Does trade creation by social and business networks hold in services? An analysis for Accommodation and Restaurants in Spain

Author:

Tamara de la Mata (tamara.delamata@uam.es) (*)

(*) Departamento de Análisis Económico: Teoría Económica e Historia Económica and the L. R. Klein Institute, Universidad Autónoma de Madrid, 28049 Cantoblanco, Madrid, Spain (email: tamara.delamata@uam.es)

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Abstract

Recent literature on the border effect fostered research on informal barriers to trade and the role of networks promoting it. In relation to social networks, it has been shown that the intensity of trade of goods is positively correlated with the migration flows between any pair of countries/regions. In this article it is investigated if such a relation also holds for the Spanish domestic trade flows of services. With this aim, a gravity model rooted in the Dixit–Stiglitz–Krugman theoretical frameworks is used taking advantage of a unique dataset on interregional trade flows of some of the main sectors linked to Tourism, namely, Accommodation and Restaurants. A different analysis of each sector separately is carried out, finding a big positive effect for Restaurants, but no effect for the Hostel industry. These novel results can be explained by forces driving the demand in each sector. Migration linkages are measured by means of Register data, regarding the stock of people born in each region living in the others. Business networks are approached by a matrix of companies in different regions operating in these key sectors that are connected.

1. Introduction

In spite of decreases in transportation costs, recent literature on the border effect shows how countries still engage more in internal trade than external trade with other countries (Chen, 2004; Evans, 2006; Helliwell, 1996; McCallum, 1995; Okubo, 2004; Wolf, 2000). According to this literature, a number of factors may explain the downward impact of boundaries on the volume of trade: tariffs, non-tariff barriers, information and transaction cost, the elasticity of substitution between local and foreign goods, the geographic location of firms, or the importance of intermediate goods. Focusing on the endogenous forces, some authors have analyzed the role of informal barriers to trade as an explanation for high trade costs. As highlighted by Rauch and Casella (2003), since lack of information about international trade and investment opportunities could act as an informal barrier (Portes and Rey, 2005), networks are seen as a way to overcome such barriers and increase the volume of international trade. Such evidence has been found for business groups operating across national borders (Belderbos and Sleuwaegen, 1998), immigrants (Gould, 1994), and long-settled ethnic minorities that maintain co-ethnic business societies.

The empirical evidence related to the effects of networks of firms on trade is much scarcer than that on the trade impact of migration patterns (Combes et al., 2005). Among the exceptions, Belderbos and Sleuwaegen (1998) show that the share of production exported to the European Union (EU) by a Japanese electronics firm is substantially higher if this firm is a component subcontractor in a vertical keiretsu and if the parent firm has previously invested in the EU. A related empirical literature has shown that Japanese imports are significantly lower in industries where a large share of sales belongs to keiretsu members. This last finding suggests that membership of a keiretsu network facilitates trade between member firms at the expense of outsiders, although it is unclear whether this effect comes from increased efficiency or exclusionary behaviour. Based on this literature, Combes et al. (2005) focused on the trade creation effect of business networks for the internal trade in France, considering the links between plants belonging to the same business group.

Motivated by this literature, in this work it is investigated whether similar results exist for regional trade in services. The analysis will be mainly focus on the special case of interregional trade flows of two main sectors linked to the tourist activity, namely, the Restaurants and Hostel industry. These two activities have the attribute that the delivery of their services is usually connected with cross-border movement of people. The effect

of migration and firms' links in trade in these two sectors, analyzing them as a group and each sector has been analyzed separately, demonstrating that the effects are different depending on the characteristics of the sector considered. A comparison between the results obtained and those obtained for the interregional trade of goods in France by Combes et al. (2005) has been done. Different results are obtained that can be explained by the different characteristics between goods and services, the way they are delivered, and the forces that drive its demand and who is consuming each product.

The motivation for this focus is threefold: first, it is well known that in all the developed countries, services account for the largest part of all economic activity; second, due to the lack of information on bilateral trade in services, it is difficult to find empirical work on this subject. Therefore, the relation between distance, trade of services, and the presence of informal barriers remains an open question[1]. A third motivation is that due to data restrictions, most studies have focused on the link between international migration and international trade, not taking into consideration that the bulk of people and trade flows is between regions within countries. In parallel with the positive relation between networks and trade in goods, it is reasonable to expect that social and business networks would also affect trade in services, and flows of sectors linked with tourism in particular.

Regarding business networks, tourism flows would be more intensive between regions and countries that share common infrastructures, business groups and intermediaries (transportation networks, business trips, common tour operators, etc.). In terms of social networks there are several mechanisms that could induce positive correlation between trade and the intensity of the demographic linkages.

Focusing on the link between tourism and migration at the international level, the network effects could be reduced by the limited number of foreign immigrants in a country, the composition of the immigration structure, and the high cost of travel back to the home country. However, when the analysis focuses on the internal or

[1] In this context of limited antecedents, some authors have used the gravity model to analyse the bilateral trade flows of services. In the field of international trade, Ceglowski (2006) developed a gravity model using panel data from the OCDE (international trade of services database for the period 1999–2000, finding a larger negative elasticity of trade with distance compared to the one usually obtained for goods. Furthermore, Kimura and Lee (2006) using the same OCDE database, found that apart from the strong negative elasticity of distance, "language and cultural proximity between producer and consumer" play an important role in determining the intensity of international trade of services. This result is in line with the "information effect" described above for the relation between social networks and the international trade of goods. In contrast with this result for aggregated flows of services, there is a dispersed literature discussing the unequal effect of distance on some specific types of services like education or tourism.

interregional tourism flows, we might expect to see higher magnitudes of flows[2]. An important distinction between interregional and international movement of citizens is that lodging expenses may be lowered by ownership of "second residences" or the ability to "share" accommodation with relatives and friends in the case of interregional flows of visitors, augmenting potential savings on "transaction costs" induced by the presence of "social networks" that would apply in the case of international tourism flows. Despite these intuitively appealing reasons to believe that the potential for significant relationships between tourist trade flows and stocks of immigrants in the interregional case is greater than for international tourism, the lack of information has limited the ability to explore interregional tourism flows.

Based on these hypotheses, in this paper it is studied the relation between interregional trade flows of services linked to the tourist sector with the distance and the social networks produced by the stock of interregional migration in each region. From the theoretical point of view, it is followed the approach of Combes et al (2005) which introduced interregional trade flows into the well-known Dixit–Stiglitz–Krugman (DSK) framework, including the role of social networks and considering the aggregate flows. With this aim a gravity model is estimated for a unique dataset on the interregional trade flows in Spain for the period 2000–08, measured in monetary units (De la Mata and Llano, 2010; Llano and de la Mata, 2009a; Llano and de la Mata, 2009b).

Section 2 reviews recent literature on the link between trade and networks, in the fields of both tradable goods and services. This section also defines the main channels through which we expect to find enhancing effects of social and business networks on the interregional trade of the two service sectors covered in the dataset. Section 3 presents the theoretical foundation of the gravity model estimated based on the one developed in Combes et al. (2005) for a cross-section dataset. Section 4 presents the main characteristics of the data used. Empirical results obtained from applying the model to interregional trade flows in Spain are presented and discussed in Section 5.

[2] For example, in the US during 2001 alone, 2.8% or 7.778 million people moved between counties, and 1.3% or 3.715 million persons moved between states. Cumulative moves over the five-year period from 1995 to 2000 involved 112 million people for the United States, of which 22 million involved moves between states. This suggests an interstate migration rate for this period of 8.6%, with an inter-county migration rate of 24.8% (Perry and Schachter, 2003). Spain is a much smaller country, but with a strong tourist tradition, since Spain ranks 3rd in the world in terms of tourist inflows. In 2001, there were 552 million overnight stays by Spanish citizens within Spain, despite the fact that Spain has only 42 million citizens. In addition, mobility of Spanish citizens is such that only 16% of the population lives in a region different from that in which they were born.

2. Trade and networks: literature and concepts

2.1 Related literature on social and business networks

As Rauch (2001) pointed out in an exhaustive review, any positive impact of immigration on trade might simply reflect immigrant taste for goods from their countries of origin or the correlation of immigration with country characteristics that promote trade, such as proximity. However, different authors have demonstrated that apart from this "taste effect," there is a "network effect" induced by the social linkages that immigrants keep with their countries of origin, which may induce important reductions in transaction cost and, therefore, further promotions of bilateral trade. Regarding this former mechanism, some authors have tried to quantify the relevance of social and business networks on the international trade of goods in a country.

For example, Gould (1994) in a pioneer article, analyzed US trade with 47 other countries (1970–86), showing how immigration reduces the information costs and the border effect. He also found that immigration affects exports more than imports and differentiated manufactures more than intermediate goods, which are more homogeneous. Then, Head and Ries (1998) repeated a similar analysis using data of Canadian bilateral trade with 136 countries in the period 1980–92. Dunlevy and Hutchinson (1999; 2001) study the imports and exports for the US (1870–1910), finding that immigration affects both the imports (where the "taste effect" is larger than the "information effect") and the exports (where the "information effect" is larger, due to the knowledge of trade opportunities between both countries). From a dynamic perspective, they also point out that the first immigration waves promote international trade of commodities in a simultaneous way, while the positive effects on trade tend to dissipate with time. Similarly, Wagner et al (2002) estimated the effects of immigration on the international trade of Canadian provinces. Rauch and Trindade (2002) study how the presence of Chinese ethnics affect bilateral trade. In the countries where Chinese ethnics represent a percentage of the population big enough and that have a lot of border connections, as in the Asian southeast, the effects on the bilateral trade are greater.

Digging deeper into the historical causes of the social networks induced by immigration stocks, Girma and Yu (2002) carried out a similar analysis using data for the United Kingdom on immigration and trade where they distinguish between migration from

countries with an historical relation with the Commonwealth and countries without it. Considering that the reduction of transaction costs can act in two different ways (first, because of presence of contacts between the countries of origin, and second, because of immigrants' knowledge of both markets and social institutions), they found that the more similar the origins and destinations are, the smaller the reduction of the border effect is. Based on this finding, they confirm that the role of networks ("information effect") is larger when immigration connects "heterogeneous" countries, which is the case where "information cost" is larger and plays a critical role as an impediment to trade. Then, with a special focus on culture, White and Tadesse (2008) measured the effect of immigration on trade, differentiating between cultural and non-cultural products. They confirmed that immigrants tend to counteract the negative effect on trade of the cultural distance. However, their results show that the influence of the immigrants on trade was not big enough to surpass the resistance to trade derived from the information costs induced by the cultural distance.

Paradoxically, although immigration and trade flows are always more intense within the country than between countries, the literature about the relation between these two phenomena at the interregional level is very scarce. Among the exceptions, Helliwell (1997) analyzed the interregional and international trade of Canada and the US, finding that the role of interregional migration plays a minor role compared to the international migration, since the "taste and information effects" are smaller between regions than between countries. More recently, Combes et al. (2005) quantified the impact of social and business networks on the intensity of interregional trade between 94 French regions (departments). In this paper, by means of different gravity models, embedded in a Dixit–Stiglitz–Krugman theoretical framework, the authors verify that, despite the traditional impediments to trade (distance and boundaries), networks facilitate bilateral trade, finding larger effects for business than for social networks.

2.2 The interaction between networks and tourism flows

For generality and simplicity, this section describes concepts related to international and interregional trade and the role of past migration flows. Although the ultimate focus is on "regions," examples that apply both for the interregional and the international cases are used. This approach might be more appealing to an international audience, despite the fact that the empirical application uses interregional data. For this purpose, an immigrant is defined as an individual who was born in a different region ("homeland

region") from his current region of residence ("host region"). Note also that, when considering interregional monetary flows of the Tourism sector, an "exporting region" is the one producing the service, in this case the region receiving the tourists.

Focusing on the tourism sector, there are several channels that may lead to a positive relationship between the intensity of trade and the presence of social networks.

For migration, we observe the following effects:

- The destination choice of immigrants is conditioned by familiar ties with their regions of origin. Since people may own homes or have access to property in their homeland regions, they take advantage of vacations to visit their region of origin. This should produce larger number of trips from a host region to regions of origin for immigrants. For example, Moroccans living in France tend to travel back to Morocco during vacations, so Morocco would account for larger tourism exports to France than would be expected from a model considering only characteristics of Moroccan tourists. As in Combes et al. (2005) this effect will be called "immigrants effect". This effect is related with the taste channel described for goods.
- Conversely, relatives and friends living in the region of origin may tend to visit immigrants in the host region, since these visits are made easier by access to information and less expensive dwelling options than other possible tourism destinations. For example, German tourists may choose Spain as the destination if they share information and housing with expatriate Germans already settled in Spain. This effect will be called the "emigrants effect", and is in the line of the information channel described for trade in goods.
- In connection with the network channel, immigrants could also affect "tourism decisions" of other non-immigrants living in the host region. For example, if we think of the large number of immigrants who form families with natives in a region, it is easy to suppose that there is an influence on immigrant tourism decisions arising from tastes and family ties that exert and influence on non-immigrants. For example, in the case of a "mixed couple" (immigrant and non-immigrant) with two children, the decision to visit a relative in the homeland of one immigrant is conditioning travel decisions of three "non-immigrants." Moreover, relatives and friends of the immigrants who are still living in the origin region (but could interact regularly with them) could also spread their travel experiences and tastes among their co-nationals in the homeland.

In addition, the interregional trade flows of the Restaurants and Hostel industry in a country could also be empowered by the presence of business networks in this sector but also in the Transport sector:

- For example, taking into account that a share of tourist flows are business trips, one may expect to find more intense interaction between the people working in regions whose companies have some kind of connection, due to trade, financial, or administrative liaison.
- Furthermore, one may expect to find more intense tourist flows between regions that share common tour operators, or regions that are connected by the presence of hotel and transportation holdings. Quite often, these holdings offer tourist packages for visiting accommodations belonging to the same chain in alternative regions, or include discounts for travelling with haulers that also belong to the business group.

3. The theoretical model

This section is based on Combes et al. (2005), who developed a model of monopolistic competition a la Dixit–Stiglitz–Krugman (Dixit and Stiglitz, 1977; Krugman, 1980), which accounts for home bias in the consumer's preferences and transaction costs.

The DSK framework offers several advantages compared to others available in the literature of international trade: first, as shown by different authors (Anderson and van Wincoop, 2003; Feenstra, 2004), this model offers a robust theoretical base for deducing the gravity model, and therefore, for the empirical analysis of the intensity of flows between dyads of countries or regions; second, monopolistic competition model is based on some theoretical assumptions that fit especially well with the tourist sector, such as the presence of a large market with free-entry conditions and a number of companies offering a large variety of services (hotels and restaurants with different qualities, cultural and environmental characteristics), with some capacity to fix prices and benefit from a certain monopolistic situation, mainly when the tourist has arrived at the destination and any variation in the tourist plan is costly.

Following Combes et al. (2005), the representative consumer's utility in region *i* depends upon the consumption c_{ijth} of all varieties *h* of services produced in any region *j*

at a moment *t*. Varieties are differentiated with a constant elasticity of substitution (CES). Each variety imported from region *j* is weighted by a coefficient a_{ijt}, which describes the preferences of *i* consumers with respect to *j* varieties at time *t*. Let n_{jt} denote the size of the supply in region *j,* and *N* the total number of regions. Thus the corresponding utility function in a moment of time *t* is

$$U_{it} = \left(\sum_{j=1}^{N} \sum_{h=1}^{nj} (a_{ijt} c_{ijth})^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \quad (1),$$

where $\sigma > 1$ is the elasticity of substitution. If p_{ij} is the price of the service in the region *i* that has to be paid by residents in region *j*, which includes the service consumed in the destination region, the cost of travel or the information cost, then, the transaction costs are represented in the price differences between locations, $p_{ijt} = (1 + \tau_{ijt}) p_{jt}$, where τ_{ij} is the iceberg-type cost of travelling from regions *j* to *i* and p_j the mill price in region *j*. Thus, the demand function of region *i* for touristic services offered by region *j* is described by

$$c_{ijt} = c_{it} P_{it}^{\sigma} n_{jt} p_{jt}^{-\sigma} a_{ijt}^{\sigma-1} (1 + \tau_{ijt})^{-\sigma}, \quad (2)$$

where $c_{it} = \sum \sum c_{ijth}$ is the total consumption (in quantities, i.e., number of nights in hotels, number of meals in restaurants) of the residents in region *i* of differentiated varieties of services imported from all possible regions and where P_{it} is the price index

in region *i*, $P_i \equiv \left(\sum_j a_{ijt}^{\sigma-1} n_{jt} p_{ijt}^{1-\sigma} \right)^{1/(1-\sigma)}$, (3)

As in Combes et al. (2005) transaction costs include two different elements. On the one hand, physical transport costs, T_{ij}, that will be approximated by the distance and consequently will be constant. On the other hand, the information costs I_{ijt}. Transaction costs are modeled as follows:

$$1 + \tau_{ijt} = T_{ij} I_{ijt} \quad (4),$$

where $T_{ij} \geq 1$ is a measure of transport cost between *i* and *j* and is a function of the distance. For the case of tourism the best option would be to consider also the relation between the distance and the transport mode used for the displacement. In the case of international or interregional tourists in a large country, the mode choice may break the linear relation between distance and transport cost. However, the assumption of a linear

function is more plausible for the interregional ones in a small country like Spain, with a prevalence of land transportation (often in private vehicles) and a less dispersed transport cost for those modes competing for short distance trips. For the information cost it is assumed:

$$I_{ijt} = (1 + mig_{ijt})^{-\alpha_I} (1 + mig_{ijt})^{-\beta_I} (1 + firms_{ij})^{-\gamma_I} \exp(-\psi_I Cont_{ij}) \quad (5),$$

where $Cont_{ij}$ is a dummy variable set to 1 when *i* and *j* are contiguous regions and ψ_I >0, that is, the informational transaction cost is higher between two distant regions than between neighboring ones. The direct impact of social networks on information costs is captured by two variables, mig_{ijt} and mig_{jit}, corresponding to migrant networks. The monetary tourist flows going from *j* to *i* (tourists moving from *i* to *j*), could be positively correlated with the number of people born in region *j* living in region *i* (therefore, mig_{ij} captures the "immigrants" effect). Reciprocally, the monetary tourist flows going from *i* to *j* (tourists moving from *j* to *i*), could be positively correlated with the number of people born in region *i* living in region *j* (therefore, mig_{ji} captures the "emigrants" effect).

Then, business networks are considered by counting the plants or firms belonging to the same business group in each region. We have considered the following service sectors: "Hotels," "Restaurants," and "Transportation" including tour operators as well as haulers. Then, we calculate for each dyad *ij* the number of potential connections within the business group as being the product of the number of plants in *i* and *j*. The sum over all business groups in these services is captured by the variable $firms_{ij}$. This variable, and, therefore, the impact of plant networks, is thus symmetric by construction, $firms_{ij}$= $firms_{ji}$. Since migrant and plant networks are assumed to reduce information costs of trade shipments going in both directions, parameters $\alpha_I, \beta_I, \gamma_I$ are expected to be positive.

Consumers are assumed to have both deterministic and stochastic elements in their preferences a_{ijt} (eq. 6). For the deterministic part it is assumed that it is more likely that individuals consume services from contiguous regions and from their homeland region[3]. Then, immigration affects trade, both through preferences and information channels. Finally, e_{ijt} is the random component of the preferences.

[3] Intraregional flows are not included for simplicity, given that they are not including in the empirical analysis. They can be included as a factor that reduces information costs and being part of the preferences in line with the strong border effects found for trade in services.

$$a_{ijt} = (1 + mig_{ijt})^{\alpha_a} \exp(e_{ijt} + \psi_a Cont_{ij}) \quad (6)$$

4. The empirical approach

4.1 The gravity model

Eq. (2) links trade between region *j* and *i* at a moment *t* as a function of the size of the demand in region *i* (c_{it}), its price index P_{it}, the size of the supply n_{jt}, the mill price of the origin region *j* (p_j), and bilateral characteristics related with preferences (a_{ijt}) and transaction costs (τ_{ijt}). As Combes et al. (2005) pointed out; the problems here are dealing with P_{it}, n_{jt}, and P_{jt}. We can assume these three variables are affected by regional invariant characteristics and also by time-variant endowments in each region. Then, it is feasible to derive a gravity equation from eq (2) replacing all time-specific, destination-specific, origin-specific, destination-time specific, and origin-time specific variables by fixed effects. In order to disentangle to what extent stocks of migration and other dyadic characteristics affect the current bilateral trade flows between Spanish regions we will estimate the following equation:

$$Lc_{ijt} = \beta_0 + \beta_1 * Lt_{ij} + \beta_2 * Cont_{ij} + \beta_3 * Lmig_{ijt} + \beta_4 * Lmig_{jit} + \beta_5 * Lfirms_{ijt} + \delta_i + \delta_j + \delta_{it} + \delta_{jt} + u_{ijt} \quad (7)$$

In eq (7), β_2, $\beta_3 = \sigma*\alpha_I + (\sigma-1)*\alpha_a$; β_4, $\beta_5 = \sigma*\gamma_I$ and Lc_{ijt} contains monetary flows in logarithms of interregional trade flows between each pair of regions *ij* for each year *t* in the period 2000–08; Lt_{ij} contains the logarithm of the actual average distance travelled between *i* and *j*; $Cont_{ij}$ is a dummy for contiguity regions; *Lmig* is the interregional stock of migrants from or to a different region in logarithms, and *Lfirms* is the logarithm of the number of connections between firms in different regions belonging to the same business group.

4.2 Data

4.2.1 The interregional trade flows

The aim of this section is to describe the unique dataset used in this paper, which contains intraregional and interregional bilateral trade flows in monetary units for the period 2000–08 for the Restaurants and Hostel industry in Spain. For the sake of clarity, a brief description of the process (summarized in Figures 1 and 2 by a simple scheme) is offered, leaving all the details for a Methodological Annex at the end of the paper.

As described in **Figures 1** and **2**, the methodology can be summarized in two steps: 1) Estimating the share of output produced in each sector consumed by Spanish residents for each of the 18 Spanish regions; 2) Determining for each region the bilateral distribution of the former.

Regarding the *first step*, the vector of regional production destined for domestic consumption can be obtained by combining existing information on the regional net production at the national level (National Accounts and *Input-Output Tables*) and at a NUTS2 level (*Spanish Annual Service Survey*, SASS from the National Statistic Institute, NSI), as well as data on the international exports of the sector coherent with the *Spanish Balance of Payments* (SBP).

Regarding the *second step*, for each year in the period 2000–08, the procedure is the following:

First of all, we investigate the domestic journeys made by individuals that can result in expenditures in the two sectors considered, using the main statistical sources available in Spain on the topic (*Occupancy Surveys*, NSI; *Familitur Survey*, Institute of Touristic Studies). It is distinguished between overnight stays in four different types of regulated establishments, such as Hotels, Apartments, Campsites, and Rural Tourism establishments (*Occupancy Surveys*, NSI). Separately, we consider overnight stays at "second homes" and "homes owned by friends and relatives" (*Familitur Survey*, ITS). In addition, the domestic excursions obtained from *Familitur Survey* (ITS) are also considered. All these categories of flows are treated separately, imputing alternative unit expenses regarding the Restaurants and Hostel industry. The stays in regulated establishments will have an associated daily expense in Accommodation and Restaurants, while the rest of the trips will generate only consumption in Restaurants.

Figure 1. Scheme describing the methodology for estimating the bilateral domestic flows in each year (period 2000-2008). Accommodation sector.

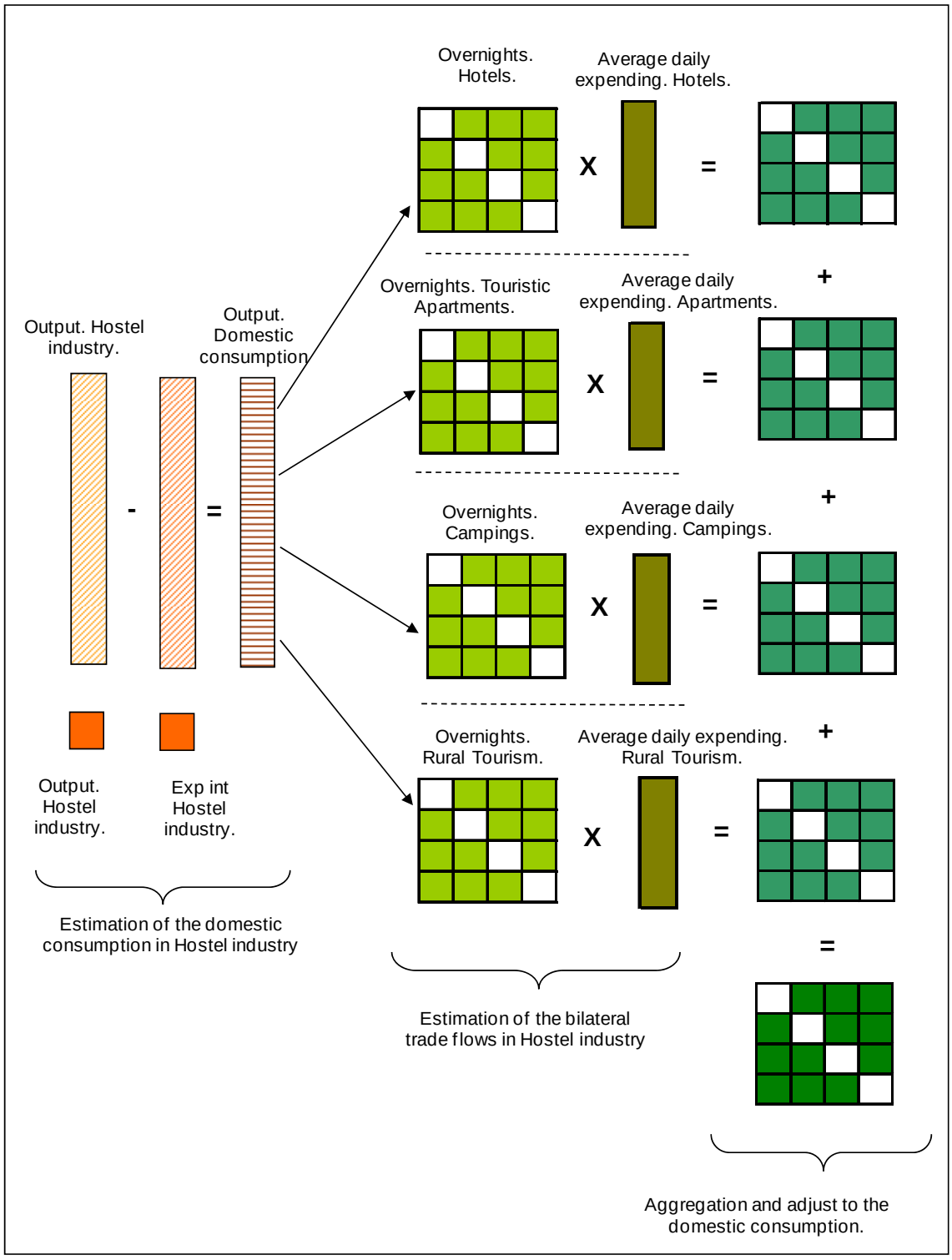
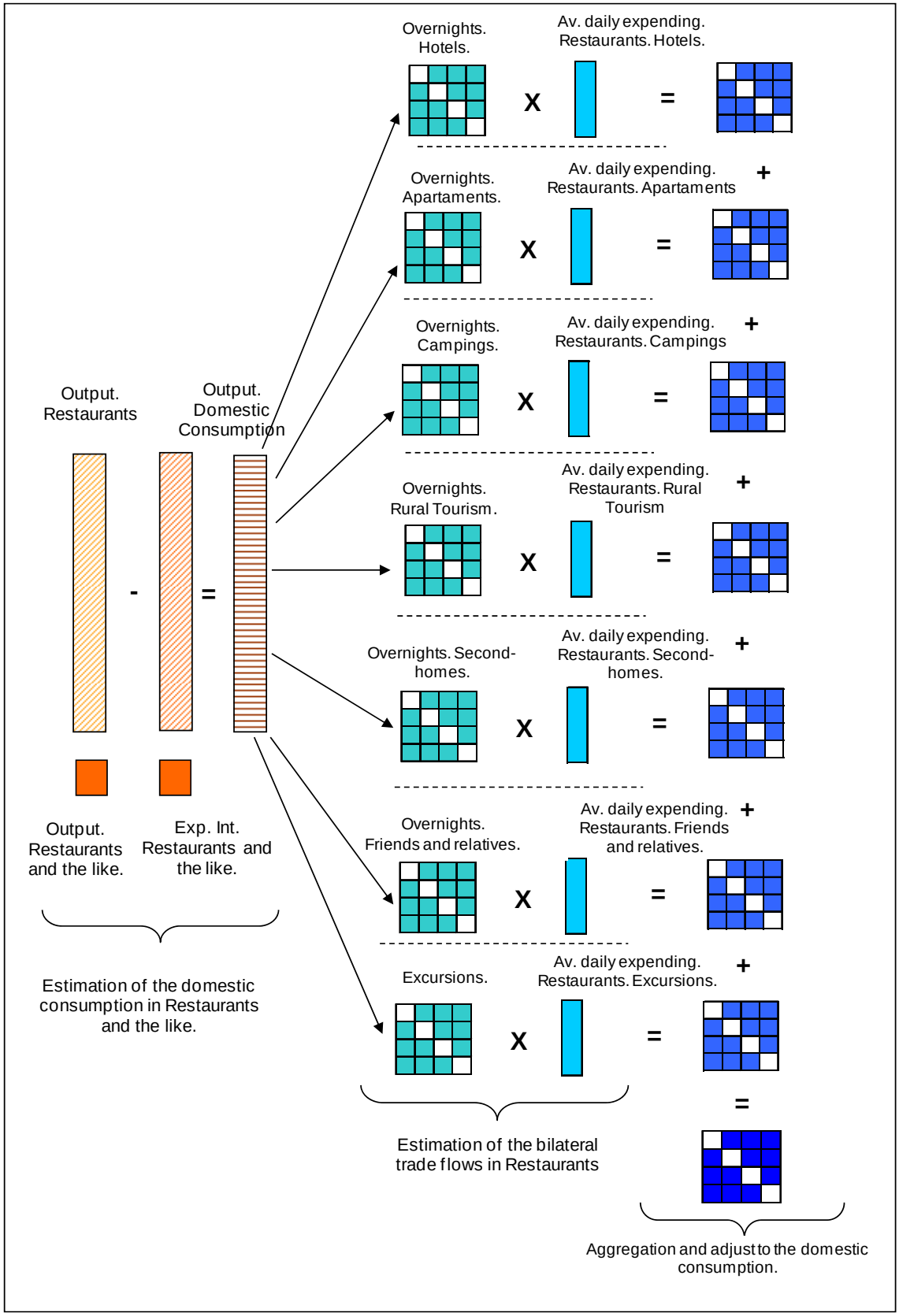


Figure 2. Scheme describing the methodology for estimating the bilateral domestic flows for each year (period 2000-2008). Restaurants sector.



Secondly, the average daily expenditure incurred by residents of every region in Accommodation is estimated using data from the *Occupancy Survey* (NSI). To estimate the average expense incurred in Restaurants, data concerning the average price of a meal from the surveys of the *Purchasing Power Parity* (NSI) is used. We will obtain a different vector price depending on the type of accommodation for each year.

Finally, once each trip and overnight stay has been correctly translated into monetary flows linked to Accommodation and Restaurants sectors and the total flows are adjusted to the production figures obtained in the first step (for more details, see the Annex), they will be aggregated in a single origin–destination (OD) matrix, which accounts for the total interregional expenditure linked to the overnight stays or excursions.

Note that all the OD matrices obtained capture the direction of the trade flow of services rather than the movements of people. As in the Balance of Payments, the direction for the journey (people movement) is opposite to the trade flow of service (monetary flow), that is, the expenditure generated by a German tourist in Spain represents an export from Spain to Germany. Similarly, a Spanish citizen living in Madrid who travels to Valencia generates an interregional export from Valencia to Madrid. Our final OD trade matrices are, therefore, calculated in monetary units and register the exporting regions in rows (considered as origins of the flows, which are the receptors of the people) and the importing regions in columns (that is, the regions who receive the service and send the people). This estimate for the intra and interregional trade flows in monetary units for these Spanish touristic sectors is coherent with the main sources available in Spain: the regional production of the sector obtained from the SASS, the international exports of the sector from the SBP, and the structure of interregional overnight stays offered by the main sources available (Familitur and Occupancy Surveys).

Although it is obtained a squared matrix which contains both interregional and intraregional flows, we will avoid introducing the intraregional flows in the analysis for two reasons: the first one is that it makes the analysis more comparable with other studies which does not include them and secondly, because there is a huge part of the intraregional flows that have a different nature than the interregional ones, given that they take into account the daily consumption in Bars and Restaurants which does not

imply any decision in which preferences have an important role but is driven by the places where an individual carries out his regular life. It can be said that this is the non-tradable part of the production in this services. The data obtained for the autonomous cities of Ceuta y Melilla are not included because the data available for these cities are very low quality and they have a small share of the total output, so we can avoid including them in the analysis.

4.2.2 The distance measure

The distance used was obtained from the Movilia survey 2001 (Ministerio de Fomento, 2001), which is the actual distance travelled by Spanish residents in their displacements between regions. One of the most interesting features of this measure is that it includes not just interregional distance but also intraregional. Moreover, the distance used is an average of the actual distance travelled by each of the more than 500 million displacements estimated by the Movilia survey in 2001. These displacements cover all motives, so the distance reported is not constrained by distance between capitals, which could be predominant for work trips but not tourist spots (beaches, skiing resorts, countryside, etc.) located in the periphery.

4.2.3 The social and business networks

The interregional migration matrices are obtained from the *Spanish Register* (NSI) for each year, which offer information on the stock of people living in a region who were born in other regions. The effects captured by the m_{ij} and the m_{ji} terms enter as two independent variables.

Data on business networks are computed from SABI (2006). This dataset, produced by the private firm Bureau van Dijk, offers data on the accounts and balance sheets of Spanish firms. Firms that belong to the same group in the origin and destination region can be identified. Following the norm established by the Spanish General Accounting Plan, two firms belong to the same business group if the same shareholder has at least a 20% participation in both firms, and the shareholder is the primary shareholder in both firms. In order to capture the links between firms belonging to the sectors considered

(Transport, Accommodation, and Restaurants), they are included the firms with CNAE (National Classification of Economic Activities) corresponding to the most similar sectors available in the SABI database, namely, "Accommodation" (CNAE 93. 55.11, 55.12, 55.22, 55.23), "Restaurants" (CNAE 93. 55.30), and "Transport" (CNAE 93. 60.10, 60.21, 60.22, 60.23, 62.10, 62.20). This variable is only available for 2006.

Table 1. Descriptive statistics.

	Mean	Std. Dev.	Min	Max.
C_ij	50941.92	110064.3	466	1504355
C_ij h	33584.68	88538.44	360	1369101
C_ij r	17602.52	36747.77	101	480378
Mig_ij	26162.82	68653.87	98	784618
Mig_ji	26162.82	68653.87	98	784618
Fims_ij	147.26	496.36	0	3900
T_ij	590.23	506.61	68	2178

Summary statistics obtained without considering the values for the cases where the importing and the exporting region is the same.

Table 2. Correlation matrix.

	C_ij	C_ij h	C_ij r	Mig_ij	Mig_ji	Firms_ij
C_ij h	0.9556*					
C_ij r	0.7111*	0.4731*				
Mig_ij	0.3537*	0.1635*	0.6679*			
Mig_ji	0.2269*	0.1634*	0.2892*	0.2321*		
Firms_ij	0.5257*	0.4809*	0.4244*	0.3403*	0.3403*	
T_ij	0.0273	0.0950*	-0.1451*	-0.1140*	-0.1016*	0.0951*

Pairwise correlation.
* Correlation significantly different from 0 at 1 %.

Tables 1 and 2 show some descriptive statistics of the main variables used and the pairwise correlations between them. An important thing to note is that the database of trade flows does not present any zero flow, so this well-known problem is avoided. For the migration variables, the summary statistics are the same, since it is a symmetric variable. The variable related with the connections between firms has a low mean. For the correlations between the variables used, it can be seen that the independent variable is positive correlated with each network variable. As in Combes et al. (2005), the network variables are positively correlated, but the correlation is slightly lower in our data. A negative relation between migration and distance is found while it is obtained a

positive correlation between distance and the connections between firms. Combes et al. (2005) focus on trade in goods where being close to other plants in the business group can have some advantages related with the scale economies and agglomeration. In contrast, the present analysis is centered on some consumer sectors where an establishment has to be set up in order to deliver the service in the area where it is established. Business groups might try to set up in different places in order to be present in different geographical markets, so it is not rare to find a positive relation between business network and distance in order to capture a larger part of the total demand.

5. Results

5.1 Descriptive analysis: trade and networks in Spain

Figures 3 and 4 show in a map the largest bilateral trade flows (in €) for 2008, as well as the strongest links in terms of immigration stocks. As can be observed, the main importing region is Madrid that imports from contiguous or east-coastal regions. Madrid is also the region with the highest share of population born in other regions. In contrast, an important percentage of people born in Andalucía are people that live in other regions and Andalucía is one of the most important exporters mainly to these regions with important family ties. On the other hand, Baleares is a great exporting region but its inflows are not related with the migration stocks.

Figure 3. Main bilateral flows in €. Accommodation and Restaurants. 2008

Units: % of total interregional flows.

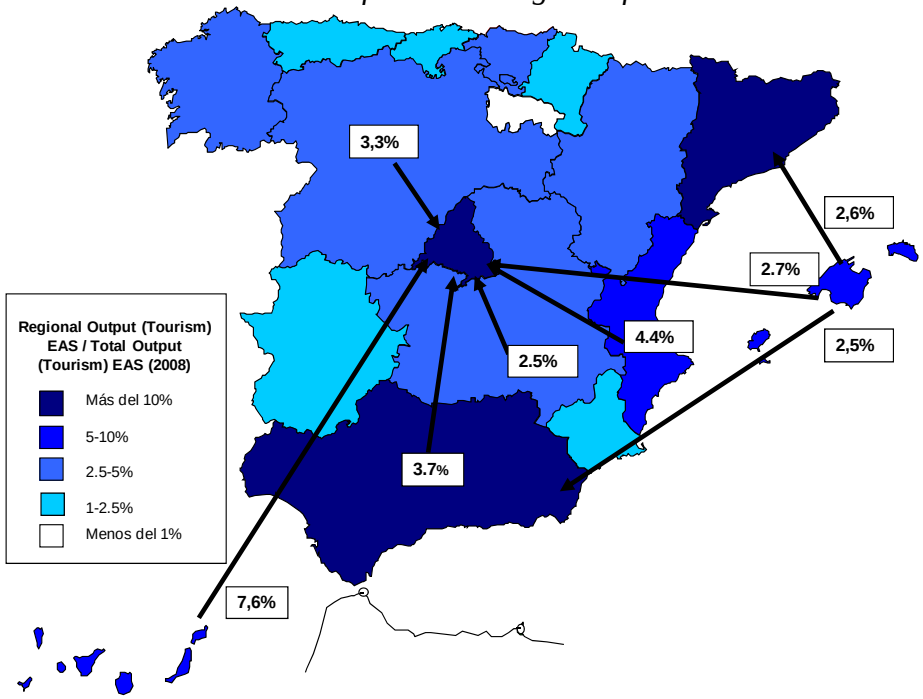


Figure 4. Main bilateral stocks of immigrants. 2008.

Units: % of total interregional migration flows.

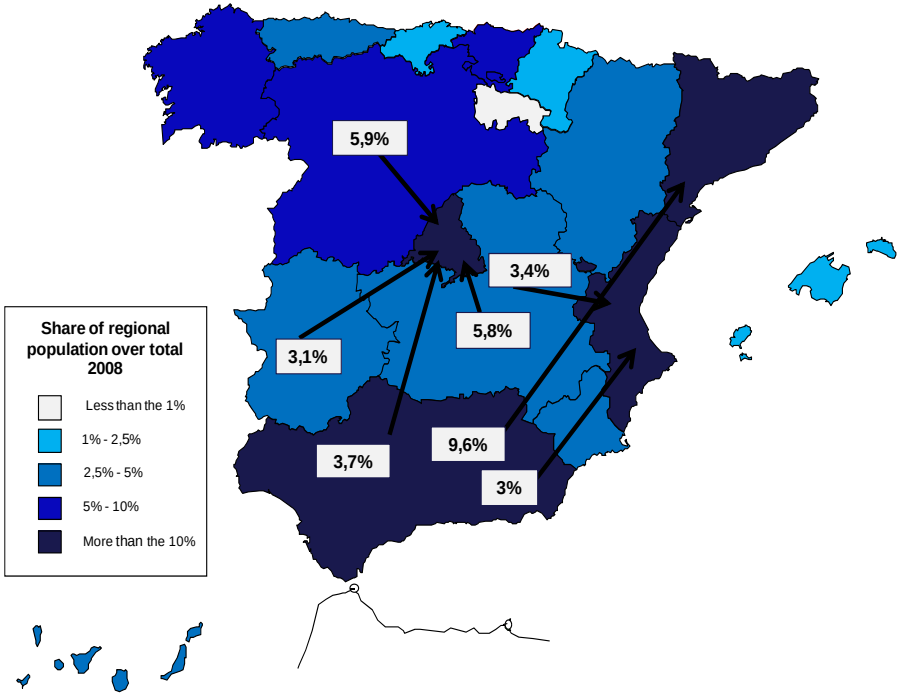


Figure 5. Main potential plant links. Accommodation. 2008

Units: % of total interregional plant linkages

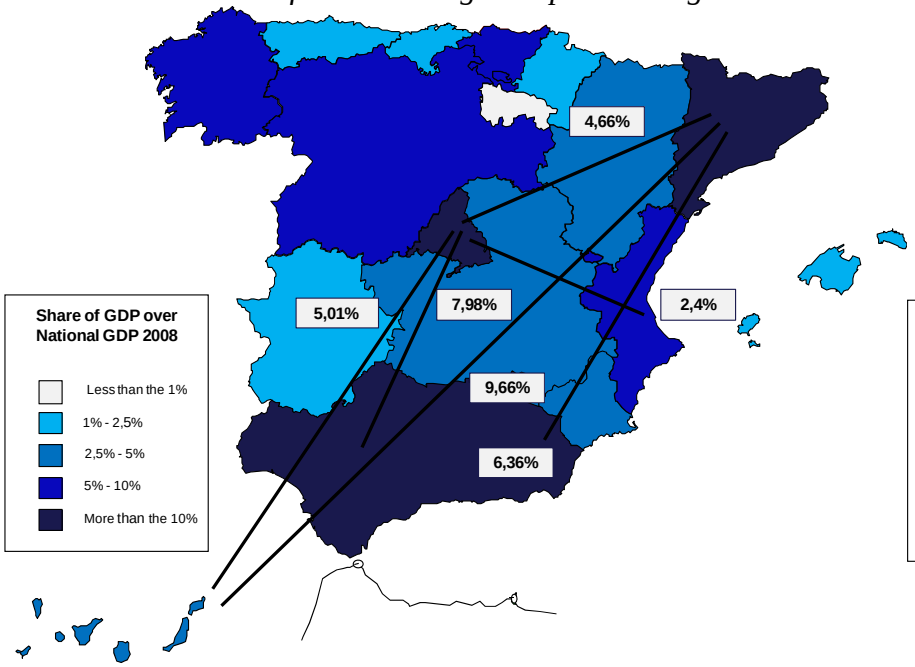
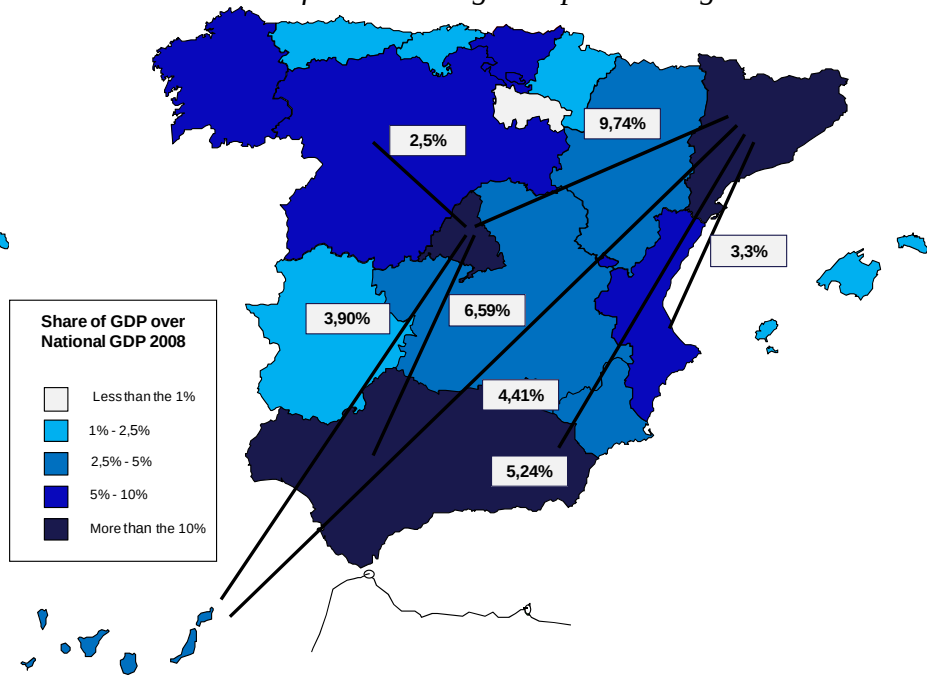


Figure 6. Main potential plant links. Accommodation, Restaurants and Transportation. 2008

Units: % of total interregional plant linkages



In addition, **Figures 5** and **6** show the most intense relations in terms of potential plant links for the Accommodation or the grouping of the three sectors considered as relevant: Accommodation, Restaurants, and Transportation. The graphs show strong linkages between Madrid and Cataluña, both of them with Islas Canarias and Andalucía both when we consider just Accommodation sector or the grouping of Accommodation, Restaurants, and Transportation. Furthermore, in the Accommodation sector a strong relation is shown between Madrid and Comunidad Valenciana, which is diluted when we include the Restaurants and Transportation sectors. In general, strong linkages are shown between the regions with a higher share in the national Gross Domestic Product and some coastal or peripheral regions.

5.2 Econometric analysis

First, we have estimated the gravity model for the Hostel industry and Restaurants as a whole. The immigration and emigration stock have been included, first separately and then simultaneously as well as the business network variable (**Table 3**). After that, and taking into account the different characteristics of the two sectors the same analysis for each sector (Hostel industry and Restaurants) separately has been carried out (**Table 4** and **Table 5)**. The same structure is followed in each of the three tables. The first column contains the results without network variables, columns (2) to (4) include migration variables separately and simultaneously, column (5) includes the business network variable without any migration variable. Column (6) reports the effect of migration and business network simultaneously. To test to what extent the results are driven by the period of time considered we have split the sample over 3-year periods. The results for each period are contained in columns (7), (8), and (9).

Table 3 reports the estimation results for the aggregation of the Restaurants and Hostel industry. Results are consistent with expectations and the coefficients are significant in all the cases. A low negative coefficient for the distance variable is found as well as a positive coefficient for the contiguity variable. It is important to note that when the migration variables are included, the contiguity and distance coefficients are reduced in magnitude because an important share of the interregional migrations takes place between contiguous regions.

Focusing on the variables of interest, immigration and emigration effects are verified. When both effects are introduced separately they reach coefficients quite high, which fall when they are introduced together. In contrast, business network effects are very weak, but with a positive and significant coefficient. When migration is controlled for, the business networks coefficient is slightly higher but still low compared with the rest of the network variables. Although results are quite consistent over the period of time, during the period 2003–05 all the coefficients are slightly lower, except for the emigration effect.

Table 3. Results to alternative specification for Hostel industry and Restaurants.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Lcij	Lcij	Lcij	Lcij	Lcij	Lcij	Lcij	Lcij	Lcij
Lt_ij	-0.287***	-0.158***	-0.160***	-0.150***	-0.275***	-0.127**	-0.133**	-0.126**	-0.133**
	(0.0640)	(0.0557)	(0.0562)	(0.0553)	(0.0639)	(0.0561)	(0.0547)	(0.0583)	(0.0603)
C_ij	0.813***	0.395***	0.397***	0.366***	0.800***	0.332***	0.336***	0.340***	0.302***
	(0.0844)	(0.0878)	(0.0884)	(0.0881)	(0.0855)	(0.0880)	(0.0884)	(0.0923)	(0.0940)
Lmig_ij		0.318***		0.191**		0.196***	0.206***	0.168**	0.221**
		(0.0404)		(0.0745)		(0.0745)	(0.0754)	(0.0806)	(0.0888)
Lmig_ji			0.314***	0.147**		0.153**	0.140*	0.181**	0.145*
			(0.0392)	(0.0686)		(0.0691)	(0.0742)	(0.0723)	(0.0814)
Lfirm_ij					0.0329*	0.0493***	0.0574***	0.0358*	0.0546***
					(0.0194)	(0.0176)	(0.0187)	(0.0187)	(0.0190)
Constant	13.12***	8.678***	8.739***	8.395***	12.89***	7.905***	7.937***	8.446***	8.658***
	(0.445)	(0.676)	(0.671)	(0.683)	(0.455)	(0.709)	(0.685)	(0.740)	(0.813)
Origin fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin - time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination - time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period	2000-2008	2000-2008	2000-2008	2000-2008	2000-2008	2000-2008	2000-2002	2003-2005	2006-2008
Observations	2,448	2,448	2,448	2,448	2,448	2,448	544	544	544
R-squared	0.928	0.943	0.942	0.944	0.929	0.945	0.946	0.944	0.945

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations have been done clusterizing the residuals for each of pair of origin – destination regions.

Table 4. Results to alternative specification for Hostel industry.

Dependent variable	(1) Lcij-h	(2) Lcij-h	(3) Lcij-h	(4) Lcij-h	(5) Lcij-h	(6) Lcij-h	(7) Lcij-h	(8) Lcij-h	(9) Lcij-h
Lt_ij	-0.253***	-0.201***	-0.202***	-0.198***	-0.233***	-0.170***	-0.165***	-0.163***	-0.199***
	(0.0594)	(0.0598)	(0.0595)	(0.0596)	(0.0594)	(0.0604)	(0.0617)	(0.0609)	(0.0616)
C_ij	0.573***	0.406***	0.406***	0.394***	0.551***	0.352***	0.328***	0.341***	0.367***
	(0.0759)	(0.0855)	(0.0863)	(0.0868)	(0.0761)	(0.0868)	(0.0899)	(0.0868)	(0.0878)
Lmig_ij		0.127***		0.0728		0.0786	0.0945	0.0691	0.0789
		(0.0399)		(0.0724)		(0.0719)	(0.0731)	(0.0739)	(0.0780)
Lmig_ji			0.126***	0.0629		0.0705	0.0507	0.0898	0.0725
			(0.0388)	(0.0694)		(0.0702)	(0.0725)	(0.0715)	(0.0743)
Lfirm_ij					0.0545***	0.0615***	0.0665***	0.0604***	0.0564***
					(0.0178)	(0.0177)	(0.0185)	(0.0181)	(0.0184)
Constant	12.40***	10.62***	10.63***	10.50***	12.02***	9.889***	9.888***	10.37***	11.16***
	(0.413)	(0.705)	(0.693)	(0.718)	(0.433)	(0.755)	(0.765)	(0.762)	(0.793)
Origin fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin - time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination - time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period	2000-2008	2000-2008	2000-2008	2000-2008	2000-2008	2000-2008	2000-2002	2003-2005	2006-2008
Observations	2,448	2,448	2,448	2,448	2,448	2,448	544	544	544
R-squared	0.946	0.948	0.948	0.949	0.948	0.951	0.948	0.950	0.951

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations have been done clusterizing the residuals for each of pair of origin – destination regions.

In **Table 4** the results for the Hostel industry are reported. First of all, a low negative coefficient for the distance variable is found, but now it is not reduced when we introduce the migration variables. In fact, the coefficients for the immigration and emigration effects are lower than before and when we introduce the two migration variables at the same time, they are not significant. This can be explained because when one person has relatives in a specific region, she will probably go to this region more often because of personal ties, but she will spend much less in the sectors that provide goods or services primary for the non-residents, because they can be freely provided by the relatives. This is the case of Accommodation where demand will be driven basically by other factors. In contrast, for the Hostel industry case, business networks do create trade. Although the coefficient obtained is not very high, it is positive and significant in every specification.

Finally, in **Table 5** the results for Restaurants are shown. The strong positive effect of sharing a boundary that appears in the first column is mitigated when migration variables are introduced. A similar pattern can be found in the case of the distance coefficient, which becomes non-significant when all the network variables are introduced simultaneously. This is related to the fact that there is a huge share of the consumption realized in Restaurants and the like that can be somehow related with the trips to the homeland and contiguous regions, in contrast with what we saw for the Hostel industry. This can be easily explained by the fact that most people when they travel to the region where they were born incur in expenses in Restaurants and the like as they do in their usual lives, but they do not in Hostels, more intended for non-residents, because they or their relatives own a second home there. Summing up, we could say that second-home stays (driven by demographic linkages) are substituting somehow the service provided by the Hostel industry; meanwhile Restaurants and the like are positively affected by the fact that family ties attract people who are potential consumers, through a reduction of the transaction costs. In contrast, business networks affect the Hostel industry more than Restaurants.

Table 5. Results to alternative specification for Restaurants and the like.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable	Lcij-r	Lcij-r	Lcij-r	Lcij-r	Lcij-r	Lcij-r	Lcij-r	Lcij-r	Lcij-r
Lt_ij	-0.344***	-0.119**	-0.127**	-0.107*	-0.338***	-0.0875	-0.0990	-0.0745	-0.0861
	(0.0808)	(0.0598)	(0.0622)	(0.0590)	(0.0803)	(0.0601)	(0.0632)	(0.0670)	(0.0682)
C_ij	1.099***	0.372***	0.388***	0.330***	1.093***	0.300***	0.325***	0.327***	0.232**
	(0.108)	(0.101)	(0.103)	(0.100)	(0.110)	(0.100)	(0.105)	(0.114)	(0.115)
Lmig_ij		0.552***		0.365***		0.369***	0.356***	0.327***	0.445***
		(0.0461)		(0.0872)		(0.0875)	(0.0967)	(0.106)	(0.114)
Lmig_ji			0.536***	0.217***		0.223***	0.234**	0.265***	0.170
			(0.0460)	(0.0794)		(0.0794)	(0.0951)	(0.0925)	(0.108)
Lfirm_ij					0.0152	0.0430**	0.0525**	0.0281	0.0565**
					(0.0245)	(0.0196)	(0.0239)	(0.0234)	(0.0233)
Constant	12.63***	4.903***	5.137***	4.483***	12.52***	4.056***	4.098***	4.303***	4.402***
	(0.569)	(0.729)	(0.752)	(0.732)	(0.572)	(0.754)	(0.786)	(0.856)	(0.946)
Origin fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin - time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination - time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period	2000-2008	2000-2008	2000-2008	2000-2008	2000-2008	2000-2008	2000-2002	2003-2005	2006-2008
Observations	2,448	2,448	2,448	2,448	2,448	2,448	544	544	544
R-squared	0.872	0.912	0.910	0.914	0.873	0.915	0.917	0.912	0.917

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Estimations have been done clusterizing the residuals for each of pair of origin – destination regions.

In most of the cases, the results are consistent over the period of the sample, although some variations in the last period of time can be seen, when the emigration effect is non-significant but the immigration effect and the plant linkages reach a higher coefficient. The importance of sharing a boundary has also been reduced during this period. These results can be connected to the fact that in 2008, with the beginning of the global economic crisis and some events such as the International Expo in Zaragoza, trips to international destinations have been probably replaced by domestic destinations, reducing the relative importance of the trips to contiguous regions.

Finally, we will compare our results for services with the results obtained by Combes et al. (2005) for domestic trade of goods in France. As a starting point, at an aggregate level it can be expected that migration affects much more the consumption of services than goods because information is more important in trade in services than in goods. Apart from the information channel, given that services are more differentiated than goods, trade in services is expected to be more affected by migration than goods through the taste channel. Finally and specifically to the results are being analyzed in this work (the Restaurants and Hostel industry), migration and business networks can act in reducing the real cost that one person has to pay when travelling to somewhere different from the region of residence, driving movement of people but acting as a substitute for trade.

Table 6. Comparison of coefficients

	Separate			Simultaneous		
	Immigrants	Emigrants	Business	Immigrants	Emigrants	Business
Combes et al (2005)	0,25	0,33	0,30	0,14	0,26	0,23
Hotels + Restaurants	0,32	0,31	0,05	0,19	0,16	0,09
Hotel industry	0,13	0,13	0,09	0,07	0,08	0,11
Restaurants	0,55	0,54	0,02	0,37	0,23	0,08

Table 6 compares the results obtained in Combes et al. (2005) for goods and in the present work both for the Hostel industry and Restaurants as a whole and separately. The face-to-face requirement in trade in services should lead to a higher coefficient for social networks given that it generates higher mobility. **Table 6** shows the results when each network variable is introduced into the regression one by one or at the same time. In the case of social networks represented by the stocks of migration, trade in goods is much more reinforced than the Hostel industry but less than Restaurants. In contrast, business networks reinforce trade of goods more than in the case of the services taken into account here. This can be explained by the fact that the sectors considered in this analysis are consumer services, so the fact that establishments in different regions belong to the same business groups can drive some part of the demand can be explained by the business trips (representing just 5% of the total trips) or by the fact that tour operators or big business groups that control the offers in this market give some preference to the establishments with which they have some kind of relationship. The share of the demand related with this fact is quite small (higher in Hostel industry). In contrast, there is a huge part of the trade in goods that it is related with intra-firm trade. A higher coefficient for the business connections in producer services trade can be expected.

6. Conclusions

In this paper the relationship between interregional trade flows, distance, the social networks produced by the stock of interregional migration in each region, and firms' links has been studied. From the theoretical point of view, we make use of previous references that embed the interregional trade flows in the well-known Dixit–Stiglitz–Krugman framework, including the role of social and business networks through transaction costs. The application focuses on a unique dataset on interregional trade flows of two important service sectors linked to the tourist activity, which includes accommodation and restaurants (www.c-intereg.es) for the period 2000–08.

According to the results obtained, a negative effect for the distance has been found and a positive effect on sharing a boundary. These coefficients are capturing somehow the

effect of the social networks, so when we introduce the migration stock, the effect of distance and share a common border seems to reduce. We have found an important positive effect on the network variables that fell once they are included at the same time. Results differ when we analyze each sector separately in such a way that we find evidence in favor of a positive effect for the migration variables in the Restaurants sector and a higher elasticity for business networks in the Hostel industry. That shows that migration is a substitute for the Hostel industry but is a force driven to a higher consumption in Restaurants.

Finally, we have compared the results obtained with those obtained for the domestic trade of goods in France and the fact that the consequences of migration in trade are bigger in the Restaurants. Although the effect is smaller in the Hostel industry, we could expect that the rest of the services have characteristics more similar to the Restaurant services, but we expect to offer further results extending the database to more services and to the international sphere. Furthermore, we have detected some limitations of some variables that do not have a temporal variation as they are the firms' connections and the transport costs. Including data that vary across years would improve the accuracy of the analysis.

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8. Methodological Appendix

The methodology used to estimate the domestic trade of the Hostel industry and Restaurants can be summarized in two main steps:

- Getting the regional output in each sector that will be consumed by Spanish residents, not exported internationally.
- Determining the bilateral distribution of the interregional flows.

1. Getting the regional output consumed by Spanish residents

In order to obtain the regional production of the Restaurants and Hostel industry (PDI_{it}^{s}) that is consumed by residents in Spain, the figures of the *Input–Output Tables* from the *National Accounts* (NSI) and the *Spanish Annual Service Survey* (NSI) are used. The figure used as the base of the estimation is the one in the IO Tables of the National Accounting ($\mathrm{Pr}_{t(IOT)}^{s}$) that will be regionally disaggregated following the SASS distribution. Following this procedure, a vector that contains the regional production in each sector for each year (Pr_{it}^{s}) (eq. 8) can be obtained.

The international exports (Exp_{it}^{s}) (eq. 9) from the regional production vector are subtracted. The international exports vector is obtained correcting the figure of "Tourism and Trips" of the Balance of Payments ($TExp_{t(BOP)}$), subtracting the parts that do not correspond with the sectors that are considered in this work. The sectorial structure imposed is the one given by the *Tourism Satellite Account* (NSI). We regionalized the national exports of the Hostel industry and Restaurants using the regional structure of the expenses incurred in each of the regions by foreign tourists ($Exp_{it(EGATUR)}$) taken from *Egatur survey* (ITE) (eq. 10). Finally, in each of the regions, the sectorial structure of the *SASS* is taken into account in order to assign the exports of each of the two sectors (eq. 11).

$$\mathrm{Pr}_{it}^{s} = \mathrm{Pr}_{t(IOT)}^{s} * \frac{\mathrm{Pr}_{it(SASS)}^{s}}{\sum_{i=1}^{18} \mathrm{Pr}_{it(SASS)}^{s}} \qquad \textbf{(8)}$$

$$PDI_{it}^{s} = \mathrm{Pr}_{it}^{s} - Exp_{it}^{s} \qquad \textbf{(9)}$$

$$Exp_{it} = TExp_{t(BOP)} * \frac{\sum_{s=1}^{2} Exp_{t(TSA)}}{TExp_{t(TSA)}} * \frac{Exp_{it(EGATUR)}}{\sum_{i=1}^{18} Exp_{it(EGATUR)}} \quad \textbf{(10)}$$

$$Exp_{it}^{s} = Exp_{it}^{s} * \frac{\Pr_{it(SASS)}^{s}}{\sum_{s=1}^{2} \Pr_{it(SASS)}^{s}} \quad \textbf{(11)}$$

Where i =1,…, 18 represents each of the regions and s = 1, 2 represents the two sectors that are part of our dependent variable: Hostels and Restaurants.

2. Obtaining the bilateral distribution of the interregional trade flows

In order to obtain the bilateral distribution of the interregional trade flows it is important to think about the characteristics of each sector. On the one hand, the expenses realized in both the Restaurants and Hostel industries are in the destination region of the trip (origin of the flow or export region), which can coincide or not with the region of residence. So, the bilateral distribution of the flows will be related with the overnight stays or displacements of the resident from his region of residence to the others.

The output of the Hostel industry will be related to overnight stays in regulated establishments, while expenses in Restaurants are linked with overnight stays in regulated or non-regulated establishments or excursions. Furthermore, there is an important part of the production of Restaurants that is consumed as a result of the normal life in any place, which will be the "non-tradable" part of the Restaurants output that will take part of the intraregional flow. In general, one methodology can be set up to estimate the intra and interregional flows of Restaurants that will be generated as a result of the displacements between regions in Spain, considering the statistical information available about trips and overnight stays. However, there is not equivalent information for the consumption in Restaurants that is not linked to trips or overnight stays. As a result, interregional trade flows of Restaurants will be estimated using its linkages to trips or overnight stays and the consumption not linked to trips or overnights will be obtained as a residual between the production consumed by Spanish residents and the domestic trade linked to trips. In that sense, interregional flows of Restaurants

will be directly estimated using the "bottom-up" methodology while the intraregional flows will be obtained as a residual.

Taking into account all the particularities and the statistical information available for each sector and type of consumption, the estimation process can be summarized as follows:

Through the information of the *Occupancy Surveys* (NSI) and *Familitur* (ITE) surveys, six origin and destination matrices of interregional overnight stays have been built, differentiating between the six types of establishments in which the stay takes place. Additionally, it is also available one origin and destination matrix of interregional excursions (ITE).

Each of the matrices has been multiplied separately by the estimated average expense by stay in Hostels and Restaurants for each region. The average expense by overnight stay is different for each type of accommodation. It is obtained a different vector of average price by overnight stay for each regulated type of establishment according to the Occupancy Surveys (NSI); obviously the non-regulated establishments do not have any expense related because overnight stays in these kinds of places do not generate any production of consumption in the sector obtained by National Accounts. The average expense in Restaurants and the like is obtained from the Surveys used by the NSI to obtain the Purchasing Power Parity making the assumption that three meals and three bottles are consumed each day when the overnight stay is in a hotel, 75% for the rest of the regulated establishments, and 50% for non-regulated establishments and excursions. The data reported by other sources in tourism studies (Familitur or Familiar Budget Survey) is less coherent and with a huge variability across regions.

The bottom-up estimation has been proportionally adjusted to the vector of production that is consumed domestically in the Hostel Industry. In the case of the Restaurants, the adjustment to the vector of production that is domestically consumed is realized as follows:

- Interregional flows of the Restaurants sector will coincide with the bottom-up estimation (overnight stays or trips * average expense/person/day)
- Intraregional flows will be obtained as a difference between the production that is consumed by Spanish residents and the interregional flows generated by the trips or overnight stays (sum along the rows of the interregional flows obtained using the bottom-up procedure).

Finally, the bilateral trade flows of the Hostel industry and Restaurants are aggregated in one single matrix.