(Wh - Wb) + (UA_h - UA_a) + rC\right]^2} < 0. \tag{2.19}$$

Therefore, any marginal increase in the educational level of migrants, wages or amenities in the target region will increase migration. Furthermore, any marginal increase in wages or amenities in home region will decrease migration.

3. **Literature review**

Spanish inter-regional migration has been low by international comparison since the 1970s. For some of this period it was actually falling. The literature is not totally consistent in its explanation for this phenomenon though much of it has pointed to the lack of migration response to traditional variables. Jimeno and Bentolila (1998), for example, conclude that "inter-regional migration flows and regional labour participation decisions are scarcely responsive to regional real wages and employment". They also indicate that the Spanish migration response to demand shocks has been low compared to that of the US and the EU. Lindley et alia (2002 p28), who have the most pessimistic evaluation of the Spanish migration tendency, claim that "Spain is effectively an economy with almost no migration" and that there is moreover "evidence, consistent with previous work, that migration is actually negatively related to the regional unemployment rate".

Econometric investigation into the explanatory factors causing migration have found variables that have been wrongly signed, unexpectedly insignificant, or with low elasticity. For Antolin and Bover (1997) the regional unemployment differential and wages variables are perverse (counter-intuitive). Bentolila (1997) argues that migration among Spanish regions fell significantly since the 1970s, in spite of large and widening regional unemployment rate differentials. Bentolila and Dolado (1991) find that a region's relative wage and relative unemployment differential (elasticity very low again) do cause some (small) net migration to that region. Relative employment growth, however, was not a significant variable. Lindley et alia (2002) also find the regional unemployment variable to be perverse.

Antolin and Bover (1997), finding traditional economic explanatory variables such as unemployment and wages problematic (for example their regional unemployment differential was wrongly signed), tested for personal characteristics as the key to the puzzle. The regional unemployment differential was found to have a different effect on individuals of differing circumstances. Higher education levels were found to promote migration responses, while having children or living with relatives reduced it. Very importantly they found that while the non-registered unemployed do respond, the employed scarcely respond (unless highly educated) while the least responsive are the registered unemployed, i.e. receivers of benefits. They conclude that the Spanish labour market (registered unemployed) is not responding to personal or regional unemployment.

Jaurez (2000) is an example of how more flexible measurement of variables - e.g. gross instead of net migration flows between regions, or the rate of change in relative wages instead of the differentials in regional wages - has been required to produce more encouraging results. He finds, contrary to the trend of the literature, that from 1963-93 regional labour migration was partially responsive to regional economic variables. For example regions with high unemployment would tend to produce outward migration, though only up to a certain level, after which the effect would be reduced, probably because very high national unemployment figures would discourage most internal migration. Juarez found evidence of inward migration to regions with higher rates of employment creation and to where wages were growing at a relatively higher rate.

Given the manifest difficulties with the *inter*-regional data, some research has focused on *intra*-regional migration. Such investigation requires less accessible data sources (e.g. Social Security records and administrative micro-data sets on migrants). Bover and Arrellano (2002) pointed out there had been a "remarkable" increase in intra-regional migration and found that a series of economic determinants were indeed significant in explaining such migration within a region. These included unemployment, housing prices, the education level of migrant, and employment in the service industry. However wages were not found to be a significant explanatory variable. Devillanova and Garcia-Fontes (1998) testing for migration between provinces (a sub-regional category) and measuring gross rather than net flows, found that before 1986 migration did not respond to economic incentives (e.g. unemployment rate and employment growth differentials) but that from 1986-1992 there was some response. For example out-migration from a province would occur in response to higher unemployment - especially from the agricultural to service sector areas. However its elasticity was low and, strangely, it would be to areas with higher than average housing prices and lower than average wages. This was not the first time in the literature that the sign on wages was counter-intuitive (Antolin and Bover 1997). The only consistent finding throughout the literature, and this is at both the *inter*-regional and *intra*-regional level, is that more highly qualified workers tended to migrate more than the less qualified in response to economic incentives (Garcia. et alia 1999, Mauro and Spolimbergo 1999). However although Devillanova and Garcia's results were encouraging, significant dummy variables in source provinces were found to be significant. This gave their results only partial validity. Further explanation was required.

Explanations for this state of affairs point mainly to the rigidities of the Spanish labour market. For example regional wage flexibility is claimed to be low in Spain due to the impact of national wages (Jimeno and Bentolila 1998). Antolin and Bover (1997) suggest a number of factors for this state of affairs including: peculiarities of the registration system whereby migrants are put at the back of the job queue; privileges of the benefits system whereby the registered unemployed are less willing to migrate than the employed in response to unemployment; personal characteristics of the unemployed (lack of skills, living with relatives or having children). An inefficient "matching" process with inadequate information about vacancies at the national level is suggested by Lindley et alia (2002), while very high national rates of unemployment have been mentioned as discouragement to regional migration by Juarez (2000).

Despite the evident difficulties encountered in the above-mentioned literature this paper wishes to look afresh at regional migration in Spain using the latest available regional statistics. Although inter-regional migration is still comparatively low in Spain it has increased significantly since the mid-1990s (see Fig.1). We have also been encouraged by recent research in other countries such as Poland where, despite chronically low or even falling rates of internal migration, its dynamics have been explained using an expanded set of variables. These include not only wages and unemployment, but also human capital, infrastructure and distance (Ghatak et al. 2004). Previous research using this combination of variables had also been applied successfully to Russian internal migration (Andreinko and Gurief 2003). Our task here is to see if this extended range of variables could also explain internal migration in Spain. Specifically we expect Spanish regional migration to be positively correlated with regional wage differentials and negatively correlated with unemployment differentials - the Harris and Todaro (1970) hypothesis explaining migration as the result of basic economic incentives. We expect it to be positively correlated with regional facilities (roads, health and education), which, by augmenting regional productivity and increasing wages, constitute agglomeration economies and act as magnets for migration - the Tiebolt (1956) hypothesis, tested successfully by Andrienko and Gurief (2003) and Ghatak et alia (2004). We expect it to be negatively correlated with the relative distance of migration (a proxy for its cost) - the Hatton-Williams (1998) hypothesis. We expect, and this time totally in accord with all previous research on Spanish internal migration, that human capital is positively correlated with regional migration, indicating that the higher skilled and better educated are more inclined to emigrate (Dustmann 1995; Ghatak 2001, 2003). Housing prices have been added to our model, a variable found significant in Bover and Arellano (2001) at the inter-regional level. We believe its addition is necessary since the wages variable, so often proving counter-intuitive, can only be understood from the point of view of the migrant in the context of relative housing prices.

Our data is drawn from INE (Instituto Nacional de Estadística) and Ministerio de Educación y Cultura.

4. Empirical specification and results

. For empirical estimation we follow

$$M_{ijt} = \alpha_j \cdot \Pi_{k=0}^{m} X_k^{\beta_k}, \qquad (4.1)$$

where M_{ijt} is the amount of migrants moving from region i to region j at time t, X_k are explanatory variables, β_k are parameters to estimate and α_j are effects related to each destination province j that might influence migration but are not captured by explanatory variables. Taking the log-linear form of (4.1) results in a fixed effects panel data model.

Table 4.1 shows all variables used in the log-linear model based on equation (4.1). We use a symmetrical model in which variables appear in differences thus assuming that would-be migrants have perfect information about all regions (Taylor and Martin 2001). Therefore, variables wages, unemployment, price of housing and regional amenities are presented as ratios in which the variable in destination region appears in the numerator and that of donor region in the denominator. With respect to regional amenities, we use students enrolled in secondary education as a proxy for publicly provided education; hospital beds as a proxy of health services; and road density as a proxy of infrastructure. Furthermore, we use students enrolled in university education as a proxy of human capital. Hence, the latter is only presented for donor regions.

Table 4.1	
Mig	Natural logarithm of migration from donor to destination region.
Wage	Natural logarithm of the ratio of wages in destination and donor region.
Unem	Natural logarithm of the ratio of unemployment in destination and donor region.
Dis	Natural logarithm of distance between destination and donor region.
Price	Natural logarithm of the ratio of price of housing in destination and donor region.
Univ	Natural logarithm of students enrolled in university education per thousand population.
Sec	Natural logarithm of the ratio of students enrolled in secondary education in destination and donor region per thousand population.
Beds	Natural logarithm of the ratio of hospital beds in destination and donor region per thousand population.
Infra	Natural logarithm of the ratio of road density in destination and donor region.

The data is organised as 17 equations each related to a destination region. Each region contains 16 observations spanned over 6 years, from 1998 to 2003. Therefore, each equation contains 96 observations, resulting in 1632 total observations. Secondary education in 2003 data were not available for some regions. Therefore, in order to use a balanced panel, data from this year were omitted from models including this variable, totalling 1360 observations in this case.

Firstly, we obtained OLS estimators from the log-linear version of (4.1). However, tests based on the OLS residuals cannot reject the hypothesis of both groupwise heteroskedasticity and serial correlation between cross-sections. Hence, OLS estimators are not efficient. Given this, Seemingly Unrelated Regression Equations (SURE) estimators, which would provide efficiency gains over OLS estimators, are used.

Table A.1. and A.2. show results for four different models. Model 1 includes the most traditional economic variables influencing migration: wages, unemployment and distance. Model 2 incorporates housing prices, model 3 human capital and model 4 regional amenities.

In model 4, all variables are significant and have the expected signs. Furthermore, Wald Coefficient Tests rejects the elimination of variables. Therefore, the restricted models 1 through 3 appear as inferior to model 4, which is our preferred model.

It follows from (4.1) that coefficients estimated are elasticities of migration with respect to its variable. We observe in model four that the highest elasticity is that of migration with respect to wage differentials, with an elasticity of 3.61. The elasticity of migration with respect to housing prices differential follows at -2.41. Therefore, wage and housing price differentials appear to be the most important pull and deterrent factors respectively, explaining migration decisions.

This is followed by elasticity of migration with respect to unemployment and university education, at -1.15 and 1.15 respectively. Distance and regional amenities show low elasticities, all below 1.

Results show that inter-regional migration does respond to economic variables as expected.

5. **Conclusion**

Spanish internal migration has been fairly resistant to economic analysis for many decades. Numerous studies have pointed to its low levels and its lack of response to traditional or expected economic incentives. At times key variables such as unemployment and wages, supposed to unlock the secrets of internal migration, have even proved to be wrongly signed. Encouraged by recent research on internal migration in other counties this paper has used an expanded model. The econometric results have proved all our tested variables significant. Thus our results show that Spanish regional migration in the period 1998-2003 responds to regional differentials in unemployment, wages, infrastructure, housing prices, and distance. Human capital is also shown to promote migration

Appendix

Table A.1.

	Model 1		*Model 2*	
Variable	**Coefficient**	**t-Statistic**	**Coefficient**	**t-Statistic**
Wage	-2.660377	-19.22210 (0.138402)	0.431858	1.693299 (0.0906)
Unem	-1.038153	-22.31843 (0.046516)	-1.245658	-25.85197 (0.0000)
Dis	-0.705054	-35.93816 (0.019619)	-0.858872	-45.30799 (0.0000)
Price			-1.344377	-15.58313 (0.0000)
Fixed Effects				
Andalucía	12.58629		13.60523	
Aragón	9.780254		10.36180	
Asturias (Principado de)	10.18378		10.99422	
Balears (Illes)	10.31310		11.80235	
Canarias	11.68783		13.44449	
Cantabria	9.701412		10.84893	
Castilla-La Mancha	10.22457		10.86402	
Castilla y León	11.04220		11.99987	
Cataluña	11.89300		13.01061	
Comunidad Valenciana	11.52866		12.39893	
Extremadura	10.45113		11.22030	
Galicia	10.74086		11.77160	
Madrid (Comunidad de)	12.29680		13.21881	
Murcia (Región de)	9.906675		10.88587	
Navarra (Comunidad Foral de)	9.518049		10.06643	
País Vasco	11.23123		12.22189	
Rioja (La)	8.707055		9.554395	
Log likelihood	-921.9080		-898.5032	
R-squared	0.497398		0.545268	
Adjusted R-squared	0.491474		0.539623	
S.E. of regression	0.941229		0.895562	
Durbin-Watson stat	1.988120		1.941961	
Number of Observations	1632		1632	

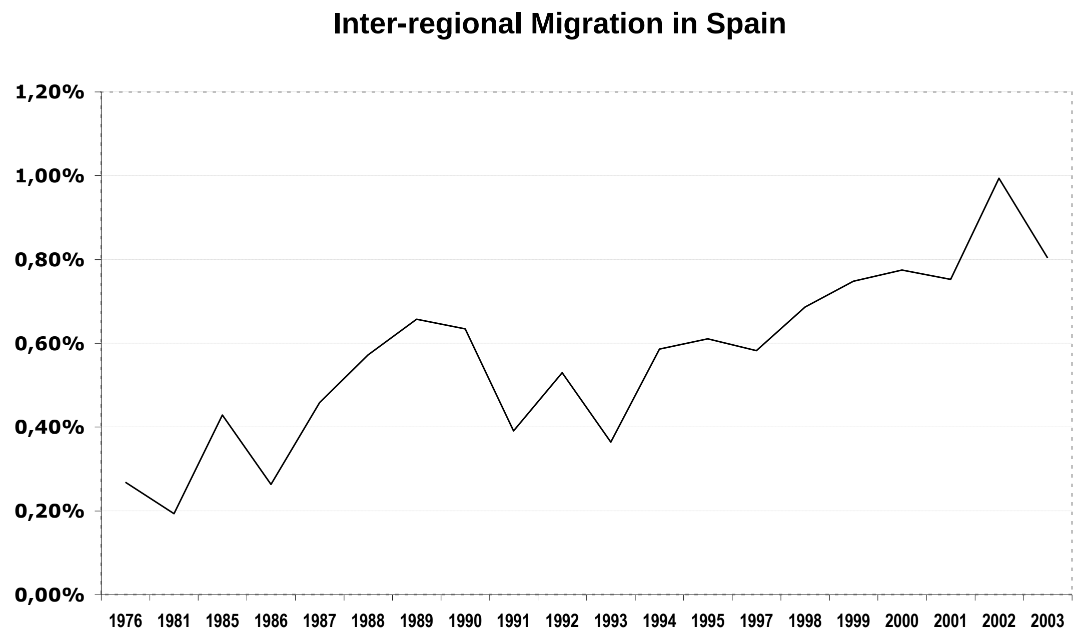
Note: Probability of t-statistics in parenthesis

Table A.2.

Variable	*Model 3* Coefficient	*Model 3* t-Statistic	*Model 4* Coefficient	*Model 4* t-Statistic
Wage	2.376549	9.641665 (0.0000)	3.618143	10.43477 (0.0000)
Unem	-1.117101	-25.30315 (0.0000)	-1.156312	-19.00008 (0.0000)
Dis	-0.899885	-53.23464 (0.0000)	-0.832555	-44.12684 (0.0000)
Price	-1.696188	-20.27534 (0.0000)	-2.410421	-19.49458 (0.0000)
Univ	1.035988	18.57922 (0.0000)	1.158605	13.86426 (0.0000)
Sec			0.576789	2.493366 (0.0128)
Infra			0.518167	9.263997 (0.0000)
Beds			0.637030	7.245017
Fixed Effects				
Andalucía	17.42427		17.54610	
Aragón	14.20290		14.28261	
Asturias (Principado de)	14.77453		14.51587	
Balears (Illes)	15.91867		16.09401	
Canarias	17.64902		17.34204	
Cantabria	14.77607		14.49612	
Castilla-La Mancha	14.74616		14.97720	
Castilla y León	15.89337		15.89853	
Cataluña	16.82990		16.82079	
Comunidad Valenciana	16.33024		16.47840	
Extremadura	15.10304		15.15932	
Galicia	15.75074		15.39056	
Madrid (Comunidad de)	16.86657		16.95989	
Murcia (Región de)	14.95300		15.00382	
Navarra (Comunidad Foral de)	13.78118		13.70681	
País Vasco	15.86725		15.72679	
Rioja (La)	13.51550		13.56967	
Log likelihood	-852.3644		-680.5916	
R-squared	0.576637		0.609764	
Adjusted R-squared	0.571115		0.602749	
S.E. of regression	0.864388		0.831176	
Durbin-Watson stat	1.948503		1.877003	
Number of Observations	1632		1360	

Note: Probability of t-statistics in parenthesis

Fig.1


Inter-regional Migration in Spain
1,20%
1,00%
0,80%
0,60%
0,40%
0,20%
0,00%
1976 1981 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1997 1998 1999 2000 2001 2002 2003

References

Andrienko,Y. and Gurief, S. 2003. *Determinants of Inter-Regional Mobility in Russia: Evidence from panel Data.* CEPR DP 3835, London.

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

Bentolila, S. 1997. "Sticky labor in Spain regions", *European Economic Review* **41**. pp.591-598

Bentolila, S. and Dolado, J.J. 1990. "Mismatch and Internal Migration in Spain", in F.Padoa-Schioppa, ed, *Mismatch and Labor Mobility*, Cambridge University Press, 1990.

Bentolila, S. and Jimeno-Serrano J.F. 1997 "Regional Unemployment Persistence (Spain *1976-94*)" *Labour Economics* **4**, 1997.

Bover, O. and Arellano, M. 2002 "Learning about Migration Decisions from the Migrants: Using complementary Data Sets To Model Intra-regional Migrations in Spain**".** *Journal Of Population Economics.* ***15****: 357-80.*

Devillanova,C. and Garcia_Fontes,W. 1998, "Migration across Spanish Provinces: Evidence from the Social Security Records. 1979-1992."

Dustmann,C. (1995), *Human Capital Accumulation And Earnings Assimilation of Migrants*. CEPR paper. London.

Fonseca, R. (2002)**. "**On the Interaction between Unemployment and Inter-regional Mobility".

García, J., Gómez, J., Muñoz Sánchez,E., Solana Ibañez,J., 1999 "Modelos Migratorios: Teoría del Capital Humano". *Jornadas de la Asociación de Economía de la Educación.* **10**.

Ghatak,S.,Levine,P.and Wheatley Price,S. (1996). *Migration Theories and Evidence: An Assessment. Journal of Economic Surveys***, 10:2**: 159-198.

Ghatak,S and Sassoon,A. eds. (2001). *Migration and Mobility: The European Perspective*, Palgrave.

Ghatak,S. Mulhern,A. and Watson,C (2004)**.** Inter-regional Migration in Poland: A New Look *Kingston University Economics Discussion Paper***.**

Gil Martin, Samuel. "An Overview of Spanish Labour Markets Reforms, 1985-2002". Unidad de Políticas comparadas. Working Paper 17-02.

Greene, William H. *Econometric Analysis*. Prentice Hall, 2000.

Hatton, T. and Williams,J.(1998), *The Age of Mass Migration*, OUP.

Hamilton,B.and Whalley,J. (1984). "Efficiency and Distribution Implications of Global Restrictions on Labour Mobility".*Journal of Development Economics*,14: 61-75.

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

Instituto Nacional de Estadística: www.ine.es

Juarez, J.P. (2000). "Analysis of Interregional Labor Migration in Spain Using Gross Flows". *Journal of Regional Science.* **40** no.2 pp377-399

Lindley, J., Upward, R.., Wright, P. 2002. "Regional mobility and unemployment transitions in the UK and Spain." *Leverhulme Centre for Research on Globalisation and Economic Policy.* University of Nottingham.. June 20, 2002

Mauro, P. and Spolimbergo, A. (1999) "How do Skilled and the Unskilled Respond to Regional shocks". *IMF Staff papers Vol 46 No.1*

Ministerio de Educación: www.mec.es.

Taylor, J. and Martin, P. (2001) *Human Capital: Migration and Rural Population Change*. *Handbook of Agricultural Economics*, Eds. Bruce L Gardner and Gordon C. Rausser. North-Holland, Ch 10.

Zellner,A.(1962) *An efficient method of estimating seemingly unrelated regressions and tests of aggregation bias*. *Journal of the American Statistical Association*, 57(297):348–368.