Institut de Recerca en Economia Aplicada Regional i Pública | Document de Treball 2017/17, 30 pàg.
Research Institute of Applied Economics | *Working Paper 2017/17, 30 pag.*

Grup de Recerca Anàlisi Quantitativa Regional | Document de Treball 2017/09, 30 pàg.
Regional Quantitative Analysis Research Group | *Working Paper 2017/09, 30 pag.*

"What drives migration moves across urban areas in Spain? Evidence from the Great Recession"

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Abstract

In Spain, economic disparities between regions have traditionally played a relevant role in migration. Nevertheless, during the previous high-instability period, analyses provided conflicting results about the effect of these variables. In this work, we aim to determine the role that labour market factors play in internal migration during the Great Recession, paying special attention to the migration response of the heterogeneous population groups. To do so, we resort to an extended gravity model and we consider as a territorial unit the 45 Spanish Functional Urban Areas. Our results point to real wages as having a significant influence on migration motivations.

JEL Classification: C23, J61, R23.

Keywords: Migration, Spanish urban areas, Labour market factors..

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Acknowledgements

We gratefully acknowledge helpful comments and suggestions from Raul Ramos and Bianca Biagi. We are also grateful to the participants of the 28th ERSA & ERES Summer School (Vienna, Austria), 56th ERSA Congress (Vienna, Austria), XLII Reunión de Estudios Regionales (Santiago, Spain) and XII Jornadas de Economia Laboral (Valladolid, Spain). We acknowledge financial support from the Catalan government. All the remaining errors are ours.

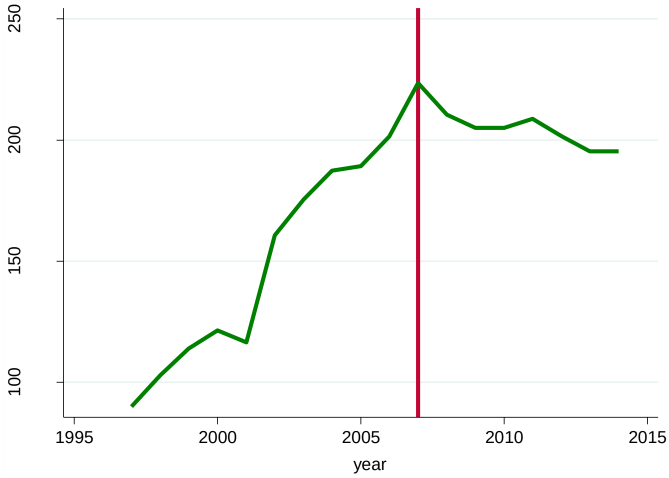
1. Introduction

Migration flows have traditionally occurred as a result of the pursuit of personal improvement. Achieving better personal and environmental conditions has motivated individuals to move from one place to another over short and long distances. For developed economies, literature has generally acknowledged the influence of economic and labour market differentials to explain migratory flows. In Spain, internal migratory flows respond to similar patterns as those observed for most countries of the European Union: during decades of economic prosperity, regional disparities in economies and employment opportunities have motivated migration flows. However, regional disparities in Spain were not the drivers of population flows in the 1980s and early 1990s, when several periods of economic instability took place. Inconclusive results were obtained: Bentolila and Blanchard (1990), Bentolila and Dolado (1991), Antolín and Bover (1997), Bentolila (1997), Ródenas (1994), and De La Fuente (1999) found small or insignificant responses to labour market variables (several times even with the wrong sign). De La Fuente (1999) acknowledges that a decline in migration occurred due to the reduction of interregional income disparities and the adverse effect of a generalized increase in unemployment combined with the growth of unemployment benefits. Economists debated the underlying causes of the unresponsiveness to traditional explanatory variables, with Mulhern and Watson (2010) labelling it an enigma.

The Great Recession had a severe impact in Spain. Economic activity shrank by 15.5 percentage points in just six years, unemployment rate increased by 18 p.p., and real wages declined by 7.2 p.p. In this context, international emigration skyrocketed, resulting in a net loss of population.[1] Although in 2013 it reached the highest volume of outflows registered for decades, it accounted for just 1.1% of the population. Internal movements have declined since the start of the crisis, as Figure 1 shows, despite the persistence of internal differences in economic and labour market terms (Cuadrado-Roura and Maroto, 2016; Melguizo, 2017). As in the past, the generalized recession in the country affected all cities and regions, constraining migration decisions.

[1] Figure A.1 in the appendix displays the evolution of international net migration and emigration for recent years.

Figure 1: Evolution of migration among Spain's Functional Urban Areas



This paper investigates the causes of migration flows in Spain during the Great Recession to determine if the Spanish migration enigma during crisis periods remains. We perform the analysis by considering an extended gravity model of migration. Our work is innovative in several ways: we investigate factors driving migration flows in the 2008 to 2014 period in Spain, one of the countries more severely affected by the Great Recession; we consider economically consistent spatial units of analysis, 45 Spanish Functional Urban Areas, improving upon previous work that uses provincial or regional data; we perform our estimates considering consistent estimation methods for count data; we take advantage of the panel dimension of our data set to control for multilateral resistance to migration by means of wide structures of fixed effects; and, we develop our analysis for different population groups, including nationals and foreigners, returned migrants and different age cohorts.

Our results point to a high influence of wages on migration. Real wages are significantly associated with migration flows between urban areas, especially in the case of foreigners, for which wages are also a retention factor. Our results for this recessive period only show the influence of employment rate on nationals' moves.

The rest of the paper is organized as follows. Section two reviews the migration literature and the theories explaining these moves. Sections three and four describe the methodology and data, respectively. In section five, we present our main results, and section six concludes.

2. Literature Review

2.1. A general overview of migration theories

Migration and its main motivations have been the focus of extensive discussion in economics literature. Authors have frequently resorted to economic differentials to explain migratory flows: Ravenstein's pioneering works (1885, 1889) acknowledge the importance of economic disparities in understanding people movements; Hicks (1932) and Bartel (1979) point out that wage differentials motivate people to move to areas with higher salaries; Greenwood (1975, 1985) argues that migration is mainly due to the job seeking process; and Jackman and Savoury (1992) consider migration as a mechanism to improve job-matching between employers and workers. These analyses fall within the disequilibrium theories, which assume that economic differentials among territories tend to level off in the long run. Migration flows and other mobility factors foster the equilibrium among areas. However, rigidities in the labour and housing markets may complicate the adjustment process and determine the speed at which the equilibrium is reached.

Nevertheless, this disequilibrium approach is called into question as a consequence of a number of studies reporting un-hypothesized signs for unemployment and real wages. The studies of Graves (1979, 1980), Marston (1985), and Knapp and Graves (1986) highlight the importance of spatial equilibrium. The equilibrium approach establishes that economic differentials among territories may occur in the long term due to other kinds of factors, such as climatic conditions and natural and social endowments, encouraging people to stay in areas where economic and labour market conditions are relatively worse. Thus, economic disparities in equilibrium are a result of constant utility across areas, where amenities and non-economic factors play a relevant role in individual preferences.

Equilibrium and disequilibrium approaches were seen as competitors throughout the 1980s and most of the 1990s. However, recent economic literature has been able to reconcile both views around the utility maximization principle, which assumes that migration flows are not only due to the specific attributes of the areas, but also to the value that individuals give to these attributes, which in turn depends on the needs and preferences of individuals and households.

2.2. Recent evidence on migration processes and the case of Spain

The utility maximization principle justifies the heterogeneity in results obtained for Europe and the US regarding their internal migration processes. In the US, people tend to be much more mobile than in Europe (Rupansigha et al., 2015). Economic disparities between these territories add to significant cultural and social heterogeneity among regions in Europe. Besides, the main motivations driving migration in the US also differ from those observed in Europe. American works like Partridge et al. (2008), Partridge (2010), and Faggian et al. (2012) find that natural amenities highly influence people movements and attribute to employment opportunities a secondary role. In Europe, economic and labour market differences among regions are key determinants of migration. Biagi et al. (2011) and Etzo (2011) find evidence for Italy: unemployment rate and per capita GDP differentials are relevant factors to explain migration from poorer southern regions to richer regions in the North. For Germany, Hunt (2006) highlights the influence of wage differentials in attracting young skilled workers from eastern to western regions. Détang-Dessendre et al. (2016) analyse 88 French labour market areas and find evidence of a significant influence of employment opportunities on people moves and commuting flows.

In Spain, internal migration shows similar patterns to those observed for Europe. Economic disparities between regions leading to disequilibrium factors have traditionally played a relevant role as determinants of population movements throughout the territory. During the 1960s and 1970s, massive movements took place from the poorer regions to Madrid, Catalonia, and Basque Country, the most developed regions, driven by wages and employment opportunities (Santillana, 1981). During the period of high economic instability that took place in Spain in the 1980s and early 1990s, migratory flows declined while poorer regions that had previously been net outmigration areas became net immigration regions, and the opposite occurred for richer regions. In these years, the more important flows were those observed within regions due to the increase of employment in services, which prompted moves towards larger towns. Devillanova and García Fontés (2004) report the existence of the Lowry Effect: relatively large gross flows can generate small net flows, which take place especially for workers in the same education category. In addition, foreign immigration became an important phenomenon in those years, resulting in an important change in internal migration patterns. As Recaño and Roig (2006) explain that migration patterns of foreigners are significantly different from those of the native population—foreigners are about three times more mobile. The first consequence is an increase in aggregate internal flows: about 3.4 p.p. in 2012, which contrasts to the 0.7% in 1960 (Minondo et al., 2013), and about 80% of recent flows had urban areas as a destination. Still, recent interregional migration flows (0.43% in 2002-11) were below the 1960s figures (0.77%) (Recaño et al., 2014).

As can be expected, territorial disparities are a major reason for migration and the large interregional flows in the 1960s and 1970s. According to Ródenas (1994), the increase in unemployment due to the economic crisis in the 1980s was resulted in the decrease in migration flows. De la Fuente (1999) notes that the reduction of regional disparities as well as factors related to quality of life caused this decline. In addition, researchers find un-hypothesized signs and, in some cases, lack of significance for both economic and labour market variables, which has attracted the attention of many economists. Later works analysing more recent flows, such as Maza and Villaverde (2004) and Maza (2006), acknowledge the influence of regional income in the decision to move. In addition, Juárez (2000) and Mulhern and Watson (2009, 2010) obtain that unemployment differentials are also relevant factors, whereas Clemente et al. (2016) observe that labour market factors play a substantial role if the economic situation in the origin region is relatively unfavourable. Works focused on micro data, such as Antolín and Bover (1997), include a variety of personal characteristics in the analysis. They find small effect of unemployment rates for the non-registered unemployed and inconclusive results on the effect of wage differentials. The recent literature analysing migration flows also considers heterogeneous groups. Maza et al. (2013) and Clemente et al. (2016), among others, analyse flows of Spanish born versus foreigners. Overall, the selectivity of migrants and the heterogeneity of flows have been labelled as a key factor in explaining population flows.

Regarding the technical approach, most academic literature focused on Spain has analysed aggregate migration flows at the provincial or regional level. Some of these works consider a panel structure, and only few of them use origin and destination fixed effects to control for unobserved heterogeneity (such as Martínez Torres, 2007). Although some articles consider count models using the number of migrants between origin and destination (Devillanova and García Fontés, 2004; Reher and Silvestre, 2009; Faggian and Royuela, 2010), most of the literature considers linear models in which the dependent variable is the migration rate or the log of migrants (recently, Clemente et al., 2016). Other works use micro data, analysing the propensity to migrate (Bover and Arellano, 2002; Reher and Silvestre, 2009).

Despite the large body of literature on the topic, there is a need to study migration flows during the Great Recession, the most significant crisis experienced in the country since the Civil War in 1936. Besides, there is space for a better analysis of population flows considering economically consistent spatial units, such as FUAs, rather than administrative definitions like province and region, together with differentiated flows, considering Spanish born versus foreigners, returned migrants and different age cohorts. Finally, the literature lacks studies using count data models together with wide structures of fixed effects controlling for multilateral resistance to migration effects.

3. Methodology

3.1. Theoretical approach

Based on the maximization utility principle, migrants decide where to go based on the relative area factor endowments and their individual preferences for these factors. The utility (U) that the i-th area reports to the k-th individual is a function of economic and amenity endowments of the area ($Z_{i,}$) and individual idiosyncratic tastes ($\mathcal{E}_i^k$):

$$U_i^k = u\left(Z_{i,}\right) + \mathcal{E}_i^k \tag{1}$$

The deterministic part is "common" to all individuals and is a function of a vector of economic factors and amenities. Given this utility function and following Faggian and Royuela (2010), k-th individual decides to move if the expected utility of a destination area j is higher than the expected reported utility of the origin area i plus the costs of moving, frequently proxied in the literature by the distance between i and j locations:

$$E(U^k{}_j) - c(D_{ij}) > E(U^k{}_i) \tag{2}$$

We aggregate individual decisions at a macro level following the works of Santos, Silva, and Tenreyro (2006) and Miguélez and Moreno (2014), and we define a dummy variable y_{ijt}^k that takes the value 1 when equation (2) is met at period t and 0, otherwise. The sum of all individual decisions is represented by y_{ijt}, which captures the number of flows registered between every pair of spatial units i and j at period t. Thereby, we can write an extensive form of the gravity model including y_{ijt} as the endogenous variable and migration potential motivations as independent variables in addition to the origin and destination population size and the distance between the aforementioned origin and destination areas. The gravity equation of our baseline specification is as follows:

$$\mathrm{y_{ijt}} = \mathrm{e}^{\beta_0}(D_{ij})^{\beta_k} \prod_{\mathrm{l=1}}^{\mathrm{L}} \mathrm{F_{il}^{\lambda_{il}}} \prod_{\mathrm{l=1}}^{\mathrm{L}} \mathrm{F_{jt-1l}^{\lambda_{jl}}} \prod_{t=1}^{T} e^{\theta_t d_t} \prod_{s=1}^{S} e^{\theta_{is} d_{is}} \prod_{s=1}^{S} e^{\theta_{js} d_{js}}\, \mathcal{E}_{ijt} \tag{3}$$

where y_{ijt} depends multiplicatively on L push (F_i) and pull (F_j)) factors. An endogeneity problem may arise due to the reverse causality problem, as migration may affect labour market variables. However, in the Spanish case, gross internal migration flows represent a small percentage of the national population, casting doubts on such impact. In Table A5 of Appendix, we show for all FUAs the percentages that net migration flows of people older than 18 represent on total and working age population for 2009 and 2014 respectively. To avoid such potential impact, we lag all right hand variables in equation (3) by one year. Our empirical model also incorporates S dummy variables, d_s for every origin and destination and one fixed effect for every time period, d_t. D_{ij} represents the travel distance between every pair of locations, $e^{\beta_0}$is the constant term, and $\mathcal{E}_{ijt}$ is the idiosyncratic error.

3.2. Estimation strategy

The most common practice in empirical migration analyses has been to transform the multiplicative gravity equation by taking natural logarithms and estimating the model using Ordinary Least Squares. However, the log-linear transformation of the model entails several problems. The first problem relates to the presence of zero migration flows between pairs of areas, which becomes particularly relevant when we focus on specific population groups. Since the logarithm of zero is not defined, truncating and censuring these zero migration flows or transforming the data are two common procedures that may be accompanied by efficiency reductions due to the loss of information and/or to by estimation and sample selection bias (Westerlund and Wilhelmsson, 2009). Another problem emerges in the presence of heteroscedasticity, which frequently occurs with migration data. The OLS estimation is based on the homoscedasticity assumption. This implies that the expected value of the error term is a function of the regressors and the estimation variance is biased, affecting the model's inference. These failures have led to the use of mixed models and nonlinear methods to estimate the gravity equation. Among them, the Poisson Pseudo Maximum Likelihood (PPML) technique proposed by Santos Silva and Tenreyro (2006) has become the workhorse in gravity analyses. PPML, as a count data model, deals in a natural way with the presence of zero migration flows. In addition, it does not make any assumption about the form of heteroscedasticity, thus it is applicable under different heteroscedasticity patterns. These characteristics make PPML the appropriate method for our analysis. In order to carry out the PPML estimation, we resort to the property establishing that the conditional expectation of y_{ijt} given the set of regressor $x_{ijt} = (1, D_{ij}, F_{it-1k}, F_{jt-1k}, d_t, d_i, d_j)$, as in the following exponential function:

$$E\left(y_{ijt} \middle| x_{ijt}\right) = exp\left[\beta_0 + \beta_k \ln\left(D_{ij}\right) + \sum_{k=1}^{K} \lambda_{ik} \ln F_{it-1k} + \sum_{k=1}^{K} \lambda_{jk} \ln F_{jt-1k} + \sum_{t=1}^{T} \theta_t d_t + \sum_{s=1}^{S} \theta_{is} d_{is} + \sum_{s=1}^{S} \theta_{js} d_{js}\right] \quad (4)$$

Therefore, we can estimate equation (4) without making the log-lineal transformation that OLS methodology requires.

4. Data

4.1. Urban areas

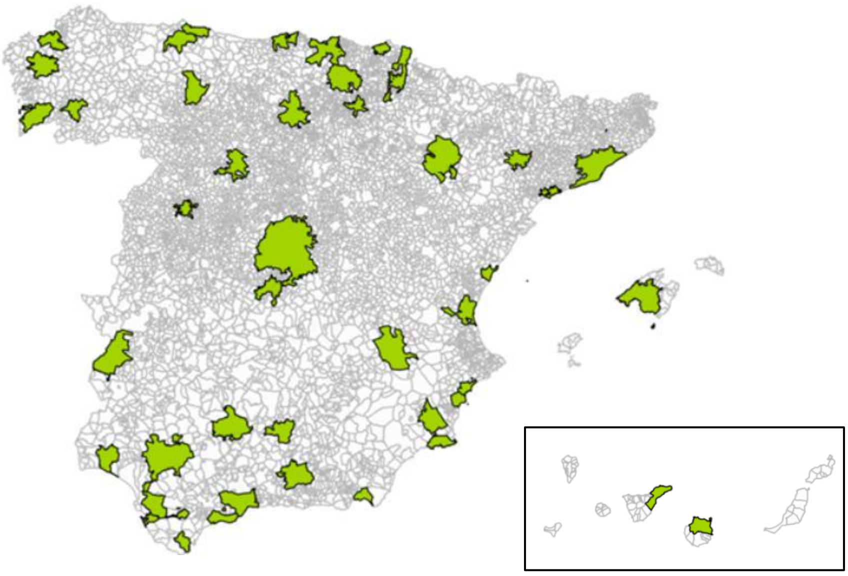
As reported above, we concentrate our analysis on migration between urban areas. We consider areas to be urban if they meet definition of Functional Urban Areas (FUA) developed by the European Commission and the OECD in 2011 in the Urban Audit project. A FUA is the closest definition of a city, based on population and density criteria and its commuting zone. In Spain, the 45 FUAs included 951 municipalities in 2013.[2] Figure 2 maps Spain's FUAs, which represent about 10% of the national territory and, in 2013, accounted for over 61% of the population and about 68% of employment.

Spain's FUAs have large differences in population size and density, and in economic aspects and labour market performance. Madrid and Barcelona are the biggest urban areas: 137 and 127 municipalities and 6.5 and almost 5 million inhabitants

[2] We follow the work of Ruiz and Goerlich (2015) to identify municipality changes in FUAs. We specifically consider the cases of "Villanueva de la Concepción" and "La Canonja" municipalities, which emerged during the considered period due to the disaggregation from "Antequera" and "Tarragona" respectively. We also take into account the case of "Oza-Cesuras," which emerged from the aggregation of "Oza Dos Rios" and "Cesuras," which no longer exist. Therefore, the number of municipalities in the considered FUAs has varied over the period. In 2016 Spain had 8,124 municipalities in total.

respectively. Nevertheless, the median FUA is quite far from these values, accounting for 13 municipalities and about 300,000 inhabitants. From an economic perspective, we also observe considerable heterogeneity among urban areas. In 2013, the average household income in Madrid, the urban area with the highest value, is 89.7 p.p. higher than that of Marbella, the city with the lowest average level. We can also observe large differences in unemployment rates. In 2013, Donostia, a northern urban area, registered the lowest unemployment rate (13.7%), which contrasts with Almeria, a southern province, differing by more than 30 p.p.

Figure 2: Representation of Spain's Functional Urban Areas



Selecting FUAs as the territorial unit of analysis has a number of advantages. They are not mere geographical areas, but territories that are economically and socially integrated and prove to be the best approximation to the concept of local labour markets. These urban areas differ not only in economic and labour factors, but also in amenities and infrastructures, which may affect their attractiveness. Therefore, determining the influencing factors of migration between them implies performing a precise analysis of long distance moves rather than analysing short distance moves and regional or provincial data. Finally, analysing FUAs overcomes the limitations of analyses that just take into account cities and do not consider the suburbanization processes. In our analysis, we remove from our observations the migration moves between FUAs whose travel distance in both directions is less than 120 kilometres. We follow the work of De la Roca (2015) in order to establish the 120 km threshold, which aims to remove from our observations those residential variations that may not imply a migration move, i.e., municipality changes that do not imply a social or a workplace change for the migrant.[3]

4.2. Data sources

The analysis of the determinants of migration between the 45 Spanish FUAs for the 2008 to 2014 period requires the use of disaggregated data at municipality level. The final data involves a list of sources.[4] Migration flows are obtained from the Residential Variation Statistics (*Estadística de Variaciones Residenciales,* EVR). This micro dataset contains information on individual moves that imply a municipality change, and it is compiled on the basis of municipality registration data. EVR exploits information such as the date of the residential variation and the municipalities of departure and arrival. It also accounts for nationality, birth place (either municipality or country of origin), birth date, and gender, which allows us to identify some characteristics of migrants and makes it possible to determine the migration motivations for specific groups that may present heterogeneous behaviour. EVR provides high-quality information due to the application of advanced control and data collection procedures, but also because of the Continuous Register implementation, which updates residential variation information immediately. The potential criticism of use of this data is that it represents only registered moves. However, in Spain, a registration certificate is mandatory to have access to basic social and municipal services and the right to vote, which serves as an incentive for movers to register. The alternative source, the Population Census, may not allow for tracing of the Great Recession and has been criticized in the past for erroneous input methods for nonresponse questions, making the information unreliable (Ródenas and Martí, 2009). Other sources, such as the Labour Force Survey or Social Security Records, are alternatives that are suitable for investigating either aggregate flows or personal characteristics of working people.

[3] The number of origin-destination pairs is not 1,980 but 1,910, as we remove moves between the FUAs with travel distances of less than 120 km.
[4] Detailed information about the datasets and the components and sources of information are compiled in table A.2, while descriptive statistics are displayed in Table A.3 in the Appendix.

As for the explanatory variables of our empirical model, we had to work with municipal data to build FUA consistent variables. Data for population comes from Spain's Continuous Register, and we measure distance in minutes.[5] We resort to Spain's Social Security records for information on employment. The workers' affiliation records with Social Security provide data on registered employment at the municipality level, and we obtain municipal working age population data from Spain's Continuous Register. We use the average provincial wage provided by the Spanish Tax Agency (AEAT), and we use information on local housing costs collected by *Idealista*, a web-based real estate firm that works at the national level. We deflate nominal variables using provincial (NUTS 3) Consumer Price Indexes (CPI). Finally, we resort to the Spanish Meteorological Agency (AEMET) to obtain information on natural amenities such as temperature and rainfall.

5. Results

We estimate the effect that labour market factors exert on migration for people older than 18 years of age to remove the bias that family responsibilities may generate in our results. Later, we disaggregate adult migrants by citizenship and their link with the destination (return/non-return migration). The distinction of the groups[6] allows us to determine heterogeneity related to the preferences of internal migrants, which makes it possible to ascertain the role of labour market factors as determinants of internal migration in Spain.

As mentioned, Table 1 presents the results of the estimation of internal migration motivations during the recent economic downturn. We consider several fixed effect structures. In column (1) we include time fixed effects, which allows to control for global time-specific events. Column (2) reports our baseline specification, including time and origin and destination fixed effects, controlling for time-invariant characteristics of every FUA. Column (3) considers a dyadic origin-destination fixed effect to control for specific permanent dyadic characteristics, such as common co-official languages that may favour migration, and social networks, as past migration

[5] The driving distance indicated on Google Maps is considered for FUAs located in peninsular Spain. For FUAs located on islands, we consider the flight time (minutes) provided by AENA on regular flights between Spanish airports, which we add to the distance to the closest airport, the driving distance between the island airport and the island FUA, and an extra hour to take into account the minimum lapse of time to remain at the airport.

[6] Table A4 in the Appendix displays the total number of migrants in each group and the percentage of adult migrants that each group represents.

episodes between pairs of FUAs may generate a stock of migrants with strong personal links, which are usually difficult to capture. Finally, we consider two additional structures of fixed effects: a model with dyadic destination-time and monodic origin fixed effects in column (4), and a model with dyadic origin-time and monodic destination fixed effects in column (5). These specifications allow us to proxy different sources of multilateral resistance to migration[7] and, therefore, help us to deal with another potential source of endogeneity. Destination-time fixed effects take into account any shock that may occur and modify the preferences for the different destinations, whereas origin-time fixed effects consider the changes that modify migration preferences by origin.

Our estimates use the PPML method, avoiding problem of omitting variables by considering different structures of fixed effects. Column (1) includes time fixed effects plus fixed amenities variables for origin and destination, which is clearly insufficient but allows us to find the basic estimates of a gravity equation, where the parameters for population are close to one: larger flows come from and to larger cities. This model uses both between and within information for all variables. In our case, there are considerable differences in the size of the FUAs, thus between differences are significant.

Column (2) introduces origin and destination fixed effects in line with most of the empirical literature applied to the Spanish case. This model captures permanent elements of every FUA by means of a list of dummies; consequently, the parameters of the control variables exploit only within information, which is a small portion of the overall variation. Still, with this strategy we are able to capture fixed non-observables that can bias the estimation. In this specification, FUAs with more population attract large flows of migrants. The estimates of the parameters for employment opportunities and wages behave as expected, while high housing costs allow for emigration and at the same time act as a pull factor, potentially signalling a higher quality of life. Distance is significant and negatively affecting migration flows, as expected. Column (3)

[7] Multilateral resistance to migration refers to the influence that third area characteristics may exert on the migration flows between two given areas. Not considering the potential sources of multilateral resistance to migration may bias the results and lead to endogeneity (Hanson, 2010), as the omission of relevant information generates regressors correlated with the error term, which is in turn also spatially and serially correlated. The Common Correlated Estimator (CCE) (Pesaran, 2006) performs correctly when the longitudinal and cross-sectional dimensions of the panel are large enough, which is not our case. In addition, this estimator exhibits the same problems as the OLS estimator in the presence of zero flows and heteroscedasticity. For all these reasons, we opt for the fixed effects structures.

introduces dyadic origin-destination fixed effects. The result is an increase in the adjustment of the model, which calls for specificities in migration costs between pairs of origins and destinations.[8] Still, the parameters for the control variables hardly change, and consequently these specificities are not correlated with our covariates.

Table 1: PPML Estimation results for total migrants (≥18)

Migration flows	(1)	(2)	(3)	(4)	(5)
log Population O	0.972***	0.488	0.475	0.564	
	(0.0197)	(0.393)	(0.392)	(0.353)	
log Population D	0.992***	1.341***	1.319***		1.198***
	(0.0186)	(0.355)	(0.353)		(0.258)
log Distance (time)	-0.985***	-1.056***		-1.056***	-1.056***
	(0.0352)	(0.0268)		(0.0268)	(0.0268)
Emp. Rate O	-0.0328	0.233	0.225	0.226*	
	(0.280)	(0.155)	(0.153)	(0.131)	
Emp. Rate D	-0.315	0.291**	0.287**		0.285**
	(0.325)	(0.142)	(0.141)		(0.130)
log Real Wage O	-0.612***	-0.680***	-0.689***	-0.603***	
	(0.202)	(0.202)	(0.199)	(0.158)	
log Real Wage D	-0.0844	0.638***	0.643***		0.665***
	(0.200)	(0.240)	(0.240)		(0.171)
log Housing Costs O	0.0935	0.0887**	0.0851*	0.114***	
	(0.113)	(0.0451)	(0.0446)	(0.0413)	
log Housing Costs D	0.194	0.0807*	0.0809*		0.0506
	(0.122)	(0.0481)	(0.0481)		(0.0458)
Amenities O	yes	no	no	no	no
Amenities D	yes	no	no	no	no
T FE	yes	yes	yes	no	no
O FE	no	yes	no	yes	no
D FE	no	yes	no	no	yes
OD FE	no	no	yes	no	no
OT FE	no	no	no	no	yes
DT FE	no	no	no	yes	no
R-squared	0.949	0.978	0.995	0.980	0.979

Notes: 11,460 observations. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The last two specifications widen the fixed effects structure and allow for a similar interpretation as column 2, but controlling for all time varying effects at the destination (columns 4) and origin (column 5). Most parameters in these new and preferred specifications experience a decrease in the magnitude and in the standard errors. The latter effect is responsible for having significant and positive parameters for employment opportunities in the origin, an unexpected result. On the contrary, the

[8] Table A.6 in the Appendix displays the basic results considering alternative measures of distance, such as physical distance (km) and straight line distance. As in Poot et al. (2016), straight-line distance reports the lower parameter, while in our case time distances yield lower parameters than distance in km.

positive parameter for housing costs in the destination stops being significant, casting doubt on the role of housing prices as quality of life signal.

The literature analysing migration in Spain reports that some of the conflicting results of aggregate models are due to specificities of individuals, as heterogeneous groups respond differently to push and pull factors. We first perform separate analyses depending of the place of birth of movers, considering those who move back to their origin areas. Table 2 reports the estimates of our preferred specification for all nationals, returned nationals, and foreigners. Our preferred specifications include controls for all destination-time or origin-time specific events, allowing for concentration on the parameters in the origin and destination respectively.

Table 2: Results by place of birth

	Nationals		Returned Nationals		Foreigners	
	(1)	(2)	(3)	(4)	(5)	(6)
log Population O	1.706***		2.162***		0.417	
	(0.362)		(0.677)		(0.634)	
log Population D		1.662***		0.831		1.501***
		(0.305)		(0.664)		(0.488)
log Distance (time)	-1.116***	-1.116***	-1.119***	-1.119***	-0.853***	-0.853***
	(0.0321)	(0.0321)	(0.0437)	(0.0437)	(0.0224)	(0.0224)
Emp. Rate O	0.0869		0.960**		0.902**	
	(0.0945)		(0.433)		(0.378)	
Emp. Rate D		0.304***		0.0102		0.399
		(0.109)		(0.197)		(0.34)
log Real Wage O	0.469***		0.48		-2.635***	
	(0.18)		(0.319)		(0.313)	
log Real Wage D		0.450**		0.603*		0.515*
		(0.197)		(0.316)		(0.303)
log Housing Costs O	-0.0146		0.072		0.0591	
	(0.0394)		(0.0644)		(0.0768)	
log Housing Costs D		0.0306		-0.274***		-0.139*
		(0.0442)		(0.0785)		(0.0836)
O FE	yes	no	yes	no	yes	no
D FE	no	yes	no	yes	no	yes
OT FE	no	yes	no	yes	no	yes
DT FE	yes	no	yes	no	yes	no
R-squared	0.962	0.961	0.921	0.915	0.988	0.986

Notes: 11,460 observations. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

With respect to the effect of the traditional gravity variables, for Spanish national migrants, population in origin and destination display significant and positive parameters. Besides, returned nationals leave areas with higher populations, whereas foreigners behave in the opposite way, as they are attracted by FUAs with higher populations. Distance reports the expected negative and significant parameter for all groups. Its magnitude is lower for foreigners: previous moving experiences decrease the negative impact of distance in migration decisions.

As for the economic variables, we see that wages have a greater effect on the foreigners group, whereas employment has a counterintuitive positive effect at origin. For Spanish national migrants, employment at destination exerts the expected influence. On the contrary, for returned national migrants, we observe a positive sign of employment at origin. This significant parameter is close to that observed for foreigners and is far from what one would expect. Finally, housing costs at destination have a negative influence on the moves of foreigners and returned migrants, which clearly shows the preference of these groups for cheaper housing.

We finally analyse migration by age cohort. As in Clemente et al. (2016), we differentiate three cohorts: 18 to 30, 30 to 60, and above 60. Table 3 displays the results of these new estimates. As above with national returned migrants, we see that the above 60 group is least affected by push and pull economic factors, as it is by far the group with the lowest adjustment models. On the contrary, younger migrants are the ones with models reporting higher R2 statistics. Younger migrants are more affected by wage differentials, followed by migrants between 30 and 60. For younger migrants, high real wages in the origin discourage leaving their city, while better wage prospects in the destination encourage them to move.

Employment rates do not display any significant parameters in the origin or destination. As in the previous crisis in Spain, we interpret this result as related to the almost non-existent employment opportunities in Spain during the Great Recession. Moving from an urban area with 25% unemployment to another city with about 20% unemployment presents the potential migrant with a low margin for improvement.

It is difficult to interpret the parameters associated with housing costs, as they arise as positively related with migration flows both in the origin and destination. In this case, we relate the negative side of the story: urban areas with a greater decrease in housing prices leave residents with fewer opportunities to sell their property and subsequently to leave their city. As other works indicate, housing ownership (particularly high in Spain) acts as a brake on population moves.

Finally, we comment on the factors influencing flows of older people. In this case, we see a positive and significant parameter for real wages at the origin, an aspect that is difficult to explain in more aggregate models or in the analysis of flows not considering the life cycle (non-returned nationals). Interestingly this group is the one more seriously affected by migration costs (distance), reporting a strong role of social networks achieved over the years.

Table 3: Results by age cohort

	[18-30)		[30-60)		≥ 60	
	(1)	(2)	(3)	(4)	(5)	(6)
log Population O	1.067*		0.142		0.488	
	(0.566)		(0.354)		(0.559)	
log Population D		1.686***		0.740***		1.522***
		(0.449)		(0.285)		(0.541)
log Distance (time)	-0.991***	-0.991***	-1.083***	-1.083***	-1.118***	-1.118***
	(0.0261)	(0.0261)	(0.0262)	(0.0262)	(0.0475)	(0.0476)
Emp. Rate O	0.305		0.203		-0.106	
	(0.227)		(0.130)		(0.254)	
Emp. Rate D		0.385		0.189		0.483
		(0.265)		(0.124)		(0.330)
log Real Wage O	-0.930***		-0.703***		0.655**	
	(0.252)		(0.176)		(0.331)	
log Real Wage D		0.859***		0.480***		1.687***
		(0.258)		(0.182)		(0.387)
log Housing Costs O	0.174***		0.0829*		0.0532	
	(0.0676)		(0.0466)		(0.0762)	
log Housing Costs D		0.153**		0.0161		-0.0367
		(0.0660)		(0.0522)		(0.0733)
O FE	yes	no	yes	no	yes	no
D FE	no	yes	no	yes	no	yes
OT FE	no	yes	no	yes	no	yes
DT FE	yes	no	yes	no	yes	no
R-squared	0.978	0.978	0.980	0.980	0.870	0.869

Notes: 11,460 observations. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6. Concluding remarks

The analysis on the role of labour market factors in internal migration decisions during the Great Recession in Spain is interesting for several reasons. First, this recent economic downturn has had a strong effect on wages and, more importantly, on unemployment rates, which have greatly absorbed the economic shock. In this context, we observe a decline in internal migration, which led us to wonder to about the extent to which migration has been motivated by economic and labour market factors. Secondly, the results for migration determinants obtained in a previous period of instability in Spain—the 1980s and early 1990s—cast doubt on the influence of labour market influences on migration during the current economic crisis.

This work aims to determine the role of economic and labour market factors in migration flows between Spain’s FUAs during the recent economic crisis. The results highlight that labour market factors exert a significant influence on internal migration decisions. The influence of real average wages is relevant, especially for foreigners and returned nationals. On the contrary, the effect of employment rate on migration flows is less clear, as we only observe a significant positive effect of employment rate at the destination for nationals. An unexpected positive effect of employment rate at the origin is found for returned nationals and foreigners. Conflicting results are also reported for housing costs. These results are in line with the previous literature, which considers the phenomenon of migration in Spain an enigma.

Still, when disaggregating migration flows by age cohort, most results are in line with the theory: real wages report significant parameters in line with the theory (negative in the origin and positive in the destination) for working age groups, while employment rates are not relevant, as unemployment rates are so high in this period that they discourage moves for finding a job. Our results can be seen as a proof of the role of the life cycle in explaining migration decisions.

The obtained results show a strong role of population flows in driving spatial equilibrium on wages. Consequently, any policy aimed at fostering economic convergence in the country needs to account for the stabilizing role of migration. Heterogeneous patterns for different population groups also calls for defining tailored policies promoting migration. We believe that further research can be devoted to the interaction between urban and rural flows, and also to internal and foreign migration flows, although these aspects are neither straightforward nor feasible in a gravitational framework like the one developed here due to data availability.

References

Antolín, P. and Bover, O. (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.

Bartel, A. (1979) "The migration decision: what role does job mobility play?," The *American Economic Review* 69, 775-786.

Bentolila, S. (1997) "Sticky labor in Spanish regions, *European Economic Review*" 41, 591–598.

Bentolila, S. and O. Blanchard (1990) "Spanish unemployment," Economic Policy 10, 233-265.

Bentolila, S. and Dolado, J. J. (1991) "Mismatch and internal migration in Spain, 1962–86,"F. Padoa-Schioppa (ed.),*Mismatch and Labor Mobility,* 182–234, Cambridge, Cambridge University Press.

Biagi, B., Faggian A. and McCann, P. (2011) "Long and Short Distance Migration in Italy: The Role of Economic, Social and Environmental Characteristics," *Spatial Economic Analysis* 6(1), 111-131.

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

Clemente, J., Larramona, G. and Olmos, L. (2016) "Interregional Migration and Thresholds: Evidence from Spain," 11(3), 276-293.

Cuadrado-Roura, J.R. and Maroto, A. (2016) "Unbalanced regional resilience to the economic crisis in Spain: a tale of specialisation and productivity," *Cambridge Journal of Regions, Economy and Society,* 9(1), 153-178.

De la Fuente, A. (1999) "La dinámica territorial de la población españoola: un panorama y algunos resultados provisionales," *Revista de Economía Aplicada* 20, 53–108.

De la Roca, J. (2015) " Selection in initial and return migration: evidence from moves across Spanish cities," IMDEA Working Paper (2011)

Détang-Dessendre, C., Partridge, M.D. and Piguet, V. (2016) "Local labor market flexibility in a perceived low migration country: The case of French labor markets," Regional Science and Urban Economics, 58, 89-103.

Douglas, S. (1997) “Estimating relative standards of living in the United States using cross-migration data,” *Journal of Regional Science* 37(3), 411–436

Etzo, I. (2011) "The Determinants of the Recent Interregional Migration Flows in Italy: A Panel Data Analysis," *Journal of Regional Science* 51(5), 948-966.

Faggian, A., Olfert, M. R. and Partridge, M. D. (2012) "Inferring regional well-being from individual revealed preferences: the 'voting with your feet' approach," *Cambridge Journal of Regions* 5(1), 163-180.

Faggian, A. and Royuela, V. (2010) “Migration flows and quality of life in a metropolitan area: The case of Barcelona-Spain,” *Applied Research in Quality of Life* 5 (3), 241-259.

Graves, P.E. (1976) “A reexamination of migration, economic opportunity, and the quality of life,” *Journal of Regional Science* 16, 107-112.

Graves, P.E. (1979) “A life-cycle empirical analysis of migration and climate, by race,” *Journal of Urban Economics* 6, 135-147.

Graves, P.E. (1980) “Migration and climate,” *Journal of Regional Science* 20, 227-237.

Graves, P.E. (1983) “Migration with a composite amenity: the role of rents,” *Journal of Regional Science* 23, 541-546.

Greenwood, M. J. (1975) “Research on internal migration in the United States: a survey,” *Journal of Economic Literature* 13, 397–433.

Greenwood, M. J. (1985) “Human migration: theory, models and empirical studies,” Journal of Regional Science 25, 521–544.

Grogger, J. and Hanson, G. H.,(2011) "Income maximization and the selection and sorting of international migrants," *Journal of Development Economics*, 95(1), 42-57.

Hanson, G. (2010) “International Migration and the Developing World,” Rodrik, D. Rosenzweig, M. (Eds.), Handbook of Development Economics 5, 4363–4414.

Harris, J. R. and Todaro, M. P. (1970), "Migration, Unemployment and Development: A Two-Sector Analysis," *American Economic Review* 60 (1), 126–142

Hicks, J. R. (1932) “Theory of Wages”, New York: MacMillan.

Hunt, J. (2006) “Staunching Emigration from East Germany: Age and the Determinants of Migration, Journal of the European Economic Association,” 4(5), 1014-1037.

Jackman, Richard and Savouri, S (1992) “Regional migration in Britain: an analysis of gross flows using NHS central register data**”** *Economic Journal*, 102 (415), 1433-1450.

Juárez, J. P. (2000) “Analysis of interregional labor migration in Spain using gross flows,” *Journal of Regional Science* 40, 377–399.

Knapp, T.A. and Graves P.E. (1989) “On the Role of Amenities in Models of Migration and Regional Development,” *Journal of Regional Science* 29(1), 71-87.

Lowry, I. (1966) “Migration and metropolitan growth: two analytical models,” Chandler Publishing Company, San Francisco .

Marston, S. (1985) “Two views of the geographic distribution of unemployment,” *Quarterly Journal of Economics* 100, 57–79.

Martínez–Torres (2007) “Migraciones interregionales en España, 1996-2004”, *Presupuesto y Gasto Público, 48,* 87-108.

Maza, A. (2006) “Migrations and regional convergence: The case of Spain,” *Jahrbuch fur Regionalwissenschaft* 26(2), 191-202.

Maza, A. and Villaverde, J. (2004) “Interregional migration in Spain: A semiparametric analysis,” *Review of Regional Studies* 34 (2), 156-171.

Maza, A., Villaverde, J. and Hierro, M. (2013) “Explaining the settlement patterns of foreigners in Spain” *Applied Geography* 40, 11-20.

Melguizo, C. (2017) “An analysis of Okun’s law for the Spanish provinces,” *Review of Regional Research* 37 (1), 59-90.

Miguélez, E. and Moreno, R. (2014) "What Attracts Knowledge Workers? The Role Of Space And Social Networks," *Journal of Regional Science* 54(1), 33-60.

Minondo, A., Requena, F. and Serrano, G. (2013) “Movimientos migratorios en España antes y después de 2008,” *Papeles de Economía Española* 138, 80-97.

Mulhern, A. and Watson, J. (2009) “Spanish internal migration: Is there anything new to say?,” *Spatial Economic Analysis* 4 (1), 103-120.

Mulhern, A., Watson, J. (2010) “Spanish inter-regional migration: An enigma resolved,” *Applied Economics Letters* 17 (14), 1355-1359

Partridge M.D. (2010) “The dueling models: NEG vs. amenity migration in exploring U.S. engines of growth,” *Papers in Regional Science* 89, 513–536.

Partridge, M. D., Rickman, D. S., Kamar A. and Olfert, M. R. (2008) “Lost inspace: population growth in the American hinterlands and small cities” *Journal of Economic Geography* 8, 727–757.

Pesaran, M.H., (2006) “Estimation and inference in large heterogeneous panels with a multifactor error structure,” *Econometrica* 74 (4), 967–1012.

Ravenstein E.G. (1885) “The Laws of Migration,” *Journal of the Royal Statistical Society,* 48 (2), 167 – 227.

Ravenstein E.G. (1889) “The Laws of Migration,” *Journal of the Royal Statistical Society* 52 (2), 241-301.

Recaño, J. and M. Roig. 2006. “The internal migration of foreigners in Spain.” Paper presented at the 2006 European Population. http://epc2006.princeton.edu/download.aspx?submissionId=60411.

Reher, D. and Silvestre, J. (2009) “Internal migration patterns of foreign-born immigrants in a country of recent mass immigration: evidence from new micro data for Spain” *International Migration Review* 43 (4), 815-849.

Ródenas, C. (1994): “Migraciones interregionales en España, 1960-1989,” *Revista de Economía Aplicada* 11(4), 5-36.

Ródenas C., & Martí M. (2009) "¿Son fiables los datos de migraciones del Censo de 2001?," Revista de Economia Aplicada 17(2), 97-118.

Rogers, A. (1967) “A Regression Analysis of Interregional Migration in California,” The Review of Economics and Statistics 49(2), 262-267.

Ruiz, F. and Goerlich, F. J. (2015) “Taxonomía y representación de los cambios en los municipios españoles,” *Estadística Española* 57(187), 165-196.

Rupasingha, A., Liu, Y. and Partridge, M. D. (2015) "Rural Bound: Determinants of Metro to Non-Metro Migration in the U.S," *American Journal of Agricultural Economics* 97(3), 680-700.

Santillana del Barrio, I. (1981) “Los determinantes económicos de las migraciones internes en España. 1960-1973,” Cuadernos de Economia, 9 (25), 381-407

Santos Silva, J. M. C., and Tenreyro S. (2006) “The Log of Gravity,” *The Review of Economics and Statistics* 88 (4), 641–658.

Sjaastad, L. (1962) “The costs and returns of human migration,” *Journal of Political Economy* 70(5), 80–93.

Wall, H.J. (2001) “Voting with your feet in the United Kingdom: Using cross-migration rates to estimate relative living standards,” *Papers in Regional Science* 80(1), 1-23.

Westerlund, J. and Wilhelmsson, F. (2009) “Estimating the gravity model without gravity using panel data,” Applied Economics 43(6), 641-649.

Zipf G. K. (1946) “The P1 P2/D hypothesis: On the intercity movement of persons” American Sociological Review, 11, 677–686.

Appendix

Figure A.1: Evolution of external migration flows

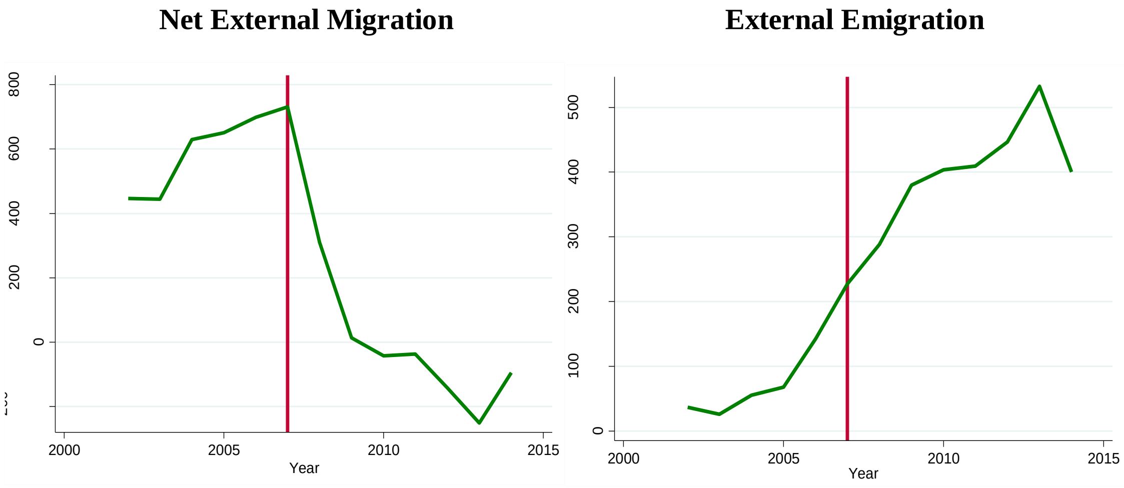


Table A.2: Variables definition and information sources

Variable	Proxy	Source
Migration flows	Counts of people flows over 18 years old flows that take place between FUAs which are located at a minimum distance of 120 km.	EVR
Population	Total population	Continuous Register (INE)
Geographical distance	Driving distance in time (minutes) Flight distance in time (minutes) if origin and/or destination FUAs are located in an island	Google maps and own calculations
Employment Rate	Registered employment in the municipalities that integer the FUAs divided by the FUAs working age population	Public State Employment (Social Security Database)
Real Wage	Nominal Wage deflated by CPI (NUTS 3 level). For the Basque country and Navarra the data is obtained from the Wage Structure Survey. The final average income of these FUAs takes into account the relationship between NUTS 2 regional average income provided by the Tax Agency and the EES wage.	AEAT
Housing costs	Average cost of housing per sq-m of the municipalities within every FUAs with at least 50 sale advertisements on the webpage. We calculate the average housing costs for every FUAs as a by weighted average in terms of local population.	Idealista
Temperature	January average temperature	AEMET. Guía resumida del clima en España 1981-2010
Raining	Yearly average precipitation	AEMET. *Guía resumida del clima en España 1981-2010*
Coast	1: if the FUA has a coast; 0: otherwise	Google maps

Table A.3: Descriptive Statistics

Variable	Mean	Std. Dev. Overall	between	within	Min	Max	Perc. of zero mig. flows (over 1)
Total migration flows[a]	77.11623	240.2902	239.597	18.91341	0	5182	0.0093
National mig. flows[a]	52.89014	150.1369	149.4347	14.83595	0	2815	0.0255
Foreigners mig. flows[a]	24.22609	98.16614	96.53414	17.93921	0	2881	0.1051
Non-returned mig. flows[a]	64.84921	208.2827	207.5543	17.93638	0	4633	0.0140
Returned mig. flows[a]	12.26702	35.797	35.39043	5.430352	0	612	0.2178
log Population	12.80887	0.846215	0.846305	0.012611	11.70911	15.69795	-
log Distance (time) [b1]	5.743414	0.453164	0.453263	0	4.313703	6.451628	-
log Distance (km) [b2]	6.442407	0.6149484	0.6150826	0	4.788857	7.826089	-
Euclidean distance	6.206696	0 .6376079	0 .6377471	0	4.476022	7.697176	-
Employment Rate	0.470909	0.082319	0.073947	0.036204	0.061432	0.711543	-
log Real Wages	9.824285	0.164877	0.155951	0.053612	9.374074	10.21438	-
log Housing Costs	7.664878	0.293618	0.239011	0.170618	6.902994	8.496229	-
log Temperature	2.138842	0.401992	0.40208	0	1.131402	2.901422	-
log Raining	6.245654	0.531201	0.531316	0	5.019265	7.490362	
Coast	0.487958	0.499877	0.499986	0	0	1	-

Notes: (i) N = 11460; n = 1910; T = 6
(ii) [a] We consider migration flows of people equal or older than 18 years
(iii) [b1] Travel distance in time considering flight travel time in the case of islands
[b2] Travel distance in km

Table A.4: Percentage of adult migrants that each group represents

Migration groups	Total Number of Migrants	Percentage (%)
Older than 18	883,752	100.00%
Nationals	606,121	68.58%
Return nationals	140,580	23.19%
Foreigners	277,631	31.42%
Aged 18-30	294,511	33.32%
Aged 30-60	512,779	58.02%
Aged older than 60	76,200	8,62%

Table A.5: Percentage of net flows on total and working age population

FUAs	Percentage of net flows (%)			
	2009		2014	
	Total Population	Working age Pop[a]	Total Population	Working age Pop[a]
Albacete	-0.054	-0.066	-0.257	-0.310
Algeciras	-0.145	-0.178	-0.007	-0.008
Alacant/Alicante	-0.103	-0.123	-0.042	-0.050
Almería	-0.044	-0.053	-0.016	-0.020
Badajoz	-0.052	-0.063	-0.209	-0.253
Barcelona	0.031	0.037	0.065	0.077
Bilbao	0.063	0.072	0.005	0.006
Burgos	-0.170	-0.199	-0.220	-0.260
Cádiz	-0.114	-0.135	-0.223	-0.265
Cartagena	-0.018	-0.022	-0.071	-0.088
Castellón	-0.164	-0.196	-0.093	-0.111
Córdoba	-0.191	-0.230	-0.189	-0.227
A Coruña	0.020	0.023	-0.100	-0.116
Donostia	-0.009	-0.011	0.098	0.115
Elche/Elx	-0.044	-0.053	-0.020	-0.024
Gijon	-0.063	-0.071	-0.090	-0.102
Granada	-0.070	-0.084	-0.136	-0.165
Huelva	-0.011	-0.013	-0.105	-0.128
Jaén	-0.184	-0.224	-0.282	-0.340
Jérez de la Frontera	-0.009	-0.011	-0.139	-0.171
Palmas Gran Canaria	-0.063	-0.076	-0.068	-0.081
León	-0.149	-0.171	-0.285	-0.329
Lleida	-0.106	-0.126	-0.133	-0.160
Logroño	-0.103	-0.122	-0.020	-0.024
Madrid	0.065	0.077	0.118	0.141
Málaga	0.084	0.101	0.097	0.118
Marbella	0.092	0.111	0.167	0.202
Murcia	-0.014	-0.017	-0.080	-0.099
Ourense	0.038	0.043	-0.148	-0.169
Oviedo	-0.072	-0.082	-0.216	-0.247
Palma de Mallorca	-0.023	-0.027	0.087	0.105
Pamplona/Iruña	0.111	0.133	-0.022	-0.027
Reus	-0.083	-0.101	-0.039	-0.048
Salamanca	-0.273	-0.319	-0.349	-0.410
Santander	-0.061	-0.071	-0.070	-0.081
S. Compostela	0.075	0.086	-0.097	-0.112
Sevilla	0.063	0.077	-0.097	-0.118
Sta. Cruz de Tenerife	-0.070	-0.082	-0.045	-0.053
Tarragona	-0.087	-0.104	-0.045	-0.055
Toledo	-0.010	-0.012	-0.064	-0.079
Valencia	-0.041	-0.048	-0.041	-0.049
Valladolid	-0.103	-0.119	-0.169	-0.198
Vigo	-0.015	-0.017	-0.066	-0.077
Vitoria-Gasteiz	0.053	0.061	0.139	0.164
Zaragoza	-0.133	-0.156	-0.044	-0.052

Notes: [a] Working age population is the population older than 16

Table A.6: Checking the results by considering different distance measures

Variables	Dep. Vble: Counts of migration moves							
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Population O (nl)	0.892***	0.488	0.608*		0.897***	0.489	0.621*	
	(0.0231)	(0.393)	(0.357)		(0.0234)	(0.393)	(0.358)	
Population D (nl)	0.907***	1.350***		1.201***	0.912***	1.347***		1.160***
	(0.0220)	(0.356)		(0.255)	(0.0221)	(0.355)		(0.254)
Travel Time Distance Km (nl)	-0.624***	-0.912***	-0.912***	-0.912***				
	(0.0388)	(0.0302)	(0.0302)	(0.0302)				
Euclidean Distance Km (nl)					-0.604***	-0.902***	-0.902***	-0.902***
					(0.0387)	(0.0306)	(0.0306)	(0.0306)
Emp. Rate O	-0.0473	0.232	0.234*		-0.0306	0.232	0.237*	
	(0.290)	(0.155)	(0.134)		(0.291)	(0.155)	(0.134)	
Emp. Rate D	-0.350	0.291**		0.280**	-0.336	0.291**		0.281**
	(0.318)	(0.142)		(0.129)	(0.316)	(0.142)		(0.129)
Real Wage O (nl)	0.122	-0.680***	-0.611***		0.167	-0.679***	-0.604***	
	(0.237)	(0.203)	(0.160)		(0.239)	(0.203)	(0.160)	
Real Wage D (nl)	0.668***	0.631***		0.659***	0.723***	0.632***		0.646***
	(0.224)	(0.240)		(0.170)	(0.224)	(0.240)		(0.169)
Housing Costs O(nl)	0.0616	0.0900**	0.118***		0.0242	0.0900**	0.120***	
	(0.116)	(0.0450)	(0.0412)		(0.118)	(0.0451)	(0.0413)	
Housing Costs D(nl)	0.165	0.0820*		0.0512	0.130	0.0820*		0.0518
	(0.122)	(0.0482)		(0.0464)	(0.122)	(0.0483)		(0.0465)
Constant	-21.67***	-13.85	8.023	-13.12***	-22.23***	-14.08	7.502	-12.70***
	(2.779)	(9.526)	(6.083)	(3.751)	(2.763)	(9.522)	(6.106)	(3.717)
Amenities O	yes	no	no	no	yes	no	no	no
Amenities D	yes	no	no	no	yes	no	no	no
T FE	yes	yes	no	no	yes	yes	no	no
O FE	no	yes	yes	no	no	yes	yes	no
D FE	no	yes	no	yes	no	yes	no	yes
OD FE	no	no	no	no	no	no	no	no
OT FE	no	no	no	yes	no	no	no	yes
DT FE	no	no	yes	no	no	no	yes	no
Observations [a]	11,460	11,460	11,460	11,460	11,460	11,460	11,460	11,460
R-squared	0.935	0.976	0.977	0.977	0.935	0.975	0.977	0.977

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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