A two-stage spatial interaction model of migratory decisions: Application to inter-municipal flows in Spain

José Miguel Navarro-Azorín[a] ✉

Andrés Artal-Tur[b]

[a] Department of Economics, Technical University of Cartagena
Calle Real, 3, 30201–Cartagena (Spain)
e-mail: jmiguel.navarro@upct.es

[b] Department of Economics, Technical University of Cartagena
Calle Real, 3, 30201–Cartagena (Spain)
e-mail: andres.artal@upct.es

✉ Corresponding author. Phone: +34 968 325 664. Fax: +34 968 325 781

Abstract: This paper investigates the determinants of migratory decisions of people for inter-municipal flows. In modelling such an issue we employ a two-stage approach: In the first stage we assume that individuals decide to leave-out their current residence when disenchantment with it surpasses a certain threshold. In the second stage, once the decision of departure is made, individuals search for a new destination by comparing the characteristics of potential locations. Empirical findings for the case of internal migratory movements in Spain suggest that economic (unemployment levels), demographic (age, education levels) and urban characteristics (size, density, housing market conditions) of municipalities play a different role in each stage. As a general result, congestion issues appear as major factors influencing the behaviour of migrants.

Keywords: intra-regional migration, spatial interaction model, urban environment.

1 Introduction

Spain has become a relevant case of study for international migration flows, as the rise of foreign population has been remarkable along the years of the economic boom 1998-2007. At the end of this period the country occupied the second position in the world ranking in terms of annual arrivals with 700,000 entrances, just surpassed by the US (OECD, 2013). In this context of growing interest on international movements of people, so much less is known on recent internal migration flows, despite its relevance as a personal and socio-economic process. Along the time, inter-regional flows contribute to conform the demographical pattern of sending and receiving territories. Moreover, the study of short-haul movements at the local (city) level is usually employed by urban economists to disentangle the behavioural trends of citizens in current societies (Glaeser, 2012).

As far as Spain is concerned, internal migrations have been the subject of a number of previous studies. A general picture from the early 1990´s onwards shows some interesting findings. First, internal flows have accelerated mainly due to an intensification of intra-regional movements, departing from previous significant inter-regional flows. Original exodus from rural places to main urban centres in the country, taking place in the 1960´s and 1970´s, has turned into a new model where short-range flows dominate the scene (García-Coll and Stillwell, 1999; Ródenas and Martí, 2002). Second, intra-regional flows account for two main trends. The first one is the emerging preference of people for living in intermediate towns in good communication with big cities, avoiding negative externalities arising therein. The other reflects the movement of people towards the residential suburbs of main metropolitan areas in the country (Hierro, 2009). On the whole, internal migratory flows are nowadays characterized to take place between urban locations, that is, people use to move from urban origins to urban destinations within the country; in fact, 75% of movements for the period 2000-2007, and 78.5% in 2008-2012 fall within the former scheme (Minondo *et al*., 2013).

A deeper look into the determinants of internal migration flows in Spain show in general the low profile played in this setting by traditional economic variables, such as real wage differentials or unemployment gaps between locations (Bentolila, 1997, 2000; Bentolila and Jimeno-Serrano, 1998; Maza and Moral-Arce, 2006; Maza and Villaverde, 2004). Indeed, some of these studies detected a negative correlation between rates of unemployment and migration flows for the regions of the country, so that high unemployment rates appear to act as a deterrent factor of people´s movements in times of crisis (Antolín and Bover, 1997). This result would probably be related to some (rational) issues limiting the mobility of people, such as the importance of maintaining the family network in times of crisis, the decreasing probability of finding a new job after moving, or even the fact that internal migration is likely conceived as part of a family plan, not being an individual choice in consequence.

Mulhern and Watson (2009, 2010) find that wage and unemployment differentials are relevant explanatory factors for internal migrations in Spain during the boom period 1998-2006. These authors argue that such a result could be reflecting the changes occurring in the Spanish economy along these years, particularly the highest level of

labour market flexibility reached. They also refer to the higher capacity shown by their methodological approach, building on spatial econometrics, in approaching this type of analysis.

In this context, the present paper makes two main contributions. First, we examine migratory decisions at the municipality level rather than between regions (NUTS 2) or provinces (NUTS 3). This is important because intra-regional movements represent now the bulk of internal migration flows in Spain, so by employing the local level of analysis we will be able of more accurately capturing their main characteristics and determinants. It would also help us to shed more light on current controversies existing between previous studies about the relevance of economic factors in influencing internal flows of people, all of them employing an (inter)-regional approach. Second, we propose a framework of analysis that models the migration choice as a two-stage process, where migrant first decide to leave a place of origin, and then select a destination where establishing her/his new residence. This modelling strategy thus implies estimating an equation of out-migration rates in which the characteristics of the sending municipalities act as push factors, and a destination choice equation for migration flows to evaluate the role played by pull factors associated to the destination.

After this introduction, the remainder of the paper is organised as follows. Section 2 introduces the modelling framework. Section 3 describes the data, and Section 4 presents the main results of the investigation. Finally, Section 5 concludes.

2 Measuring migration behaviour with spatial interaction models

The migratory decision has been traditionally approached in the literature as a destination choice action. By building on the theoretical random utility maximization framework, researchers have usually employed discrete choice models where the only relevant choice of the migratory decision was the selection of a location where arriving to.[1] In this context, it is appealing for the researcher to extend the analytical framework for the study of the migratory decision by splitting it into two differentiated parts: the decision to leave-out, or not, the present location, plus the choice of a new destination. Following this approach, the migrant is confronted with a two-stage process: the basic decision is now to get out of the original settlement, while the choice of a particular new destination becomes a subsequent decision that could be involving a different set of determining factors. Implementing this modelling approach now requires a new strategy. Out-migration flows would be linked to main features of the location that is going to be abandoned (*push* factors), while new destination attractiveness should be explained by its own salient characteristics (*pull* factors).

In statistical terms, we start by decomposing the probability of population living in a municipality *i* to move to destination j, denoted by $p_{i \to j}$, into two parts

[1] See Pellegrini and Fotheringham (2002) for a review of spatial choice models in the context of migration.

$$p_{i\to j} = p_i \times p_{i\to j|i}, \quad j \neq i, \tag{1}$$

where p_i is the probability of departure from municipality *i*, and $p_{i\to j|i}$ is the conditional probability of choosing destination *j* when departing from municipality *i*. Our main interest centres on the evaluation of the determinants of the probabilities in equation (1) , thus in this study we will separately model the expected values of the departure probability p_i and the destination choice probabilities $p_{i\to j|i}$ as functions of observable variables which characterizes either origin localizations or destinations.

2.1 The magnitude of out-migration

In this first stage we investigate how the characteristics of municipalities of origin of migrants contribute to out-migration flows. With this objective, we consider an econometric model for the expected probability of departure from municipality *i,* or its observed sample analogue, the out-migration rate, defined as the ratio of people who left municipality *i* in a given period relative to the population of that municipality at the beginning of the period. Moreover, given that migrants from a municipality may move either to another municipality of the same country (internal out-migration) or to an overseas destination (external out-migration) we specify a multivariate model which relates both the internal and external out-migration rates. Specifically, we consider

$$E(p_i^k \mid X_i) = \frac{\exp(X_i\alpha_k)}{1+\exp(X_i\alpha_I)+\exp(X_i\alpha_E)}, \quad k = I,E;\ i = 1,\ldots,n\ , \tag{2}$$

where p_i^I and p_i^E represent the probabilities of internal and external out-migration, respectively; X_i a vector of observed characteristics of the municipality *i*, and α_I, α_E are vectors of parameters to be estimated. Note that this specification for the expected probability of departure only considers push factors related to the place of origin of migrants; this helps to emphasize our approach to the migration process as a two-stage sequence of independent considerations. In this way, the decision of departure would be mainly driven by attributes belonging to municipality *i* and influencing the level of dissatisfaction of individuals, which will decide to leave their current residence once these factors have exceeded a certain threshold level.

2.2 The destination of out-migrants

In the second stage of our modelling strategy, we will use a migration destination choice model that distributes the total number of emigrants from municipality *i* into each of the alternative locations according to their characteristics. When making migratory decisions, individuals face a multiplicity of choices, and it is generally accepted that migrants decide where to move by comparing the costs and benefits of living in each potential destination. However, it would be naive to assume that these costs and benefits are evaluated ex-ante for every possible destination.

Indeed, *the competing destinations model* (Fotheringham, 1986) makes the assumption that there is a limit to individuals' ability to process large amounts of information and suggests a simplifying decision scheme whereby a cluster of

destinations is first selected, and then the final destination is chosen among those belonging to that cluster.[2] Under this hierarchical setting, destinations inside the same cluster are perceived by migrants as close substitutes. As a result, single alternatives within the cluster would lose visibility by themselves, resulting in smaller choice probabilities than those located in more isolated but visible destinations. The competing destinations model takes into account both, the hierarchical nature of the choice process and the effect of spatial competition arising among alternatives, by specifying the expected probability of moving to destination *j* departing from location *i* as

$$E(p_{i\to j|i} \mid Z_{ij}) = \frac{\exp(Z_{ij}\beta)L_j}{\sum_{r\neq i}\exp(Z_{ir}\beta)L_r}, \quad j \neq i,\ j = 1,\ldots,n, \tag{3}$$

where Z_{ij} is the set of observed characteristics of destination *j*, β is a vector of coefficients, and L_j is a measure of the effect of spatial competition on the choice probability of each individual alternative. In the standard form of the competing destinations model, the term L_j is defined as

$$L_j = ACCESS_j^{\theta}, \tag{4}$$

where θ is a parameter to be estimated, and $ACCESS_j$ represents the accessibility (or centrality) of destination *j* relative to all other alternative destinations. Such a measure can be computed as the weighted average of the *inverse* distances between location *j* and the rest of potential destinations (d_{jr}), using the size (in terms of population, for example) of each destination (w_r) as weights, that is

$$ACCESS_j = \frac{1}{n-1}\sum_{r\neq j}\frac{w_r}{d_{jr}} \ . \tag{5}$$

For a given destination *j,* larger values of the accessibility index reflect this to be located in a central position, that is, to be so close to other potential locations candidates to conform a joint spatial cluster. Correspondingly, lower values of the accessibility index are associated with a greater degree of spatial isolation of the destination. In the framework of the competing destinations model, if $\theta < 0$, then more spatially isolated localizations are more likely to be selected by migrants and competition forces are said to exist.[3] In the opposite case, if $\theta > 0$, potential destinations in close proximity to other alternatives will have a higher probability of being selected and agglomeration forces are said to exist. Finally, $\theta = 0$ corresponds to

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[2] Moreover, it is assumed that the identification of the spatial clusters made by individuals is unknown *a priori* for the researcher, so that employing a *nested logit model* in this framework would be inappropriate. Indeed, the specification of the nested logit requires the researcher to know in advance the composition of each nest (cluster).

[3] That means that the higher the accessibility of a particular location, the lower the probability to be chosen by the migrant. By letting the data talk on the sign of this parameter, we empirically observe if the case of Spain is characterized by one situation or another.

a situation wherein individuals evaluate all alternatives simultaneously, and the competing destination model is equivalent to a standard conditional logit specification.[4]

3 Descriptive analysis

In our empirical application we will use data on migration flows among Spanish municipalities stemming from the Residence Variation Statistics (*Estadística de Variaciones Residenciales, EVR*) of the Spanish National Statistics Institute (*Instituto Nacional de Estadística, INE*) for years 2002-2005. These data are based on the official Municipal Population Registers (*Padrón Municipal de Habitantes*) and comprises all residential movements declared by citizens.[5]

Data on inter-municipal migratory movements for Spain shows an annual flow of more than 2 million movements per year (**Table 1)**. This implies that on average 4.28 per cent of the resident population change of locality every year, a number big enough to influence the local housing and labour market conditions.[6] As it is natural, internal migratory processes do not affect homogenously to each municipality, as shown by the geographical distribution of the internal in-migration and out-migration rates in **Figure 1**. A general feature is the coincidence of municipalities displaying simultaneously both high (low) in-migration and out-migration rates; these locations, the most active in terms of both inward and outward migratory flows, are mainly concentrated in the metropolitan area of Madrid, the Mediterranean coastline, and the island regions (Balearic Islands and Canary Islands). Moreover, **Figure 2** clearly illustrates the existence of a positive relationship between in-migration and out-migration rates.

Finally, it is equally remarkable the short-haul nature of the internal migration movements in Spain. As shown in **Figure 3**, 25% of the migrants travelled a distance lower than 10 kilometres, while 60% of them did not surpass the 100 km boundary. This implies that the bulk of internal movements are intra-regional, with an important fraction of them being flows inside the same metropolitan area of a major urban centre. Hence, inter-regional flows have lost relevance in the whole migratory picture, what confers even more value to the municipal approach informing this investigation.

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[4] Fotheringham *et al.* (2001) in fact remark that the competing destination variable may account for hierarchical destination choice and competing effects between places within the same cluster or, alternatively, it may also reflect migrants' preferences regarding the spatial agglomeration of destinations. However the authors conclude that we could be confident that if hierarchical destination choice is present, then the inclusion of the competing variable would significantly capture it.

[5] The Spanish local authorities are required to make entries in these registers for all individuals usually living in the municipality, whether they are Spaniards or foreigners and whether or not they have residence permits. These data are available up to 2013, but data for the explanatory variables of the model coming from national population census not, and that is the main reason that we restrict the period of analysis to the referred years.

[6] As stated by Ródenas and Martín (2009), a fraction of the movements recorded by the EVR are associated with repeated migrations by the same individual. These authors report a ratio of approximately 1.12 movements per migrant during the period 2003–2005, and this is the ratio we use to approximate the percentage of resident population involved in internal migratory flows.

4 Estimation results

4.1 Stage 1: the departure model

In our two-stage framework for migration choices, the first stage focuses on the decision of out-migration according to a set of characteristics of the municipality that is left away. In doing so, we specify a model where the expected out-migration rate probability for a given municipality *i* depends on a set of covariates capturing the local economic conditions, housing market features, availability of amenities, climate, etc. All these variables would be acting as push factors, that is, they influence the level of dissatisfaction of local residents and ultimately may encourage the decision to leave-out the municipality *i*.

The econometric specification for the departure decision is then written as

$$E(p_i^K \mid X_i) = \frac{\exp(V_i^K)}{1+\exp(V_i^I)+exp(V_i^E)}, \quad K = I,E$$

$$\begin{aligned} V_i^K = {} & \alpha_{K0} + \alpha_{K1} UNEMP_i + \alpha_{K2} HOWN_i + \alpha_{K3} POP_i + \alpha_{K4} DENSITY_i \\ & + \alpha_{K5} ACULT_i + \alpha_{K6} CLIMATE_i + \alpha_{K7} EDUC_i + \alpha_{K8} YOUNG_i + \alpha_{KR} REG_i), \end{aligned} \tag{6}$$

A detailed definition of the explanatory variables employed in the model can be found in **Table 2**. They include the rate of unemployment (*UNEMP*), the homeownership rate (*HOWN*), population size (*POP*), population density per square kilometre (*DENSITY*), proxies for the availability of cultural amenities (*ACULT*) and for climate harshness (*CLIMATE*), and measures of the educational level (*EDUC*) and share of people aged between 20 and 34 years in the population (*YOUNG*), as well as regional dummies (*REG*). This specification is estimated by quasi maximum likelihood and the figures reported in **Table 3** are the average probability elasticities (APEs) values of each variable aside from the constant term and the dummy variables.[7] According to these results, the probability of moving from a municipality to another municipality within the same country is influenced by housing property patterns, urban characteristics of the origin municipality (size, density) and local demography (level of education and age of the population).

Following a common practice in migration studies, the unemployment rate in origin is included to incorporate the general availability of employment opportunities in a simple manner. We expect that a rise in the unemployment rate of the origin will contribute to accelerate out-migration from that municipality. However, as a striking outcome, the unemployment rate is found to exert no significant effect in encouraging the departure decision of people, in line with traditional results of the literature for Spain, such as, for example, Antolin and Bover (1997), who find that unemployment persons are not particularly willing to move.

[7] The nonlinearity of the model implies than interpretation of the estimated coefficients is not straightforward. In this case, APEs provides us a measure of the responsiveness of the probabilities to a change in the specified explanatory variables.

Model estimates results show that housing market conditions constitute a critical element in out-migration decisions in Spain, with the propensity of migrating being inversely related to the prevalence of owner-occupied homes. In this way, and given that homeownership is much more common in Spain than in the average European countries (in 2001, the prevalence of owner occupancy was 92% for Spanish households, while the EU-15 average was 75%), it results in that internal mobility of people could be impeded by this characteristic of the national housing market.

Origin population size and population density are factors commonly considered in migration studies to account for the degree of urbanisation of the municipality and related potential agglomeration economies (or diseconomies), which in turn would be affecting the quality of life of inhabitants. By including these two variables in the departure model we want to capture two different effects, related to the size of the locality on the one hand, and the settlement pattern on the other. For example, while most populated municipalities could offer higher opportunities of personal interaction thus increasing the attractiveness for current residents, high levels of spatial density of the population might induce significant costs associated with congestion issues; therefore, it seems convenient to consider separately both types of factors. The coefficients fitted to these variables indicate that the probability of out-migrating decreases with the population size of the municipality, while population density exerts a positive effect on the probability of leaving-out a municipality, reflecting the expected effects of both variables as explained.

The availability (or lack) of local amenities are thought to decisively contribute to enhance (or deteriorate) the life quality standards in a municipality, and by then influencing the decision of out-migration of individuals. In this way, the model specification includes several proxies for local amenities: the number of cultural establishments per inhabitant, as well as an index of climate harshness.[8] Results regarding these factors show that the proxy for cultural amenities supplies at origin are significant but only at a marginal level. On the other hand, climate harshness appears not to influence the leaving-out decisions.

Regarding the education level of the population, a common result in the literature suggests that educated individuals are more likely to migrate looking for higher returns to education elsewhere. Moreover, as education is correlated with non-observable ability and employability at the individual level, highly educated individuals will be more likely to move as a way to improve their employment prospects. Our estimates confirm that higher education levels of the population are linked to a higher probability of out-migration.

Finally, in what refers to the population's age composition, we expect a high out-migration propensity in areas with a higher share of population aged 20–34 years as compared to municipalities wherein this group is less relevant. The latter is explained by two facts. First, as younger individuals has a longer life expectancy, the present value of potential gains from migration is greater thus a higher rate of migration is

[8] The index of climate harshness is defined as the product of the origin's latitude and elevation. The underlying hypothesis is that climate conditions tend to worsen as latitude and elevation of a location increases, thus making it a less desirable place to live in.

expected as the ratio of young people increase in a municipality. Secondly, the age of the person may generally reflect some physical and family conditions that favour migration at certain ages and not at others. Our results show that the age composition of the local population is a significant push factor: municipalities with younger population are more likely to send out migrants as evidenced by the positive sign of the coefficient.

4.2 Stage 2: the destination choice model

The second stage of our modelling approach explains the destination choices of migrants. Fotheringham (1991) suggests that equation (3) should be estimated separately for each locality of origin, because the magnitude of the effect that each factor might exert on the migrant's destination choice is origin-specific, that is, it depends on the relative value of the variable between origin and destination. Since the model is estimated for each origin *i*, we consider a specification with coefficients varying among origins[9]

$$E(p_{i\to j|i} \mid Z_{ij}) = \frac{\exp(V_{i\to j|i})\, ACCESS_j^{\theta_i}}{\sum_{r\neq i}\exp(V_{i\to r|i})\, ACCESS_r^{\theta_i}}, \quad j \neq i,\ j = 1,\ldots,n$$

$$\begin{aligned} V_{i\to j|i} = {} & \beta_{i1} DIST_{ij} + \beta_{i2} POP_j + \beta_{i3} UNEMP_j + \beta_{i4} RENTAL_j + \beta_{i5} VACANT_j \\ & + \beta_{i6} DENSITY_j + \beta_{i7} ACULT_j + \beta_{i8} CLIMATE_j + \beta_{i8} AGE_j + \beta_{iR} REG_j \end{aligned} \qquad (7)$$

The specification of the model includes as explanatory factors the traditional gravity variables, that is, the aerial distance between origin and destination (*DIST*), the destination population (*POP*) as the mass variable of the model, together with other destination characteristics that potentially contribute to conform its attractiveness for migrants. As in the model for the out-migration rates, we consider factors related to the local socio-economic conditions, housing market, and supplies of amenities. Regarding the housing market, here we are interested in the ease of finding housing at destination, and consequently consider a measure of the rental market size (*RENTAL*), and the proportion of housing units which are vacant (*VACANT*). Finally, we include the average age of the population (*AGE*) as an additional potential explanatory factor; as well as regional dummies.

Estimates of the parameters in the model for each origin are obtained by quasi-maximum likelihood. As noted above, for each explanatory variable in the model we compute one single coefficient estimate and its corresponding average partial effect per each municipality in the sample. Finally, the results are summarized in **Table 4** by applying the DerSimonian and Laird procedure to the set of estimates.

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[9] It is worth noting that according to well-known theoretical result the model will lead to identical coefficient estimates that those obtained by assuming that the migratory flows, m_{ij}, are Poisson random variables with mean $\mu_{i\to j|i} = \exp(\omega_i + V_{i\to j|i} + \gamma \ln(ACCESS_j))$, where ω_i are origin specific parameters (see for example, Baxter, 1984). Moreover, it can be shown that the specification is equivalent to a stochastic spatial interaction model for migration flows.

The distance variable is a proxy for overall transaction costs of migrating whether financial or personal; moreover, it is assumed that these costs increase as the distance between the origin and destination does. Distance can also be related to the information costs of traveling, with higher distance hampering the migration process. As expected, estimates of the distance-decay parameter are negative, so the probability of migration decreases with distance, what in turn would also explain the predominant short-range nature of today´s movements.

The population parameter estimates are positive and statistically significant, as expected. Migrants prefer large municipalities as destination and the values of this parameter are less than unity on the average, indicating that the attraction of a destination increases at a decreasing rate as its population rises. The preference for larger municipalities as the destination of migratory flows is associated to both the better knowledge of such places (from the media, personal contacts, etc.) and the fact they offer more opportunities for employment, entertainment, etc. It equally shows, together with results from the out-migration model, that internal migration flows are nowadays basically between urban municipalities.

One widely accepted argument in the migration literature is that people are interested in maximizing their incomes, hence they evaluate the economic opportunities arising at destinations. The availability of better alternatives in the job market is captured by the unemployment rate at potential destinations. Our findings indicate that, as expected, unemployment rates at destination plays a statistically relevant role as pull factor, in sharp contrast with its irrelevance as a significant push factor in the out-migration model.

The possibility of finding home accommodation easily may also be of importance for the destination choice, therefore, in the specification of the model appear two variables that proxy this characteristic. The estimates suggest that immigrants are more likely to go to places with substantial fractions of rentals and vacant dwellings, that is, municipalities whose home market allows for an easier access to housing are more prone to receive migratory flows.

Local amenities may act as a pulling factor for migrants. The destination choice model includes two types of amenities: those related with the availability of cultural facilities, and climatic conditions. Our findings suggest that cultural related amenities do not contribute significantly to increase the attractiveness of a place as destination for potential migrants. On the other hand, climate harshness represents a negative amenity, that is, migrants prefer destinations enjoying a mild climate. The significant negative effect of the average age of the population on the probability of being selected as destination by potential migrants reveals a clear preference for youthful places, maybe associated with a environment socially more dynamic and attractive.

Finally, apart from capturing the effects of hierarchical destination choice, the accessibility (centrality) variable may also indicate the degree of attraction of large clusters of population for migrants. Consequently, the negative estimates for this parameter are either representative of a hierarchical strategy in the choice of destinations by migrants or of migrants' reluctance regarding large metropolitan areas so as there are dispersion forces at work. It is remarkable that the results for the size

variable together with those for the destination competition variable suggest that very populated destinations, but relatively isolated from dense neighbours, are preferred over other more densely surrounded potential destinations. In this way, externalities and agglomeration effects seem to play a prominent role in fostering internal flows of people in Spain. More carefully, we can observe that dense and congested areas are left away for migrants in their mobility choices.

4.3 Further discussion of the empirical results

In this section we present additional discussion of the results from the two-stage migration framework. The first point to note makes reference to the role of unemployment levels in shaping the pattern of the internal migration flows. The conventional disequilibrium approach to migrations assumes that unemployment differentials between territories are among the main drivers of migrations, so that we should observe people moving from regions with high rates of unemployment towards regions with low ones. However, our empirical findings indicates that internal migration patterns in Spain are only partly consistent with this theoretical framework. Indeed, while unemployment appears to exert not a relevant influence on the intensity of out-migration, it is however a prominent determinant in the choice of the destination. Thus, internal migrations in Spain can be characterized as flows directed towards the more prosperous places (those with lower unemployment), but originated from any other place, that is, independently of the level of unemployment at origin.

In the case of Spain, people tend to leave large cities (those more densely populated) and go to relatively less isolated (non-central) urban destinations, but to a large extent these movements only imply a short-distance travel, even within the limits of the metropolitan area of origin (up to 50% of the migrations are within a radius of 30 km, **Figure 3**). Consequently, these migratory flows contribute to span the metropolitan areas into peripheral areas and it would be more appropriate to describe the process of de-concentration taking place as the result of suburbanization trends. Anyway, what is more striking is that employment opportunities are pursued inside the same city or region, changing the neighbourhood, and pursuing higher levels of life quality away from more central and dense areas, while the people scales the status ladder along their working lives. Obviously, this makes the migration studies a general topic of urban economics, taking it away from more traditional focus of developing economics. In this sense, the Spanish experience seems to be closer to a post-industrial pattern of movements as those characterizing the leading cities in the 21st century world.

Finally, it remains certainly true that housing market conditions are today one of the most important variables determining the mobility options of people across the countries. Dynamics of the sell and buy options for real estate assets inside a country or continental market, and rotation of such type of assets, as well as flexibility conditions for financing these options, also play a major role in defining the capacity of people of moving abroad to improve their life conditions when business cycle changes. This appear to be a pivotal result for the current Spanish economy, mainly if we take into account the disproportionate rate of unemployment characterizing the country, and this hitting the young population in particular. In such a tough context, the friendly

management of the housing market appears to be a pivotal tool for the recovery of the national economy for the case of Spain, as this investigation has helped to highlight.

5 Conclusions

In this paper we have analysed the determinants of the inter-municipal migratory flows in Spain during the period 2002-2005. We evaluated the effect of labour market, housing and other local characteristics on the two parts of the migratory process: the decision to leave-out a municipality and the choice of a particular new destination. Both issues conform the main contribution of the paper, say the local approach to migratory decisions, and the splitting of the two main choices making up them.

Key findings of the study have shown the relevant role in explaining both the departure and the destination choices of pivotal variables of the urban studies, such as agglomeration and congestion economies, diversification of the amenities supplies, housing market conditions, and demographics at the city level. Development of professional careers of migrants also plays a prominent role in internal movements, as they are mainly of the intra-regional, intra-urban type. Main urban destinations are receiving the bulk of arrivals and exits in this process, which has clearly turned into a search for better life quality standards in personal and professional terms. Moreover, these flows seem to be no more responding to the shift of traditional economic variables, mainly to unemployment differentials between locations.

Finally, and regarding policy recommendations, our findings suggest that serious steps should be taken in improving housing market flexibility at the country level, and particularly those options related to facilitate the migratory options of collectives more affected by the ongoing crisis. Cultural and health amenities are both of relevance for in-and-out flows of people at the local level, while congestion problems of big cities should be addressed by employing policy guidelines such as the promotion of public transport networks and related actions, that help to revitalise these increasingly abandoned urban areas of the main cities of Spain. In any case urban policies became more necessary than ever at the country level, as one must remind that millions of people moving around every year would be increasingly depend on them.

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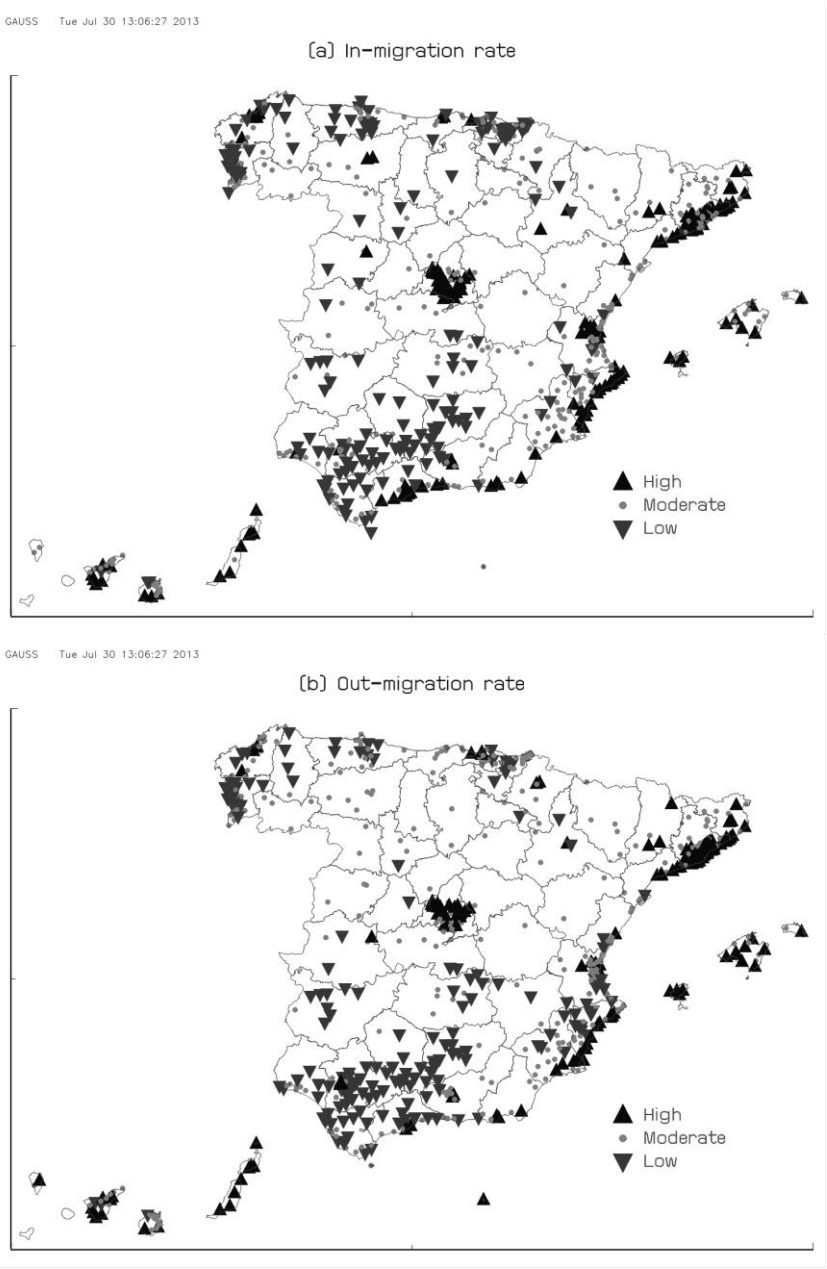
Tables and figures

Figure 1. Geographical distribution of the in- and out-migration rates 2002-2005.



Note: In- and out-migration rates are classified as *High* if rate>Q_{75}, *Moderate* if Q_{25}<rate<Q_{75}, or *Low* if rate<Q_{25}, where Q_k is the k^{th} quantile of the rate empirical distribution.

Figure 2. In-migration vs. out-migration rates.

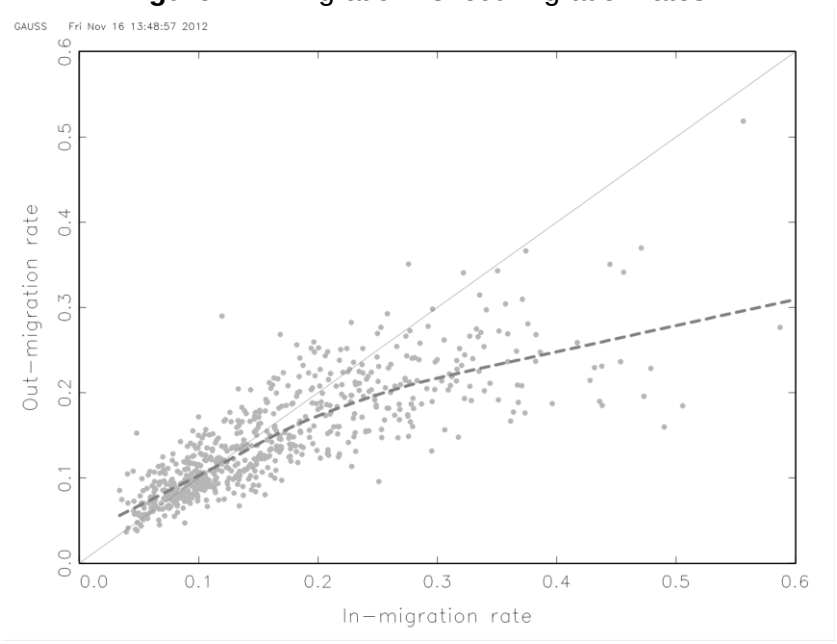


Figure 3. Distance travelled by internal migrants.

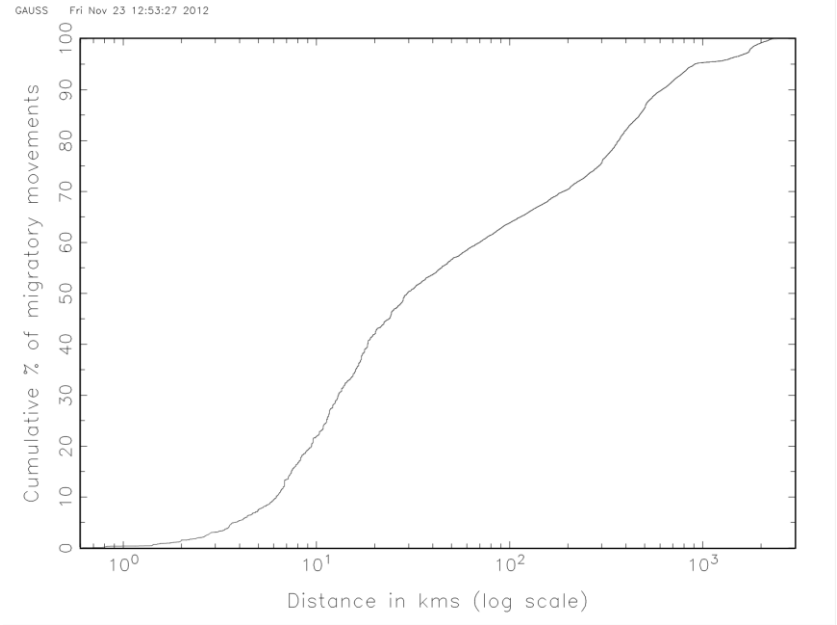


Table 1. Internal migratory movements in Spain 2002-2005.

Year	Population	Internal migrations	Ratio %
2002	41837894	1807187	4.32
2003	42717064	1937913	4.54
2004	43197684	2212007	5.12
2005	44108530	2289645	5.19

Source: Estadística de Variaciones Residenciales INE.

Table 2. Variables definition and sources of information.

Variable	Definition	Data source
DIST	Euclidean distance between municipalities centroids (in kilometres).	IGN
POP	Total municipality population.	Censo 2001 (INE)
UNEMP	Unemployment rate.	Censo 2001 (INE)
HOWN	Homeownership rate computed as the proportion of owner-occupied housing units over the number of housing units.	Censo 2001 (INE)
RENTAL	Rental rate computed as the proportion of renter occupied housing units over the number of housing units.	Censo 2001 (INE)
VACANT	Homeowner vacancy rate computed as the proportion of housing units which are vacant over the number of housing units.	Censo 2001 (INE)
DENSITY	Number of inhabitants per squared kilometre of urban area.	Censo 2001 (INE), CORINE
CULT	Number of cultural establishments per 10000 inhabitants.	Censo 2001 (INE)
CLIMATE	Index of climate harshness computed as the product of latitude and elevation above the sea level.	IGN
EDUC	Percentage of people who have achieved upper secondary and tertiary levels of education.	Censo 2001 (INE)
YOUNG	Index of population youth computed as the ratio of persons aged between 20 and 34 to the whole population.	Censo 2001 (INE)
AGE	Average age of the population.	Censo 2001 (INE)
ACCESS	Index of accessibility. Details of computation are given in the main text.	Censo 2001 (INE), IGN

Table 3. Departure model internal migration.

variable	APE		s.e.	p-value
POP	-0.1632	***	0.0131	0.0000
UNEMP	-0.0617		0.0500	0.2177
HOWN	-1.8361	***	0.2270	0.0000
DENSITY	0.0671	***	0.0112	0.0000
ACULT	-0.0452	***	0.0158	0.0043
CLIMATE	-0.0089		0.0084	0.2918
EDUC	0.7871	***	0.1151	0.0000
YOUNG	1.2094	***	0.1475	0.0000
Regional dummies included.				
Pseudo-R^2	0.6595			
Observations	660			

Note: Dependent variable is the expected probability that population from a municipality move to another Spanish municipality. APE stands for average probability elasticities. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Table 4. Destination choice model.

	APE		s.e.	p-value
DIST	-1.6560	***	0.0134	0.0000
POP	0.9035	***	0.0060	0.0000
UNEMPL	-0.1397	***	0.0211	0.0000
RENT	0.4038	***	0.0136	0.0000
VACANT	0.0535	***	0.0130	0.0000
DENSITY	-0.0251	***	0.0054	0.0000
ACULT	0.0012		0.0085	0.8900
CLIMATE	-0.0516	***	0.0037	0.0000
AGE	-0.2406	***	0.0095	0.0000
ACCESS	-0.7304	***	0.0262	0.0000
Regional dummies included				
Pseudo-R^2	0.3926			
Observations	659			

Note: Dependent variable is the expected probability of immigrants choosing to live in a particular destination given its characteristics. APE stands for average probability elasticities. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.