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# The Migration Flux:

## Understanding International Immigration through Internal Migration[1]

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**Abstract**

This paper introduces the idea that the network structure that emerges from a foreign-born population's internal migration process changes the conditions for international immigration. The idea is tested by using data from the period between 1998 and 2008 about virtually all internal and international migration events in Spain. The findings show that internal migration changes the intensity and the quality content of immigrant social capital transfers, with both positive and negative ramifications for subsequent network-driven international migration. The effect of internal migration was particularly influential in localities with no prior direct international immigration experience. The findings also revealed a synergistic effect between the two migration processes - high levels of internal migration lead to elevated overall international immigration levels. Almost all research focusing on network-driven migration treats the causal mechanism producing the network effect in an endogenous way. For example, it is commonly claimed that increasing international immigration is the result of an expansion of the immigrant network due to past international immigration. My findings constitute explicit evidence that network-driven international migration is also determined by exogenous factors such as the second-order migration of past migrants in the destination.

**Key-Words:** International, Internal, Domestic, Migration, Immigration, Cumulative Causation, Chain Migration, Social Networks



[1] A shorter version of this paper was presented at the American Sociological Associations annual meeting in Las Vegas in August 2011. I like to thank the participants in the session on International migration in Las Vegas, Raj Chari, and Javier Polavieja for their comments on an earlier version of the paper.

In this paper, I argue that past international immigrants' internal or second order migration in the new country constitutes a destination-specific change that notably modifies an immigrant collectives conditions for future international immigration.

The foreign-born population's internal migration process has attracted surprisingly little attention in the literature on international migration (Castells 2010). Research is particularly scant on the potential for a causal link between the foreign-born population's internal migration process and international migration. When internal and international migration are considered simultaneously, internal migration is usually considered as an outcome variable (e.g., Ali et al 2010; Borjas 2003; Borjas 2005; Filer 1992; Frey 1995; Frey 1996; Kritz and Gurak 2001; White and Imai 1994). Another research strand focuses on similarities between the internal and the international migration process (e.g., Bohra and Massey 2009; Garip 2008; Rivero-Fuentes 2004). Very few studies distinguish between internal migration of the foreign-born population and internal migration in general (Houle 2007). When such a distinction is made, internal migration is typically analyzed in isolation from international immigration or as an outcome variable contingent on the international immigration processes (e.g., Torres 2009; Kritz and Nogle, 1994; Newbold 1996; Light 2006; Recaño and Roig 2006).

Hence, conclusive empirical support that the foreign-born population's *internal* migration changes the conditions for *international* immigration constitutes a significant advance in our general understanding of the international immigration process.

I base my analysis on cumulative causation. That is, I will assume that social capital, in the form of assistance and information passed on from past migrants to potential migrants, facilitates future migration (Massey 1990 Massey and Espinosa 1997). More specifically, I will argue that an immigrant collective's internal migration recast the



collective's network structure in the destination. This alters the contact density between a specific origin and the location in the destination targeted by internal migrants. The result is stronger/weaker supply of immigrant social capital from the location experiencing internal migration with an increasing/decreasing volume of international immigration into the location in question.

Second, when foreign-born internal migrants venture into localities in the destination not yet ventured into by their compatriots, they mold the immigrant network structure in the destination society. This enables the supply of immigrant social capital from locations in the destination with no prior links to a particular origin country. This implies that the foreign-born population's internal migration process is a causal factor that explains the timing and the spatial diffusion international immigration events in locations in the destination.

Third, by moving into a location, internal migrants increase a collective's exposure to information about local immigration opportunities in the destination. An increased exposure to information about local immigration opportunities is conducive to more international migration. Hence, there is a synergistic effect between internal and international migration events, insofar as high rates of internal migration are likely to subsequently cause high rates of international immigration.

To achieve my analytical objectives, I use exceptional data from the Spanish local population register for the period 1999 to 2009. I will analyze about 4.6 million international immigration events and about 10.1 million internal migration events, of which 2.6 million events are internal migration events involving the foreign-born population. The data spans a total of 198 different immigrant collectives. Data is further



unique because it includes information on the movements of both documented and undocumented migrants. This extraordinarily rich data allows me to analyze how one internal and/or one international migration event changes the local conditions in which subsequent international migration events occur.

I have organized the paper as follows. First, I discuss the causal mechanisms likely to have generated the social network effects that the paper focuses on. Next, I present the data, the Spanish immigration context, the measures, the models, and an empirical analysis in which I test the main hypothesis as explained in the theoretical part. Finally, in the conclusion I discuss some general implications of my findings.

**Understanding International Immigration through Internal Migration**

Theoretically, I base my analysis on cumulative causation (Massey 1990 Massey and Espinosa 1997). Immigrant social capital transfers are at the core of this approach. The main idea is that social capital, in the form of assistance and information passed on from past migrants to potential migrants, facilitates future migration (Fussel and Massey 2004; Garip 2008; Light 2006; MacDonald and MacDonald 1964; Massey 1990; Massey and Espinosa 1997; Massey and García España 1987; Massey and Zenteno 1999; Massey et al 1994b; Massey et. al. 1998; Winters et al 2001). While, most of the work in this area has focused on the incidence of emigration, the same causal mechanisms apply when explaining the incidence of immigration (Sandell 2012).

With respect to immigration, most potential immigrants face a high level of uncertainty regarding 1) their choice of destination and 2) their potential for making it in the destination society. Therefore, if potential immigrants have family, friends, colleagues or other general contacts in a potential destination it is pragmatic to draw upon the information potential of this social network to reduce any uncertainties concerning the

destination and opportunities in the destination (Burt 1992; Granovetter 1985; Portes 1995). Potential immigrants may also call on past immigrants with a view toward reducing social or economic transition costs (Aparicio and Tornos 2004; Boyd 1989; Jennisson 2003; Light 2006; Massey et al 1987; Massey et al 1998; Moreno and Lopez 2006; Massey et al 1998). Finally, past migrants may take the initiative. By providing family friends and colleagues back home with incentives actively, additional immigration may become more likely. These incentives include, for example, social and economic remittances and family reunification (Böcker 1994; Jennisson 2003; Levitt 1998).

One distinguishing feature of the immigrant social capital just described is that its utility and availability are localized where the past migrants reside (Davis et al. 2002; Krupka 2009; Massey et al 1987; Sandell 2012; Winters et al 2001). For example, as past migrants interact with people in the destination they make new friends and develop formal and informal relationships with institutions and organizations in the *location* in the destination where they have settled (Massey et al 1994). These contacts are a primary source of information about opportunities in the destination. Hence, the physical location of jobs brokered by past to potential immigrants is usually close to where past immigrants live and/or work in the destination. Similarly, once established in a location in the destination past immigrants are increasingly in a position to cater for part of the social and economic transition costs faced by a potential migrant. Social support or economic aid such as for example sharing housing costs with an already established immigrant also requires geographical proximity to the past immigrant.

In other words, when international immigration is the result of social capital transfers between past and potential immigrants, the settlement decisions of new immigrants



tends to depend on the location of past immigrants in the destination (Davis et al 2002; Haug 2008).[2]

The notion that immigrant social capital is "*location-specific"* is analytically important. It introduces a spatial constraint on the micro level social influences that past research shown generate cumulative causation processes. The implication of this constraint is that social capital transfers between past and potential immigrants affects primarily the future volume of international immigration *in the location* in the destination in which the past immigrants reside, and from which social capital is being transferred.

Consequently, when and if international immigration is the result of social capital transfers at the micro level, the effect of these transfers would automatically reverberate at aggregated levels of analysis, such as the location, municipality, or the province in which the past immigrant resides (Sandell 2012). In other words, past immigrants operates as bridges that link two social settings or places. By supplying location specific immigrant social capital past immigrants make migration between the places they connect less complicated and less costly and also more likely.

Because the utility of immigrant social capital is contingent on the location of the past immigrant, the spatial distribution of these bridges/past immigrants is an important parameter insofar that it determines the shape and the intensity of the immigration process at the local and higher aggregated levels in the destination.



[2] The cumulative outcome of this process is spatial concentration of immigrants from the same origin in the destination. This gives rise to so-called ethnic enclaves and ethnic enclave economies (Portes and Jensen 1987; Portes and Manning 1986; Portes and Wilsson 1980). The membership to an ethnic enclave and ethnic enclave economy is in itself a type of location-specific social capital (Deléchat 2001; Glaeser and Redlick 2009; Haug 2008; Kritz and Nogle 1994). Hence, once established, ethnic enclaves inflate the value of a particular location, causing a collective's local immigration propensities to further increase.

Results from past research tell us that the spatial structure that emerges from past international migration between the origin and the destination may be the most important structure to consider (see Massey et al 1998; Rivero-Fuentes 2004).

However, and central to this research is that because immigrant social capital is *location-specific* past immigrants' continued whereabouts in the destination is of key importance for correctly assessing changes in the content, intensity, and shape of the social capital transfers between past and potential immigrants. Hence, an additional network structure of considerable importance for understanding cumulative causation processes in international immigration is the local network structure that emerged out of past migrants internal or domestic migration in the new country.

To this end, I argue that the foreign born populations internal migration have three main implications for international immigration. First, past international immigrants internal migration in the new country changes the local composition of an immigrant collective's network in the destination. Depending on the direction of local internal migration – in- or outbound – the new local network composition result in an increases or decreases in the supply of immigrant social capital from the location experiencing internal migration. As the new conditions become manifest, we will subsequently see increasing or decreasing local international immigration into the location in question.

Second, foreign-born internal migrants already reside in the destination society when they make their internal migration decisions. While we can expect that internal migration too is subject to cumulative causation (Garip 2008; Rivero Fuentes 2004), internal migrants have different information about local destination-specific factors, such as, the local economies and local labor markets, than do international immigrants (e.g., Borjas 2003; Borjas 2005). For these reason, internal migrants may target outlying



localities in the destination not yet settled by their compatriots. The network structure that emerges from such movements enables social capital transfers from otherwise disjoint localities in the destination. By spawning novel links, internal migrants turn disjoint localities into immigration-friendly environment. In response to this, future direct international immigration into locations with no prior experience of direct immigration is increasingly channeled toward the "new" footholds in the destination (see Massey et al 1994).

Third, access to location-specific immigrant social capital implies that potential immigrants have contacts who can act as intermediaries in the quest for opportunities (Burt 1992). However, information about an existing immigration opportunity is only accessible to potential international immigrants when an intermediary (a past immigrant) is present in the location where the opportunity exists and when they have established informal and formal contacts with people and institutions providing the opportunities in the location in question. Because, opportunities are likely to be spread out within specific locations in the destination, unless the immigrant network has reached a very high level of saturation, it is likely that information about some of the existing opportunities is inaccessible.

An important aspect of the foreign-born population's internal migration is that it may lead to increased local saturation of the immigrant network. As local saturation increases, the exposure to information about opportunities in the destination location rises. This suggests synergy between internal and international migration insofar as internal migration helps uncover otherwise concealed information about immigration opportunities. Once this information becomes accessible, the volume of international immigration rises accordingly.



The effect of this synergy is likely to be of intra- as well as intercollective character. For example, change in the level of intra-collective internal migration over time is likely to be positively associated with change in the future volume of intra-collective international immigration. Similarly, immigrant collectives with high levels of internal migration are likely to experience higher international immigration levels than do collectives with low internal migration levels.

These three hypotheses have important theoretical implications for how the international immigration process is construed. If they are borne out, the foreign-born population's internal migration is a direct conditioning factor in the variation in the volume of international immigration across locations and time. Furthermore, the spatial expansion and increased local penetration of immigrant networks resulting from internal migration, makes available new information about immigration opportunities in the destination. Hence, internal migration exerts an exogenous influence on the quality content of the causal loop between past and potential immigrants that past research has found central when explaining international migration.



## Data

A decisive test of the hypotheses outlined above requires not only relevant longitudinal and spatial data on all past immigrants, but also data about their exchange of information and assistance with all potential immigrants in the relevant population at different points in time. Even if such data were possible to collect, it is definitely not currently available. In the absence of such data I turn to an alternative empirical strategy.

It has been suggested that network size, is an effective proxy measure of quantity of social capital being exchanged (Burt 1992, p. 12). Consequently, instead of individual-

level relational data, I will use data with information about the change in the number of past immigrants from a specific origin into a given location to estimate change in social capital transfers between the origin and the locality in question (see also Bohra and Massey 2009; Dunlevy 1991; Dunlevy and Gemery 1977, 1978; Greenwood 1970; Levy and Wadycki 1973; Walker and Hannan 1989; Massey 1990; Massey and García España 1987; Massey et al 1994b; Massey and Espinosa 1997; Nelson 1959; for empirical studies using network size as a proxy for social capital transfers). As will be discussed more fully below in the methodological section, this approach allows for a reasonably reliable test of the key hypothesis developed above.

The data I use, which meets the specified requirements, have some unique features. They are drawn from the "Spanish local population register," the so called "Padrón Municipal." I focus on the period from January 1, 1999 to January 1, 2009, comprising information on approximately 5.4 million international migration events on a monthly basis. For the same period, and from the same source, I have information about 13.9 million intermunicipal migration events, of which 3.8 million events concern the foreign-born population. For each migration event, I have information about place of birth, nationality, country of origin in the case of international migration, and the municipality of origin in the case of internal migration. Due to data protection constraints location is only revealed if the destination/departure municipalities have a population that is larger than 10 thousand people. For this reason, out of approximately 8.000 municipalities in Spain, my analysis focuses on 737. However, the included municipalities received approximately 4.6 million or 85% of Spain's total international



immigration and about 2.6 million or 70% of the foreign-born population's total internal migration for the period.[3]

Finally a distinguishing and unique feature of this data is that it contain information both documented and undocumented migrants. [4] To my knowledge, no other country produces such a reliable continuous account of immigration and internal migration events for both its documented and undocumented foreign-born population at this level of detail.

The following information may be useful for those unfamiliar with the Spanish immigration context. In 1999, Spain received fewer than 50,000 new documented and undocumented immigrants. Since then annual immigration levels have increased dramatically, reaching a peak in 2006 and 2007, with new inflows exceeding 800,000 (see light gray bars in Figure 1). Spain's documented and undocumented foreign-born population has risen from approximately one million to more than 6.4 million in the period analyzed (see solid line in Figure 1). Its share of the total population has risen from less than 3% to over 13%. Spain has been one of the world's most important immigration destinations in absolute as well as in relative terms over the last decade.

**Figure 1 about here**

[3] This data have been made available to me by the Instituto Nacional de Estadistica (INE).

[4] Inscription in the Spanish local population register is a basic right and an obligation for both documented and undocumented immigrants. Inscription is reinforced by legal incentives since it gives undocumented immigrants access to health care and education in the municipality in which they reside. Spanish law also includes important mechanisms for regularizing undocumented immigrants, which are conditional on the length of undocumented stay in Spain, of which inscription in the local population register is irrefutable evidence. If we also consider that the last amnesty for undocumented immigrants explicitly mentioned inscription in the local population register before a specific date as a precondition for inclusion in the campaign, and that if, or when, Spain embarks on a massive regularization campaign in the future, inscription in the population register is again likely to be a prerequisite. It is expected that very few immigrants will fail to inscribe in the population register.

Currently there are immigrants from almost all nations in Spain. However, some 20 immigrant origins account for approximately 80% of Spain's total immigrant population. Immigrants from Romania form the largest minority in Spain (767,000 in January 2009), followed by immigrants from Morocco (737,000 ) and Ecuador (479,000).[5] Europe and South America combined account for more than 70% of Spain's total immigrant population (see Table 1). Most of the European immigrants are EU citizens. The falling share of European immigrants from non-EU member states is explained by the successive enlargements of the Union from 15 to 27 states over the past decade. The proportion of immigrants from Africa has declined throughout the period, from 20% to 16%. Over 80% of African immigrants are from Northern Africa, and in particular from Morocco (70% in 2009). Finally, 5% of Spain's foreign-born population comes from Asia, and about half of the immigrants from Asia come from China (146,000).

**Table 1 about here**

Interprovincial differences in immigrant density have intensified as time has passed (see Figure 1). In 1999, coastal provinces in the south and in the east, including Malaga, Almeria, Murcia, Alicante, Girona, Barcelona, Castellon and the Balearic Islands had density levels between 5% and 10% of the total population. The rest of the country, except for Navarra in the north and Orense in the northwest, had density levels close to zero. At present, (January 2009), there is a variation from less than 5% to more than 25%. These patterns are accentuated at the level of municipalities (not shown). For example, in 2009, about 20% of Madrid province's population was foreign-born. However, immigration density varied from just under 8% to 32% across the province's

[5] Romanians overtook Moroccans as the largest minority in 2007.

municipalities. Interprovincial differences with respect to immigrant origin are significant as well, and ethnic clustering is prevalent. Whenever a collective dominates numerically in more than one province, these provinces tend to be adjacent. [6]

**Figure 2 about here**

As for the political context, legislative changes have been frequent in the past decade. However, these changes are by and large cosmetic. The main mechanisms regulating immigration are the same today as in 2000, when Spain's first law addressing immigration came into effect. These are contractual in the origin according to national needs for foreign labor.

However, the truth of the matter is that existing legal mechanisms only account for a fraction of Spain's immigration over the past decade. Clandestine and undocumented immigration has been very frequent. A conservative estimate is that as much as 70-80 % of Spanish immigrants have been undocumented immigrants at some point. Typically, immigrants enter the country legally on a tourist visa and then overstay. Illegal migration, such as the dramatic flow of so called boat migrants , the "Cayucos," between Africa and the Canary Islands, and between North Africa and the p[eninsula's southern shore is much less common. Only about 1-2% of the annual newcomers enter through this route (Sandell 2008).

That undocumented immigration is predominant does not imply that the majority of Spain's immigrants are undocumented (see note in Table 1 for an estimate of the

[6] For example, without any a priori assumptions about the various collectives' settlement patterns, we could expect that the Moroccan, Romanian, and Ecuadorian collectives would dominate numerically at lower administrative levels. While it is true that immigrants from these countries dominate a majority of Spain's provinces, nine other collectives manage to outnumber these three collectives at the level of provinces despite being significantly inferior in size. These collectives are from Argentina, Bolivia, Bulgaria, Colombia, France, Germany, Portugal, Venezuela, and the UK. Of these nine, the UK is the largest with 380,000 immigrants and Portugal the smallest with 148,000.

problem). An interesting and unique feature of Spanish immigration legislation is that undocumented migrants can obtain documentation after a limited period of undocumented stay. This mechanism is known as "Arraigo." Arraigo literally means roothold. By means of this mechanism, undocumented immigrants may gain status as documented immigrants if they can demonstrate that they have lived and participated in community life in Spain for a period of three years or longer and that someone is willing to contract them.[7]

In sum, Spain has been the scene in Europe of the type of mass immigration that we have seen between, for example, Mexico and the United States. Thus, it represents an excellent European case of transnational labor immigration likely to fit into the conceptual model of network-driven migration of the type that this paper focuses on (see Massey et al 1994b and MacDonald and MacDonald 1964).



## Methods

I will perform three tests in the following analysis. The first concerns whether a collective's internal migration process changes the supply quantity of immigrant social capital and thereby alters the conditions and hence the volume of subsequent international immigration. In this test the dependent variable is defined as:

$$M_{ljt} = \sum_{i=1}^{N} m_{ljit} \qquad \text{Eq. 1}$$

$m_{ljit}$ is an individual-level international immigration event in location $l$ where the immigrant is from origin $j$ at time $t$. Consequently, $M_{ljt}$ is the total influx of new

[7] The three-year waiting time corresponds to the mechanism known as social "arraigo." The so-called labor "arraigo," requires two years of undocumented stay. The latter is seldom used. It gives undocumented immigrants working illegally in Spain documented status if they report their employer to the authorities.

international immigrants from *j* into *l* at time *t*. This means that the unit of analysis in this test is the municipality/collective. I use data on a total of 197 immigrant collectives and 735 municipalities. Pairing them yields a total of 144,795 unique municipalities/collectives. Furthermore, the data is longitudinal, which means that each municipality/collective pair contributes one observation for each time period. The time unit is the quarter. [8] This makes the total number of observations in this test 5,109,471. A reasonable test of my first hypothesis is achieved with the following fixed-effect linear model:

$$M_{ljt} = \beta_1 M_{lj(t-1)} + \beta_2 Z_{lj(t-1)} + \beta_3 K_{lj(t-1)} + \Sigma\beta D_{l(t-1)} + \Sigma\beta O_{j(t-1)} + \alpha_j + \varepsilon_{j(t-1)} \qquad \text{Eq. 2}$$

where $M_{lj(t\text{-}1)}$ is the past inflow of international immigrants into location *l* from origin *j*, $Z_{lj(t\text{-}1)}$ and $K_{lj(t\text{-}1)}$ is the past internal *immigration* and the past internal *emigration* into/out from municipality *l* of foreign born from *j*. These measures are obtained similarly as $M_{lj}$ above. Hence, using network size as a proxy for location-specific social capital supply, $M_{lj}$, $Z_{lj}$, and $K_{lj}$ are influence coefficients measuring the change in the social capital supply quantity between location *l* and origin *j*. A positive parameter estimate for *Z* and a negative for *K*, while controlling for the expected positive effect of past inflow of international immigrants *M*, suggest that internal migration influences the quantity of social capital transferred between past and potential immigrant, and therefore alters the conditions for international immigration locally.

Furthermore, I control for pertinent local economic factors - $D_l$. Economic measures at the level of municipality over long time periods are rare. However, I have access to two

[8] While the data are recorded on a monthly basis, I chose the quarter as the analytical time scale mainly for computational reasons. I have played with monthly as well as half-yearly intervals. The results in these tests were consistent with the results using data on a quarterly time scale.





measures, local economic activity and local unemployment.[9] All analyzed localities are subject to the same national legislation. The general political context is therefore a constant, and redundant. However, I control for legislative changes that permanently influence the entry propensities for citizens from a particular country of origin ($O_j$) by means of dummy variables. Examples of such events are country-specific changes in visa exemptions, and EU membership. I use year dummies to neutralize nonlinear time trends. Finally, I treat unmeasured municipality/collective differences as fixed by accommodating them in $\alpha_j$.[10]

The second test seeks to establish whether the foreign-born population's internal migration process influences the timing of a collective's first direct international immigration event into a municipality.[11] To this end, I use a Cox proportional hazard rate model. As in the first test, the unit of analysis is the municipality/collective. The risk set is made up of all municipalities with zero people from the concerned collective as of January 1, 1999. Since I have time-varying covariates, each municipality/collective with zero people from the concerned collective contributes one observation for each time period it is at risk of experiencing its first direct international immigration event. Within each time period, it can experience or not experience an international immigration event. Hence, my dependent event measure is one (1) in the

[9] The economic measures at the municipal level are from the Anuario Económico de España 2010, made available on line by La Caixa. Municipal unemployment is measured in percent of total population. I use the number of activities classified as retail by Spain's national statistical agency (INE) in each municipality as an estimate of local economic activity. The Anuario Económico de España offer several competing measures. However, local retail activity is the only one for which data is available for the whole period of interest.

[10] I use STATA's xtreg command (STATA v.11.1) to estimate this model. Because each collective is non-nested (each collective appears in more than one municipality), my observations are not independent. To correct for this, I use Stata´s cluster option to obtain robust standard errors.

[11] Direct international immigration events are defined as all new inscriptions in a municipality where the last place of residence is a place abroad.





time period that a municipality/collective experiences its first direct international immigration event and zero (0) for all the preceding time periods. Immigration events occurring after December 31, 2008 are censored. As in the previous test the time unit is quarter. The following equation describes the model:

$$r_{ljt} = h_{ljt}\, e^{\beta_1 \Delta P_{lj(t-1)} + \beta_2 D_{l(t-1)} + \beta_3 O_{j(t-1)}} \qquad \text{Eq. (3)}$$

where $r_{ljt}$ is the probability that a given Spanish location $l$ will experience its first direct international immigration event from collective $j$ at the next point in time. $h_{ljt}$ is the (unspecified) baseline hazard. $P$ is the size of the collective in $l$. $\Delta P_{lj(t-1)}$ is simply the change in a collective's size due to internal migration $(P_{lj(t-1)} - P_{lj(t-2)})$. Consequently, using network size as a proxy for location-specific social capital supply, $\Delta P_{lj(t-1)}$ is an influence coefficient that measures the change in supply of social capital between location $l$ and origin $j$ due to internal migration during the time period preceding the analyzed event. An increase in the hazard ratio suggests that a social network effect resulting from internal migration is likely to be operating on the timing of a collective's first local international immigration event.[12]

The third and final test investigates whether there is a synergy between internal migration and international migration. I define the dependent variable in this test as follows:

$$M_{jt} = \sum_{l=1}^{N} M_{ljt} \qquad \text{Eq. (4)}$$

[12] My observations are spatially- and time-dependent. I therefore relax the assumption of independent observations in the analysis. Furthermore, a specific collective can appear in multiple locations. To correct for this, I use Stata's cluster option to render robust standard error estimates. I chose to cluster at the highest nested level, which in my case is the collective. A total of 198 clusters are defined (see Nichols and Schaffer for a discussion on the problem of non-nested clusters and its possible solutions). http://repec.org/usug2007/crse.pdf





where $M_{ljt}$ is the inflow of international immigrants into *l* from *j* as defined in equation 1. Consequently, $M_{jt}$ is the total inflow of international immigrants from *j* into Spain at time *t*. I fit two different models in this test.

$$M_{jt} = \beta_1 X_{j(t-1)} + \beta_2 S_{j(t-1)} + \beta_3 O_{j(t-1)} + \alpha_j + \varepsilon_{j(t-1)} \qquad \text{Eq. (5)}$$

$$\overline{M}_j = \beta_1 \overline{X}_j + \beta_2 \overline{S}_j + \beta_3 \overline{O}_j + \nu_j + \bar{\varepsilon}_j \qquad \text{Eq. (6)}$$

The first model (Eq. 5) is a fixed-effect linear model. $X_j$ is the total level of internal immigration in Spain for collective *j* at time *t;* it is defined similarly as $M_j$ in Equation 4. $S_j$ is the stock of immigrants. $O_j$ is origin-specific characteristics defined in tests 1 and 2 above.

The first model treats intercollective differences as fixed by accommodating them in $\alpha_j$. Hence, this model tests the assumption that an increase in an immigrant collective's internal migration during one period is followed by an increase in its international immigration volume at the next point in time.

The second model (Eq. 6) is a between (collectives) effect linear model. By averaging the dependent and independent variables for each collective *j* over time *t*, this model enables an analysis of intercollective differences with respect to the independent variable. With this design, it is possible to test the assumption that collectives with high average internal migration have higher average international immigration than do collectives with low average internal migration. The independent variables of interest in these models are $X$ and $\bar{X}$ A positive estimate for both variables across models, while controlling for the collective's size and collective-specific legal changes, suggest synergy between a collective's internal and international immigration.



## Results

Tables 2, 3, and 4 contain the results of the three tests outlined above. Because data protection limitations force me to exclude municipalities/collectives below a population of 10,000, it could be argued that I am modeling a sample rather than the population of events. However, a more correct interpretation is that I model the population of municipalities/collectives where the municipality's population is greater than 10,000. This means that a statistical significance test is no longer an indicator of sample properties. Therefore, the only way to do justice to any observed relationships in my data is by interpreting the size of the parameter estimates. However, while statistical significance tests are redundant, they are informative about the strength of a particular parameter estimate (Alison 1982). This is why I report them in Tables 2 and 3.

The first model in Table 2 formally tests the paper's key assumption that immigrant social capital is location-specific. As expected, the increased supply of location-specific social capital due to past international immigration has a very strong effect on the magnitude of future international immigration.

A unit increase in location-specific social capital corresponds to a 0.82 increase in a collective's international immigration during the next time period. This finding is largely consistent with the cumulative causation thesis, and with empirical findings from research in this genre (e.g., Davis et al 2002; Dunlevy 1991; Massey 1990; Winter et al 2001). The parameter estimates for my other independent measures are in the right direction and consistent with economic migration theory and Spanish migration studies (e.g., Borjas 2003; Devillanova and Fontes 2004; Torres 2007; Hierro 2009). Rising local unemployment has a negative effect on local international immigration, whereas rising economic activity have a corresponding positive effect.



**Table 2 about here**

Now, it could be argued that my measure of location-specific social capital merely reflects a general increase in the supply of immigrant social capital regardless of location. To verify that this is not the case, apart from my measure of location-specific social capital supply, I also include a measure of total social capital supply. This alternative measure reflects the change in social capital supply due to a collective's *total* international immigration into Spain during the previous time period. If immigrant social capital is location-specific, an increase in the total supply of social capital should not be statistically relevant once I control for the supply of location-specific social capital. As we can see this is indeed the case. The parameter estimate for the alternative measure is approximately zero.[13] This finding constitutes a strong indication that immigrant social capital is location-specific in the way I have set out in this paper.

Model 2 tests the paper's first hypotheses, that the foreign-born population's internal migration changes the local conditions for international immigration by altering the potential supply of location-specific social capital. Judging from the results, an increased supply of location-specific social capital due to internal immigration lead to a 0.26 increase in international immigration during the next time period (see Model 2, Table 1). On the contrary, the decrease in the supply of location-specific social capital due to internal emigration is associated with a 0.55 decrease in international immigration during the next time period. A positive parameter estimate for internal immigration and a negative estimate for internal emigration, while holding constant the effect of past international immigration, are congruent with my hypothesis.

[13] The total social capital supply measure is positive and significant when the location-specific measure is omitted from the model (not shown).





In this model, it is worth noting that internal emigration of the foreign born population from a municipality seems to affect the conditions for future local international immigration to a greater extent than does their internal immigration into the municipality. A plausible explanation for this is integration. Internal migrants moving out from a municipality have knowledge about existing local opportunities and an established relationship with the locality and local community at the moment of their departure. By contrast, internal migrants moving into a municipality have to acquire this social capital upon arrival. The social capital advantage of the former vis-à-vis the latter would suggest that the negative effect of the foreign born populations departure from the municipality is proportionally larger than the direct positive effect of foreign born internal migrants' arrival to the municipality.

A potential problem with Models 1 and 2 is that we cannot rule out that unmeasured local amenities drive the observed changes in local international immigration. A straightforward way to test for this alternative explanation is to control for change in the size of the foreign-born population from other origins (*k*) in a given location. An increase in the foreign population from other origins would signal that a location is an attractive destination. But since origins $k \neq$ origin *j*, this increase does not presuppose an increasing supply of location-specific social capital for latent immigrants from *j*. Consequently, if local amenities drive local immigration, an increase in the foreign population from other origins should be associated with an increase in the international immigration from a particular collective *j*.

The results in Model 3 indicate an inverse relationship for the alternative measure. That is, an increase in the foreign population from other origins results in decreasing international immigration from the focal collective. Also worth noting is that the parameter estimates for the original social influence measures are uniform across





models. Together, these results indicate that the observed network effects in Models 1 and 2 are genuine, and that the alternative hypothesis can be relaxed.

Even so, it is somewhat surprising to observe such a strong reversed effect. A close to zero effect of the alternative measures would have been more in line with my prior expectations. How can this be explained? An important aspect of network-driven immigration is that potential immigrants have contacts with intermediaries in the destination who can transfer information about job openings, affordable housing, or other relevant information about opportunities (see Burt 1992). Opportunities or resources such as these are not unlimited. Hence, if other immigrant collectives are present in a location, there is a potential for intercollective competition. Consequently, one way to interpret the fairly strong reversed effects of the control measures is to assume that the increased competition implied by the expansion of other foreign-born groups impedes the expansion of a particular collective. And the opposite, that the decreased competition implied by the internal emigration of members of other collectives benefits a particular collective's capacity for expansion.

I now turn to my second test. This test focuses on whether the new network structure emerging from an immigrant collective's internal migration affects the timing of the collective's first direct international immigration event in a location. In this test, the dependent variable is time to a collective's first direct international immigration event into a municipality. I estimate the model using a Cox proportional hazard rate model (see results in Table 2). The risk set consists of all municipalities/collectives with zero population from the collective in question on January 1, 1999.

**Table 3 about here**



Interpreting the hazard ratios is straightforward. For example, the hazard ratio 1.10 observed for my measure of change in the supply of social capital due to internal migration means that each increase in the measure is associated with a 10 percent increase in the probability (risk) that a municipality will experience its first international immigration event from the collective in question during the next time period. Apart from being an illustrative example, the observed hazard rate clearly suggests that foreign-born internal migrants act as pioneers in the manner suggested by my second hypothesis. That is, when internal migrants from a given collective settle in municipalities that have not been settled by their compatriots, they enable the supply of location-specific immigrant social capital between places that used to be unconnected. This significantly shortens the waiting time until a municipality experiences its first direct international immigration event by the collective in question. Likewise, if members of the collective in question abandon the municipality before the first direct international immigration event has taken place, direct international immigration is substantially delayed.

Building on the experience from the first test, that intercollective competition may impede a collective's expansion in the destination, I look in Model 2 at how the timing of a collective's first international immigration event responds to changes in the size of other collectives. Judging from the negative effect, the potential for intercollective competition cannot be excluded. This finding is consistent with the findings in relation to the first test reported above. Finally, an increase in local unemployment lowers the probability that a municipality will experience an international immigration event from the collective in question during the next time period. An increase in native population and economic activity are coupled with an increasing probability of experiencing an



international immigration event. These estimates are also consistent with the results obtained in the first test (see Table 1).

The empirical evidence from my first two tests points in a similar direction. The network structure emerging as a result of an immigrant collective's internal migration generates links between an origin and locations in the destination that used to be poorly connected or simply out of reach. The result is an increased volume of international immigration into the locations targeted by internal migrants. However, a core argument of this paper is that internal migration also influences the quality content of the feedback loop between past and potential immigrants. More precisely, I predicted a synergistic effect whereby the likelihood for international immigration rises as internal migration intensifies. The third and final test addresses this hypothesis.

As explained in the methodological part the third test is divided in two parts. Part 1 examines how the intensity of internal migration influences international migration intensities over time within an immigrant collective. Part 2 seeks to establish whether collectives with high internal migration intensity have higher international immigration rates than do collectives with low internal migration intensities.

**Table 4 about here**

The results are displayed in table 4. As for Part 1, controlling for a collective's size, a one unit increase in a collective's internal mobility implies a 0.92 increase in the number of international immigration events for the collective during the next time period. Similarly, in Part 2, a one unit increase in a collective's average internal mobility implies a 0.68 increase in the collective's average number of immigration events. In other words, whenever a collective experiences a rise in internal migration, this is followed by a higher level of international immigration during the next time period.



Similarly, in comparing different collectives, I find as expected, that collectives with higher internal migration rates have higher rates of international immigration. A relationship of this nature is expected if an immigrant collective's internal migration creates new destination-specific conditions that are conducive to superior rates of further international immigration. Hence the results of both subtests corroborate my claim that there is a synergy between the two migration processes that this paper has focused on.

## Conclusions

That past immigrants facilitate future immigration by transferring immigrant social capital in the form of information and assistance, is one of the most explored issues in the international migration literature. Empirical support for this view is consistent. Consequently, most researchers now take for granted that past international migration facilitates future international migration. However, one weakness with the approach is that it often fails to consider changes in the destination's meso- and macro-contexts in which immigration take place (see de Haas 2010 and Light 2006). Such changes may alter the content and shape of the feedback process between past and potential immigrants, with significant consequences for the flux of future immigration into the destination society.

In this paper I introduced the idea that the foreign-born population's internal migration is an example of a destination specific change that conditions network-driven international immigration. I developed three sets of predictions that were tested using exhaustive and unique data on international and internal migration in Spain during the period from 1999 to 2008. When I confronted my predictions with the empirical data I found strong support for all three predictions.



More specifically, my findings indicate that the foreign-born population's internal migration reinforced or weakened the links between an origin and different locations in the destination. This resulted in higher or lower local immigration rates, depending on the direction of the internal migration flow. Furthermore, my findings also indicate that foreign-born internal migrants acted as pioneers for international migrants. When internal migrants ventured into locations that had not yet been settled by their compatriots, they linked origins with otherwise disjoint localities in the destination. These actions lead to an increased probability of direct international migration into municipalities with no prior direct international immigration from the collective in question. Finally, my findings reveal a synergistic effect between internal migration and future international immigration. By increasing geographical saturation of immigrant networks, internal migration made available information about otherwise concealed local immigration opportunities. In other words, high levels of internal migration were conducive to more international migration, both within and across immigrant collectives.

The theoretical implications of my findings are important. Research that focuses on network-driven migration often treats the mechanism producing the network effect in an endogenous way. For example, a common claim among researchers who advocate cumulative causation or chain migration is that increasing international immigration is the result of an expansion of the immigrant network due to past international immigration. It is also the case that when researchers model this causal loop, they often use some form of dynamic models with lagged dependent variables. That is, past international migration is viewed as a determinant for future international migration. For these reasons, it is tempting to infer that changes in the feedback loop between past and latent migrant are endogenously determined.



My findings constitute explicit evidence that changes in the feedback process between past and potential migrants are also determined by factors exogenous to the international immigration process. As places with no prior links to a given origin became connected and already connected places saw their links reinforced or weakened by means of internal migration, the incidence of international immigration in a location changed accordingly. Moreover, by facilitating social capital transfers from novel places, or by simply increasing the local saturation of an immigrant network, internal migration enriches and increases available information about immigration opportunities in the destination, with increased international immigration rates overall as a result. Hence, internal migrations change the conditions for future international immigration in a way that would explain how cumulative causation and chain migration are sustained over time. Or put slightly differently, without internal migration, the effect of cumulative causation would die off faster as it would be deprived of the new information about international immigration opportunities made available by the internal migration process.

An additional finding of the research reported here is that when I assessed the impact of internal migration on international immigration I found that there is a potential for intercollective residential competition. This finding is not trivial. It suggests that ethnic competition, or rather the change in ethnic competition across immigrant collectives, constitutes a destination-specific change with a capacity to alter the conditions of immigration. If competition over local resources in the destination becomes fierce, this will seriously hamper the feedback process between past and potential migrants, with lower international immigration rates as a result. Ethnic competition over local resources in the destination is an overlooked phenomenon in most research on network-driven immigration. While the potential of intergroup competition has yet to be fully



understood, it is clear that the web of contacts between members of competing ethnic groups is an intervening factor with a capacity to diminish or neutralize the otherwise positive effect of the feedback loop between past and potential immigrants. Hence, explaining local international immigration without considering information about other immigrant group's whereabouts in the destination is likely to be misleading.

Explaining international immigration in space and over time using information about social networks that result from both internal migration and international immigration in the way I have done here changes network-based explanations of international migration. It shows that multiple and possibly overlapping network structures have to be considered to understand how social influences operate on the international immigration process. Since it would be fair to assume that internal migration decisions are more responsive to conditions in the destination society than are international migration decisions, network-driven international immigration is likely to be more sensitive to factors that are unique to the destination than we have been lead to believe by past research.



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| Table 1. Immigrant stock in Spain | | | |
|---|---|---|---|
| | **2009** | **2004** | **1999** |
| **Total Population in Spain** | 46,745,807 | 43,197,684 | 40,202,158 |
| **Total Foreign-born Population** | 6,466,278 | 3,693,806 | 1,259,054 |
| % of tot. population | 13.83% | 8.55% | 3.13% |
| **European Union Member States** | 2,327,845 | 821,479 | 519,824 |
| % of tot. immigration | 36.00% | 22.24% | 41.29% |
| **European Non EU Countries** | 286,784 | 465,046 | 82,702 |
| % of tot. immigration | 4.44% | 12.59% | 6.57% |
| **Total Europe** | 2,614,629 | 1,286,525 | 602,526 |
| % of tot. immigration | 40.43% | 34.83% | 47.86% |
| **Africa** | 1,042,124 | 649,976 | 254,311 |
| % of tot. immigration | 16.12% | 17.60% | 20.20% |
| **Central America and the Caribbean** | 294,251 | 158,559 | 70,071 |
| % of tot. immigration | 4.55% | 4.29% | 5.57% |
| **North America (including Mexico)** | 86,959 | 65,755 | 36,382 |
| % of tot. immigration | 1.34% | 1.78% | 2.89% |
| **South America** | 2,097,825 | 1,366,268 | 233,447 |
| % of tot. immigration | 32.44% | 36.99% | 18.54% |
| **Asia and the Pacific** | 330,490 | 166,723 | 62,317 |
| % of tot. immigration | 5.11% | 4.51% | 4.95% |

Note: These figures refer to both documented and undocumented immigrants as well as nationalized immigrants. In 2009, 817,000 of the total foreign-born population were Spanish citizens. According to the Ministry of Labor Statistics, and excluding EU member states, about 2.7 million residence permits and 40,000 study visas were in force at the end of 2008. Hence, of the 3.3 million non-EU foreigners, approximately 2.74 million foreigners who figure in the population register are likely to be documented and 560,000 undocumented as of January 2009.



**Table 2. Fixed effect linear model**
**Dependent variable: $M_{lj}$ (Volume of International Immigration in location l from collective j)**

| VARIABLES | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| ***$M_{lj(t-1)}$ (International Immigration)*** | 0.8171*** | 0.8296*** | 0.8293*** |
| | (0.0067) | (0.0164) | (0.0164) |
| ***$M_{j(t-1)}$ (Total International Immigration)*** | -0.0012 | N.A. | N.A |
| | (0.0008) | | |
| ***$Z_{lj(t-1)}$ (Internal Immigration)*** | N.A. | 0.2615** | 0.2610** |
| | | (0.1254) | (0.1239) |
| ***$K_{lj(t-1)}$ (Internal Emigration)*** | N.A. | -0.5536** | -0.5608** |
| | | (0.2559) | (0.2552) |
| ***International Immigration by people from $k_{(t-1)}$, (k≠j)*** | N.A. | N.A. | -0.0001 |
| | | | (0.0001) |
| ***Internal Immigration into l by people from $k_{(t-1)}$, (k≠j)*** | N.A | N.A | -0.0011** |
| | | | (0.0005) |
| ***Internal emigration from l by people from $k_{(t-1)}$, (k≠j)*** | N.A | N.A | 0.0027*** |
| | | | (0.0009) |
| ***(Size in Native Population in l/1000) $_{(t-1)}$*** | N.A. | N.A. | 0.0000 |
| | | | (0.0002) |
| ***Local Un employment in l (in percent) $_{(t-1)}$*** | -0.0174*** | -0.0227*** | -0.0174** |
| | (0.0046) | (0.0061) | (0.0068) |
| ***(Local economic activity in l/100) $_{(t-1)}$*** | 0.0271 | 0.1187*** | 0.0294** |
| | (0.0307) | (0.0341) | (0.0148) |
| ***Constant*** | 0.2905 | -0.9233*** | -0.0924 |
| | (0.4871) | (0.3147) | (0.1273) |
| Observations | 5,109,865 | 5,109,865 | 5,109,865 |
| No. of Municipalities/Collectives groups | 144,795 | 144,795 | 144,795 |
| No. of Clusters | 197 | 197 | 197 |
| R-squared (within) | 0.6780 | 0.6904 | 0.6907 |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. 17 Origin-specific dummies capturing legal changes and 10 "year dummies" are included in the regressions but omitted from the result table.



**Table 3. Cox proportional hazard rates:**
**Dependent variable: Time to Collective j's first international immigration event in location l**

| VARIABLES | Model 1 | Model 2 |
|---|---|---|
| $\Delta P_{lj(t-1)}$ *(Internal migration)* | 1.1025*** | 1.1001*** |
| | (0.0127) | (0.0127) |
| *(Change in Foreign Population in l /100)*$_{(t-1)}$ | N.A. | 0.9943*** |
| | | (0.0011) |
| *(Change in Native Population in l / 1000)*$_{(t-1)}$ | N.A. | 1.0515*** |
| | | (0.0027) |
| *Local Unemployment in l (in percent)*$_{(t-1)}$ | 0.9414*** | 0.9398*** |
| | (0.0038) | (0.0038) |
| *(Local economic activity in l/100)*$_{(t-1)}$ | 1.0058*** | 1.0117*** |
| | (0.0002) | (0.0004) |
| Observations | 3,413,269 | 3,413,269 |
| No. of Subjects | 98643 | 98643 |
| No. of Clusters | 197 | 197 |
| No. of Events | 22686 | 22686 |

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 17 Origin-specific dummies capturing significant legal changes over time are included in the Cox-regressions but omitted from the result table



**Table 4. Fixed- and Between-effects linear regression estimates**
**Dependent variable: Number of international immigration events (t)**

| VARIABLES | Model 1 within | Model 2 between |
|---|---|---|
| $X_{j(t-1)}$ ***(No. of internal migration events)*** | 0.9276*** | |
| | (0.0368) | |
| $\bar{X}_{i(t-1)}$ ***(Average No. of internal migration events)*** | | 0.6343*** |
| | | (0.0661) |
| ***Size of collective j*** $_{(t-1)}$ | 0.0091*** | 0.0174*** |
| | (0.0011) | (0.0015) |
| ***Constant*** | 200.0013*** | 59.1338*** |
| | (13.6590) | (22.0056) |
| Number of Observations (Collective/Quarter) | 7,683 | 7,683 |
| Number of collectives | 197 | 197 |
| R-squared | 0.5051 | 0.9770 |

Notes: Robust standard errors in Model 1 and standard errors in Model 2 in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 17 Origin-specific dummies capturing legal changes over time are included in the two models but omitted from the result table



**Figure 1. Summary of international and the internal migration of foreign born people in Spain 1999-2009**

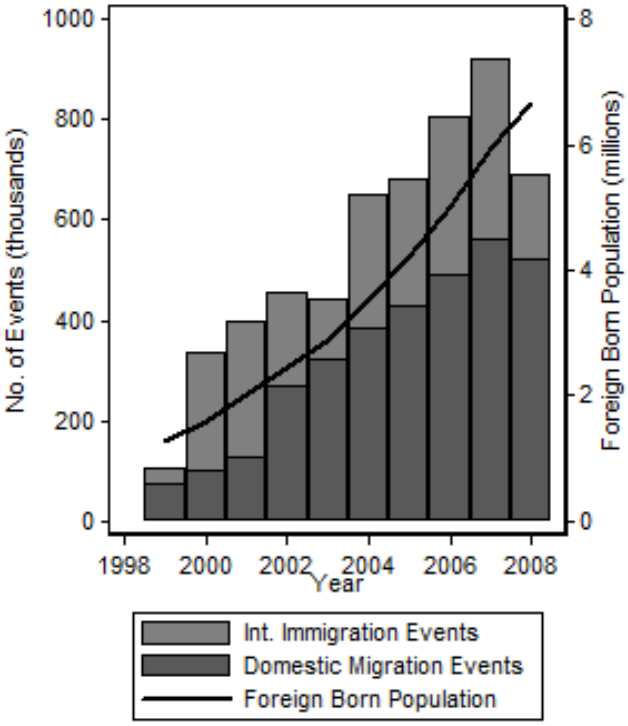

**Figure 2. Immigration Density in Spain Jan 1999, Dec 2003, and Dec 2008**