Does Trade Creation by Social and Business Networks Hold in Services?

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Abstract

Recent literature on the border effect has fostered research on informal barriers to trade and the role of networks in promoting it. In relation to social networks, it has been shown that the intensity of trade in goods is positively correlated with the migration stocks between any pair of countries/regions. The number of references for business networks is more limited, but they are also related with a reduction on information costs. In this article we investigate whether such a relation holds also for Spanish domestic trade flows in consumer services. To this end, we use a gravity model rooted in the Dixit–Stiglitz–Krugman theoretical framework and a unique dataset on interregional trade flows for some of the main tourism service sectors: namely, *accommodations* and *restaurants*. Our industry-specific analysis finds a large positive effect for *restaurants* but a more limited effect for *accommodations*. Forces driving the demand in each sector explain this result and suggest the idea that, although social networks can act as a substitute of firms in some sectors at the same time that enhance trade flows in other sectors. We perform the same kind of analysis with a dataset (obtained by a similar method) for domestic trade in goods and discover a different response to social and business networks. Finally, we treat the potential endogeneity by taking the instrumental-variables approach of the Poisson pseudo-maximum likelihood estimator and thus obtain consistent results.

1. Introduction

Although the literature of gravity models suggests that countries or regions tend to trade most with their closest neighbors, the steady reduction in transportation costs and the rise of other factors, such as social and business networks, can help overcome trade barriers like distance. In this regard, Rauch (2001) has noted that the positive impact of immigration on trade might simply reflect immigrants' taste for goods from their countries of origin, or the correlation of immigration with country characteristics that promote trade, such as proximity. Various authors have demonstrated, however, that in addition to this "taste effect" there exists a "network effect." This network effect, generated by the social links that immigrants maintain with their countries of origin, may induce important reductions in information and transaction costs, and thus spur bilateral trade. Certain authors (Gould, 1994; Dunlevy and Hutchinson, 1999, 2001; Girma and Yu, 2002; White and Tadesse, 2008; Peri and Requena, 2010; Felbermayr and Toubal, 2012; et al.) have tried to quantify the relevance of social and business networks on the international trade of goods.

Fewer studies link the presence of firms of the same business group to an increase in trade. Among them is Belderbos and Sleuwaegen (1998), which shows that the share of production exported to the European Union (EU) by a given Japanese electronics firm is substantially higher if the firm is a component subcontractor in a vertical keiretsu, and if the parent firm has previously invested in the EU. Their results suggest that membership in 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 behavior.

The literature that relates these two phenomena at the interregional level is very scarce. Combes et al. (2005), for instance, have quantified the impact of social and business networks on the intensity of interregional trade in goods between ninety-four French regions (departments). Using different gravity models, the authors verify that networks facilitate bilateral trade regardless of traditional impediments (distance and boundaries) and find larger effects for business networks than for social networks. Garmendia et al. (2012), meanwhile, have taken on the Spanish case. Using domestic flows, they find a large internal border effect that tends to disappear when the higher density of social and business networks within regions is taken into account.

The limited number of papers on the pro-trade effect of social and business networks within borders is probably due to (1) a lack of data and (2) a notion that this kind of relation cannot hold in domestic trade: the differences between domestic institutions being so small, potential gains in information costs are lower for domestic than for international trade (Helliwell, 1997). However, this might not be the case for trade in services, which is mostly domestic. According to World Bank data, only about 6% of total services produced are traded internationally. In other words, around 94% of service output is domestically traded. This might explain the limited number of references on international trade in services. Among these references are Kimura and Lee (2006), who use panel data from the OCDE international trade-in-services database for the period 1999–2000. They find that there is a strong negative elasticity of distance and that "language and cultural proximity between producer and consumer" play an important role in determining the intensity of international trade in services. This result is in line with the "information effect" described for the relation between social and business networks and international trade in goods (Gould, 1994). In other words, personal contact is essential for trade in services, as illustrated by the "proximity burden" described by Christen and Francois (2009). Factors that reduce transaction costs (reductions in information costs, cultural similarities, etc.) should thus play a more important role in services than in goods.

Moreover, since services are more differentiated and heterogeneous than goods, migration should influence trade in services more than trade in goods, because of the "taste effect": differences in how individuals value or perceive products from their homelands. With greater heterogeneity, then, we should expect the "taste effect" to increase. To the best of our knowledge, however, there has been little study of the effect of social and business networks on trade in services. The aim of this paper, therefore, is to analyze the extent to which the pro-trade effect of social and business networks—as found in the literature on the international trade of goods—holds for trade in services. Since most service flows take place within national borders, I have focused the paper on two industries linked with tourism: Accommodations and Restaurants. Moreover, because these two industries have different characteristics and different forces feeding their demand, it is possible to show the importance of taking into account industry heterogeneity within the service sector, even when both of the compared industries are consumer services.

Since consumers must travel for service to be rendered, any trade increase due to the social network in international trade of tourism-related services might be reduced by border-crossings and the cost of traveling back to the home country. In an analysis on domestic trips (as in the present paper), however, we might expect to see higher magnitudes of flows. In 2011 domestic trips accounted for the 91% of the total 147 million of trips taken by Spanish citizens (Instituto de Estudios Turísticos, 2011). An important distinction between the interregional and international movement of citizens is that lodging expenses may be lowered for interregional trips by ownership of "second residences" in the destination region or by accommodations shared with relatives or friends. Thus interregional migrations can increase trade in services though reductions not only in "transaction costs" but also in prices. Social networks then substitute for firms as service providers in lodging. These results are induced by "social networks" that exist also in the case of international tourism flows. In terms of social networks, several mechanisms could induce a positive correlation between trade and the intensity of demographic links (as described in the next section). For business networks, we would expect flows of tourism-related services to be more intense between regions and countries that share common infrastructures, business groups and intermediaries These are all intuitively appealing reasons to believe that the potential for significant relationships between trade flows of tourism-related service sectors, immigrant stocks and firms is greater for interregional than for international tourism, but a lack of data has limited the empirical exploration of these hypotheses on the domestic flows of services.

A similar analysis has been carried out for goods, to test the extent to which social and business networks have different effects on trade in goods and services, taking into consideration their respective characteristics, mode of delivery, demand-driving forces and consumer identities. To make this comparison ourselves, we use the same specification with datasets on trade in goods and services, with similar data sources, methods, levels of disaggregation and time periods. Additionally, we use the instrumental variables version of the Poisson pseudo-maximum likelihood estimator (PPML) to track the potential endogeneity problem caused by the reverse causality between bilateral trade flows and networks.

The results confirm the trade-creation effect of social and business networks on trade in services, but show heterogeneous behavior between sectors. Social networks have a

greater effect on Restaurants than on Accommodations. The former is positively affected by the stock of migrants in both directions, whereas the latter gets different results for emigrants and immigrants. The effect on trade in goods falls somewhere in between; we find a consistently significant positive effect for emigrants when all networks variables are introduced simultaneously into the regression. For services, we test two different business networks: one including all firms and a second including only firms in the accommodations, restaurants and transport-service sectors. Our purpose is to determine whether the potential effect of business networks on service trade flows is due to some price policy on the part of the firms in our sectors or to links between firms in the same business group that, through business trips, have a particular influence on the services under study. Although we find a greater effect on trade in goods than on trade in services, we also find a certain positive effect on the accommodations sector.

The remainder of the paper is organized as follows: Section 2 defines the main channels through which we expect social and business networks to exert an enhancing effect on interregional trade in the dataset's two service sectors. This section also presents the gravity model as the proper framework for the analysis of factors that determine bilateral-flow structure. Section 3 presents the main characteristics of our dataset. Section 4 presents and discusses the empirical results we obtain by applying the model to interregional trade flows in Spain. Section 5 concludes.

2. The gravity model and social and business networks in the trade in tourism services

2.1.Interaction between networks and tourism flows

For generality and simplicity, this section describes concepts of international and interregional trade and the role of migration flows. We define an immigrant as an individual born in a region (*homeland region*) different from his current region of residence (*host region*). Note also that in our discussion of interregional monetary flows for service sectors linked with tourism we define *exporting region* as the region providing the service: in this case, the region receiving the tourists.

Several channels can lead to a positive relationship between the intensity of consumer-services trade and the presence of social networks. We observe the following:

- The destination selected by immigrants is conditioned by family ties with their homeland. Since they may own homes or have access to property in the regions of their birth, people normally spend their vacations visiting their homelands. This should result in a larger number of trips from the host region to the hometowns of immigrants. This *emigrants effect* on exports, as we will call it, is related to the information and taste channels described for goods.
- Conversely, relatives and friends living in the homeland (people who have not migrated) may tend to visit immigrants in the host region. These visits are increased by access to information and reductions in the cost of lodgings with respect to other tourism destinations. This *immigrants effect* on exports is in line with the information channel described for trade in goods.
- Through the network channel, immigrants could also affect the "trip decisions" of non-immigrants living in the host region. Consider, for example, the large number of immigrants who might form a family with a native in a region. It is easy to suppose in these circumstances that family ties would influence immigrant and non-immigrant tourism decisions alike. In the case of a "mixed couple" (immigrant and non-immigrant), the decision to visit an immigrant's relative in the homeland would condition the travel plans of one non-migrant. In addition, past migration stocks will affect the present travel decisions of second-generation immigrants. If the aforementioned mixed couple has two children, the decision to visit a relative of the immigrant's in the homeland conditions the travel plans of three non-immigrants. Moreover, relatives and friends of the immigrant who are themselves still living in the homeland but interact regularly with her could also spread their travel experiences and tastes among co-nationals in the homeland.
- Finally, we could find an effect linked with the previous effects but producing opposite results. For some sectors, if the service providers are not firms but, instead, members of a social network, then there will be an increase in the number of trips between home and host regions but not in the monetary value of trade. Members of a family living in different regions could travel to spend a few days in their hometown, where other relatives still live, or travel to a region

where some family member owns a second home and stay there. Here we have family members, rather than hotels, providing the service of accommodations. In such situations the number of arrivals to the homeland region will increase without producing a pro-trade effect for accommodations-providing firms, because said accommodations are provided *free of charge* through the social network. However, for sectors that produce other services (e.g., restaurants, bars, retailers, transport companies, etc.) consumption might increase, because the region might attract more people by providing savings on one of its products (i.e., accommodations).

The interregional trade flows of a country's *Restaurants and the Like* and *Hospitality Industry* (*Accommodations*) could also benefit from the presence of business networks in these, or any other, sectors:

- We might expect to find more intense tourist flows between regions that share common tour operators, or between regions connected by hotel and transport holdings. Quite often these holdings offer tourist packages for accommodations provided by the same chain in alternative regions, or discounts for travel with haulers belonging to the same business group. We will represent these links between firms operating in the accommodations, restaurant and transport industries by the variable *service-firm links* or *service business networks*.
- Furthermore, since some share of tourist flows is made up of business trips, we may expect to find more intense interaction between people working in regions whose firms have some kind of connection (regardless of sector of operation), whether in trade, finance or administration. We will represent these regional links between overall firms, independently of their main activity, by the variable *total plant links* or *total business networks*.

2.2.The gravity model

The gravity model has been widely used to estimate all kinds of spatial interactions. It is possible to formulate a gravity equation with trade theories built on different foundations. In particular, we can formulate a gravity equation to account for bilateral trade flows in trade models characterized by CES preferences or iceberg trade costs and

for models where the decision of how much of a goods category to consume is separable from the decision of where to buy said goods, or where the decision of how much of a goods category to produce is separable from the decision of where to sell the goods (Anderson and van Wincoop, 2003).

As Santos Silva and Tenreyro (2006) have pointed out: if economic theory suggests that *y* and *x* are linked by a constant-elasticity model of the form $y_i = \exp(x_i\beta)$, where the relation $y_i = \exp(x_i\beta)$ holds on average but not for each *i*, then an error term, defined as $\varepsilon_i = y_i - E[y_i \mid x]$, is associated with each observation where the conditional expectation of y_i given x ($E[y_i \mid x]$) is $\exp(x_i\beta)$. This stochastic model can thus be formulated as:

$y_i = \exp(x_i\beta) + \varepsilon_i = \exp(x_i\beta)\eta_i$ *with* $y \geq 0$ and $E[\varepsilon_i \mid x] = 0$ and $\eta_i = 1 + \varepsilon_i / \exp(x_i\beta)$ and $E[\eta_i \mid x] = 0$.

Combes et al. (2005)—one of a great many such gravity-model papers—presents a gravity model rooted in the Dixit–Stiglitz–Krugman framework (Dixit and Stiglitz, 1977; Krugman, 1980) to estimate the trade-creation effect of social and business networks. The authors include various parameters for preferences and transaction costs to account for the pro-trade effect of social and business networks. However, they also linearize the resulting equation by taking logarithms. Santos-Silva and Tenreyro (2006, 2011) and Arvis and Shepherd (2011) have shown that the log normal transformation yields biased and inconsistent estimations in the presence of heteroskedasticity, even when there is no large number of zero flows.[1] In their 2006 paper, Santos-Silva and Tenreyro proposed a modified Poisson model that has been widely used in the empirical literature. The multiplicative gravity relationship that forms the baseline model of the present paper can be written as the exponential function:

$$T_{ijt} = \alpha_0 * mig_{ijt}^{\alpha_1} * mig_{jit}^{\alpha_2} * firms_{ijt}^{\alpha_3} * dist_{ij}^{\alpha_4} * e^{\alpha_5 cont_{ij} + \theta_i\delta_i + \theta_j\delta_j + \theta_t\delta_t} \quad (1)$$

Or, in its stochastic version:

$$E[T_{ijt} \mid Z_{ijt}] = \exp(\alpha_0 + \alpha_1 \ln mig_{ijt} + \alpha_2 \ln mig_{jit} + \alpha_3 \ln firms_{ijt} + \alpha_4 \ln dist_{ij} + \alpha_5 cont_{ij} + \theta_i\delta_i + \theta_j\delta_j + \theta_t\delta_t)$$
$$\text{With } Z_{ijt} = \left[\ln dist_{ij}, cont_{ij}, \ln mig_{ijt}, \ln mig_{jit}, \ln firms_{ijt}, \delta_i, \delta_j, \delta_t\right] \quad (2)$$

[1] One of the arguments uses Jensen's inequality—E(ln y) ≠ ln E (y)—to show that the standard interpretation of the parameters of log-linearized models as elasticities can be misleading in the presence of heteroskedasticity.

With an associated error term defined as: $\varepsilon_{ijt} = T_{ijt} - E[T_{ijt} | Z_{ijt}]$. T_{ijt} represents the service exports of each region *i* to each region *j* in monetary units for each year *t* during the period 2000–2009; *ln* $dist_{ij}$ is the logarithm of the actual average distance travelled between *i* and *j*; $cont_{ij}$ is a dummy variable capturing the positive impact on bilateral trade flows of a shared regional border; *ln* mig_{ijt} is the interregional stock of emigrants born in region *i* and living in region *j* over period *t*; *ln* mig_{jit} is the interregional stock of immigrants from *j* living in *i* over period *t*; ln $firms_{ijt}$ is the logarithm of the potential links between firms in *i* and *j*. Finally, δ_i and δ_j are region-specific fixed effects capturing multilateral resistance terms and any unobservable invariant characteristic of the regions; δ_t is the year-specific fixed effect capturing the business cycle; and θ_i, θ_j and θ_t are vectors of the parameters associated with the aforementioned set of fixed effects.

3. Data

3.1.Interregional trade flows

This section describes the paper's unique dataset, which contains interregional bilateral trade flows in monetary units for the period 2000–2009 for Spain's restaurants and accommodations sectors. For the sake of clarity, we offer here a brief description of our method for compiling the database. There is a detailed description in De la Mata and Llano (2013).

We can summarize the method in two steps: (1) estimation of each sector's share of the output consumed by Spanish residents for each of the eighteen Spanish regions; (2) estimation of the bilateral distribution of each region's share.

In the *first step*, we obtain the vector of regional production consumed by domestic demand by combining existing information on regional net production at both the national (National Accounts and *Input-Output Tables*) and the NUTS2 level (*Spanish Annual Service Survey*, or SASS, from the Instituto Nacional de Estadística, INE), as well as data on the sector's international exports as reported in the *Spanish Balance of*

Payments (SBP). In the *second step*, we use the following procedure for each year in the period 2000–2009:

First, we quantify domestic trips taken by individuals that can result in expenditures in the two sectors considered, using Spain's main relevant statistical sources (*Occupancy Surveys*, INE; *Familitur Survey*, Instituto de Estudios Turísticos–IET). We differentiate between overnight stays in four types of regulated establishments: hotels, apartments, campsites and rural-tourism establishments (*Occupancy Surveys*, INE). We separately consider overnight stays at "second homes" and "homes owned by friends and relatives" (*Familitur Survey*, IET). We also consider domestic excursions as reported in the *Familitur Survey* (IET). We treat all these flow categories separately, imputing alternative unit expenses for restaurants and accommodations. To overnight stays in regulated establishments (hotels, apartments, campsites and rural tourism) we associate a daily expense in accommodations and restaurants, whereas for other trips we generate only consumption in restaurants.

Second, we estimate the average daily expenditure incurred by residents of every region in accommodations with data from the *Occupancy Survey* (INE). To estimate the average expense incurred at restaurants, we use data on the average meal prices from the *Purchasing Power Parity* (INE) surveys. We obtain a different price vector depending on accommodations type for each year.

Finally, once (i) we have properly translated each trip and overnight stay into monetary flows linked to the accommodations and restaurants sectors and (ii) adjusted total flows to the production figures obtained in the first step, we can aggregate the data into a single origin-destination (OD) matrix, which then accounts for total interregional expenditure linked to overnight stays or excursions.

Note that all OD matrices obtained capture the trade-flow direction of services rather than the movements of people. As in the Balance of Payments, the direction of a trip (people movement) is contrary to the trade (monetary) flow of the attributable service. The expenditure generated by a German tourist in Spain, for instance, 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. The trade matrices are, therefore, calculated in monetary units and register the exporting regions in rows (receptors of people) and the importing regions in columns (regions that acquire services by sending people). We remark that our monetary-unit estimates for the intra-

and interregional trade flows of these tourism-related sectors in Spain are coherent with the statistics given in available Spanish sources: i.e., each sector's regional production, as reported by the SASS; each sector's international exports, as reported by the BP; and the structure of interregional overnight stays, as reported by the main available sources (*Familitur* and *Occupancy Surveys*).

Although we obtain squared matrices containing both interregional and intraregional flows, we will not include intraregional flows in this analysis. The reason is that intraregional flows are in very large part different in nature from interregional flows. The former take into account daily consumption in *Restaurants and the Like*, where social and business networks play no important role in decisions. Instead, this sort of daily consumption is determined by the setting of individuals' regular daily lives. To avoid discussing the tradable character of a certain type of service, we have preferred to focus strictly on interregional flows (for further analysis of this topic, with the same dataset, see De la Mata and Llano (2013)). We also exclude flows to/from Ceuta y Melilla, because the primary statistics available for these autonomous cities are of very low quality and the cities' share of total output is small enough to be negligible for our analysis.

We compare our results for these services with the results for the interregional trade in goods for the same period. The dataset for domestic trade in goods is also borrowed from the c-intereg project (www.c-intereg.es). Although the c-intereg project has disaggregated data for sixteen sectors at the provincial level (NUTS 3) since 1995, we will consider the aggregate for all goods since 2000 at the NUTS2 level (regions) in order to be consistent with the time period and aggregation level available for data on trade in services.

3.2.Distance measure

The distance variable, obtained from the 2001 edition of the Movilia survey (Ministerio de Fomento), corresponds to the actual distance travelled from region to region by Spanish residents. One of the most interesting features of this measure is that it includes not just interregional but also intraregional distance. Moreover, the distance used is an average of the actual distance travelled in each of the more than 500 million displacements estimated by the 2001 Movilia survey. Displacements for all motives are

included, so the distance reported is not limited to the distance between capitals, which might predominate for work trips but not for tourist trips to the periphery (beaches, skiing resorts, countryside, etc.).

3.3.Social and business networks

We obtain our interregional migration matrices from each year's *Spanish Register* (INE), which provides information on the stock of people living in one region but born in another. The effects captured by the terms m_{ij} and m_{ji} enter as two independent variables.

Data on business networks has been kindly provided by Aitor Garmendia (Garmendia et al., 2012). It was computed from SABI (2006), which was produced by the private firm Bureau van Dijk, and offers data on the accounts and balance sheets of Spanish firms. We can thus identify firms of the same group that operate in both origin and destination regions. According to the Spanish General Accounting Guidelines, two firms belong to the same business group if one shareholder owns at least a 20% share in both firms and said shareholder is the primary shareholder in both firms. With this information we can calculate the number of firms belonging to the same business group in each region. For the *service-firm links* variable, we consider the service sectors 'Accommodations' (NACE 93. 55.11, 55.12, 55.22, 55.23), 'Restaurants' (NACE 93. 55.30) and 'Transport' (NACE 93. 60.10, 60.21, 60.22, 60.23, 62.10, 62.20), which includes tour operators as well as haulers. For *total plant link*s we consider all firms. In both cases, we calculate the number of potential connections within the business group for each pair *ij* by multiplying the number of plants in *i* and *j*. These variables, and therefore the impact of plant links (including all or certain tourism-related firms), are thus symmetric in construction: $firms_{ij} = firms_{ji}$. These variables are available only for 2006.

Table 1 shows the correlation between all the variables. We see that all the types of trade flows are positively correlated with each network variable. In general, the correlations of service business networks (*firms_ij (serv)*) with trade flows are very similar regardless of flow type, while total business networks is more highly correlated with bilateral trade in goods than with services. The pairwise correlation between each type of social network (immigrants, *mig_ij*, and emigrants, *mig_ji*) and trade flows varies by flow type. The lowest correlation is found for trade flows in the

accommodations sector (*Tij h*) and is about the same (~0.16) for both emigrants and immigrants. In the restaurants sector (*Tij r*), however, domestic flows are much more highly correlated with the stock of emigrants than with the stock of immigrants (0.66 vs. 0.29). The correlation between all types of networks and bilateral trade in goods (*Tij g*) is very similar across the network variables, although it is slightly higher for total business networks (*firms_ij (total)*). Also, it is important to note that although the social network variables (immigration and emigration) show a positive correlation between them (0.24), the correlation is slightly lower than in any other similar analysis, such as Combes et al. (2005).

Table 1. Correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Tij	-							
(2)Tij h	0.9528*	-						
(3)Tij r	0.7151*	0.4696*	-					
(4)Tij g	0.3694*	0.2362*	0.5317*	-				
(5)mig_ij	0.3577*	0.1665*	0.6572*	0.4545*	-			
(6)mig_ji	0.2293*	0.1657*	0.2857*	0.4940*	0.2401*	-		
(7)firms_ij (serv)	0.5233*	0.4810*	0.4145*	0.4771*	0.3416*	0.3416*	-	
(8) firms_ij (total)	0.5008*	0.4322*	0.4611*	0.5740*	0.2975*	0.2975*	0.8748*	-
(9) dist_ij	0.0254	0.0946*	-0.1439*	-0.2207*	-0.1146*	-0.1023*	0.0951*	-0.0555

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

As for the relation between the network variables and distance, there is a notable negative relation between migration (emigration and immigration) and distance, whereas a positive correlation exists between distance and service-firm connections (*firms_ij (serv)*), and a negative but non-significant correlation between distance and total plant links (*firms_ij (total)*). We might expect a priori that close proximity to other plants in a business group could provide advantages in terms of economies of scale and agglomeration. However, this is not necessarily the case with service business groups, which set up an establishment so as to deliver service specifically to the area of the establishment's location. Business groups in these service sectors might set up in different places to cover different geographical markets (differentiation by location) and thus capture different segments of total demand.

Maps in **Figures 1** and **2** show the largest bilateral trade values for 2009 for the sectors *Hospitality Industry (Accommodations)* and *Restaurants and the Like*. There are relevant differences between the main bilateral flows for each sector. **Figure 1**, showing the main interregional flows in accommodations, reveals the strong relationships of the east coast and the islands with Madrid. It is important to highlight the importance of the

islands as exporters of this kind of flow. Exports from Canarias to Madrid account for 12% of overall interregional exports; while exports from Baleares to Cataluña represent 4.02% and from Baleares to Madrid 3.98%. This is in line with the hypothesis that people select more distant destinations if their accommodations are to be regulated establishments. **Figure 2** shows the main bilateral flows for restaurants. Contrary to the trade patterns just shown for accommodations, here the main bilateral flows occur between regions with strong relations in terms of migrant stocks (Andalucía to Cataluña, Extremadura to Madrid, Andalucía to Madrid) or between contiguous regions (some with strong links in terms of crossed population). Such is the case with exports from Castilla y León to Madrid, from Castilla–La Mancha to Madrid, and from Castilla y León to the País Vasco. Additionally, certain large flows are related to strong interregional exports of accommodations, such as exports from Canarias to Madrid.

In addition, **Figure 3** presents the largest stocks of interregional migrants (according to the Spanish Register in 2009). Madrid is the region whose population has the highest share of people born in other regions. In contrast, Andalucía, with its particularly large percentage of native-born people living in other regions, is one of the most important exporters to other regions through family ties. On the other hand, Baleares, although a great exporting region, has inflows unrelated to migration stocks. Therefore, although distance might very well be a limiting factor in migration patterns generally, what we see in Spain is significant migration to and from regions that are not geographically close. This migration pattern appears to be due to economic differences between the migration-paired regions.

Figure 4 shows the most intense relations in terms of potential plant links for our three relevant sectors (*service-firm links*): Accommodations, Restaurants and Transport. The graph shows strong links between Madrid and Cataluña, and between each of them and Islas Canarias and Andalucía. In general, we see strong links between regions with high share of the national gross domestic product and certain coastal or peripheral regions.

Figure 1. Main bilateral flows in €.
Accommodation. 2009
Units: % of total interregional flows.

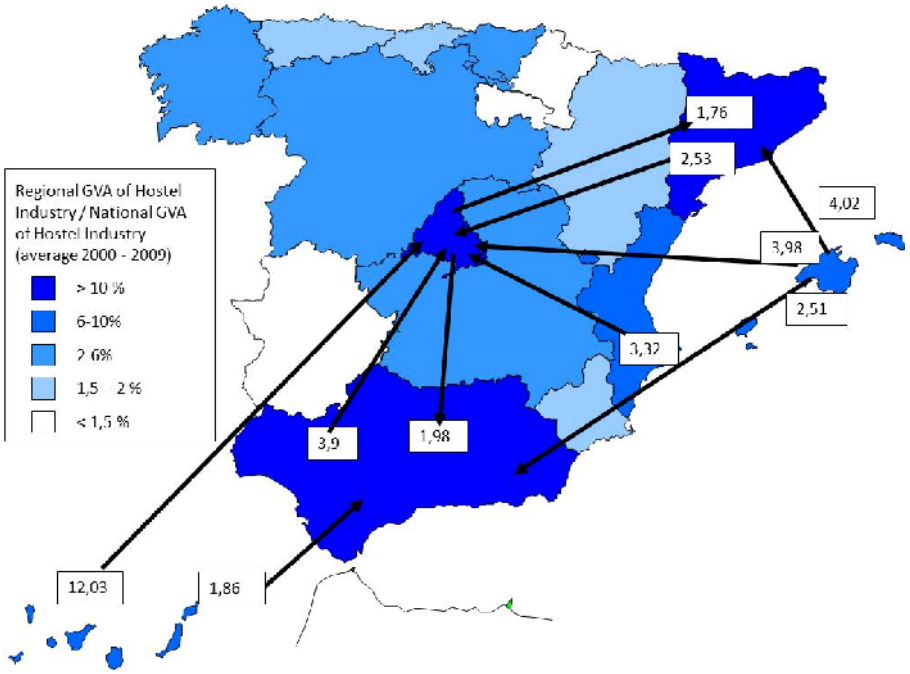


Figure 2. Main bilateral flows in €.
Restaurants. 2009
Units: % of total interregional flows.

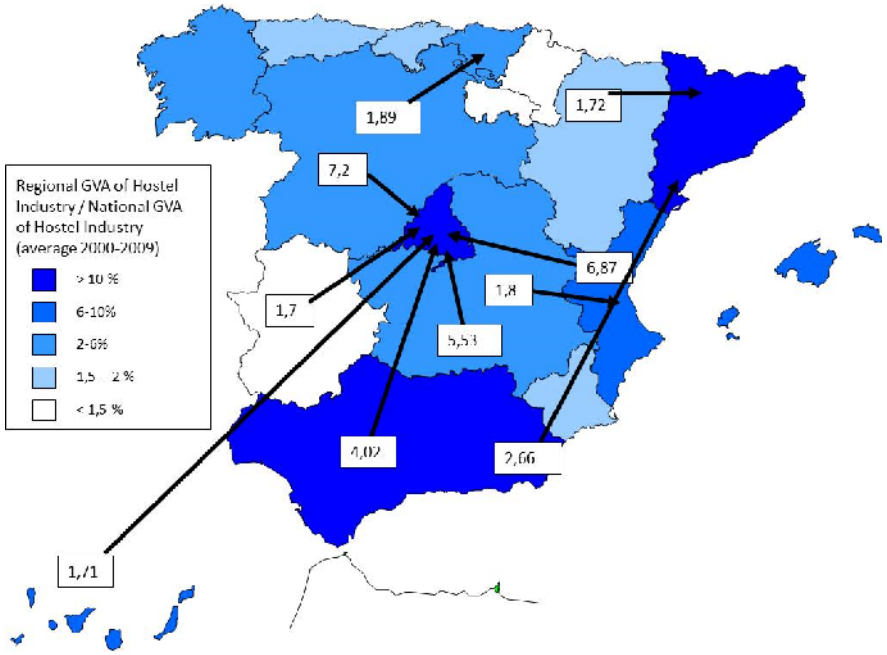


Figure 3. Main bilateral stocks of immigrants. 2009.
Units: % of total interregional migration stocks.

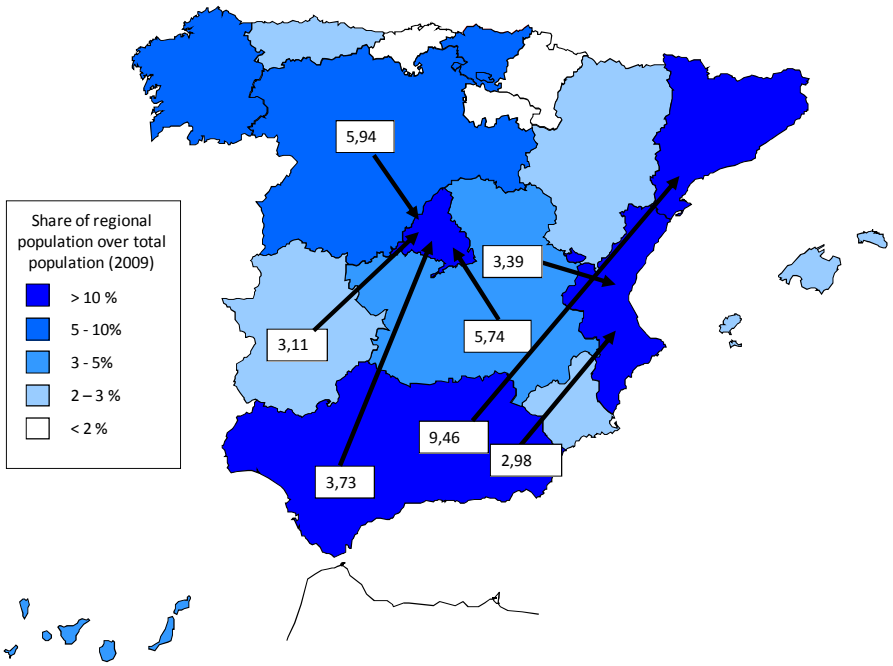
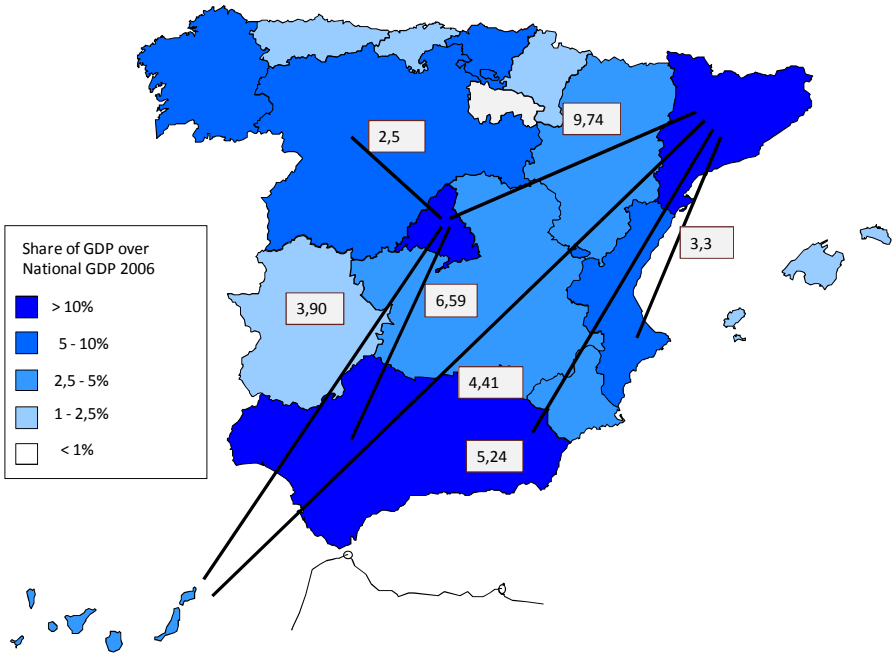


Figure 4. Main potential plant links.
Accommodation, Restaurants and Transportation. 2006
Units: % of total interregional plant linkages



4. Empirical Strategy and Results

Estimating eq (2) could induce some endogeneity problems induced by reverse causality on the variables of interest: immigrant and emigrant stocks and plant links. Let us first consider social-network variables (migration). A region with high service exports will see its gross domestic product rise. As a result, an increasing number of people might have an economic incentive to move there or travel there, triggering large flows of services linked to tourism. At some point (e.g., retirement) certain tourists might decide to move there (i.e., migrate). Now, a similar mechanism can arise with the business-network variable. A firm looking to open a branch in some new region has every incentive to maximize profits by selecting a region that attracts many people: i.e., that has high exports.

Then, in addition to estimate the results generated by eq (2) with the Poisson pseudo-maximum likelihood (PPML) procedure described in Santos-Silva and Tenreyro (2006), we have solved the endogeneity problem in two ways. First, the trade variable is a yearly flow, whereas the social and business networks are, respectively, stocks of migrants and firms located in a given region at a given point in time. This should reduce simultaneity and reverse causality. Second, we repeat the analysis with the instrumental variable version of the Poisson pseudo-maximum likelihood (IVPPML), as described in Windmeijer and Santos-Silva (1997). In the literature, the endogeneity of the stock of migrants has been treated with an instrumental-variables approach (IV), with the lagged dependent variable as instrument. To the best of my knowledge, no paper has tackled the endogeneity problem in business networks. This is due in part to the dearth of papers analyzing the business-network effect on trade, but also to the difficulty of finding a valid instrument. In fact, Combes et al. (2005) recognizes that this problem can arise for business networks but finds no good instrument. As in previous analyses, we use as our instruments stocks of immigrants and emigrants as reported a year prior to the sample period: in this case, the stock of migrants given by the Spanish Census for 1981 (INE). For business networks, since we have constructed our variable with data for 2006, the reverse causality problem does not apply as long as we restrict the analysis to the period 2007–2009.

We have conducted an analysis first for the aggregate of Accommodations and Restaurants (**Table 2**) and then separately for *Hospitality Industry (Accommodations)* (**Table 3**) and *Restaurants and the Like* (**Table 4**). We have then replicated the analysis

for goods, in order to make suitable comparisons (**Table 5**) and determine the extent to which goods and services present different elasticities with respect to the same factors. Immigration and emigration stocks, as well as the business network variable, are included simultaneously in the regression[2].

All four tables adhere to the same structure. We show, first, the results using the PPML procedure and in the last columns of each table, the results obtained with the IV approach. The first column of each table shows the results without network variables, while the rest of the columns show the fully saturated specification which add all the networks variables, using alternatively the business network variable based on service firms and on the total number of plants. The columns that contain the results using IV show the results for the specification using the full time period and using data just between 2007 and 2009. Table 5, which shows the results for trade in goods, only includes four columns since just the business network variable for all the firms have been used to explain the magnitude of this kind of trade flows. By including service-firm links and total firm links separately, we can identify the trade-creation effect on our service sectors (*accommodations* and *restaurants*) through two different channels: marketing policies in the relevant sectors and business trips for any kind of firm.

Table 2 reports estimation results for the aggregation of Restaurants and Accommodations. It is important to highlight the low coefficient generated for distance; this coefficient sharply reduces its magnitude (from -0.34 to -0.1) when all the network variables are included and becomes non-significant when the endogeneity is treated using the IV approach and the period of analysis is restricted from 2007 to 2009. This interesting and novel result is in line with the hypothesis that distance has a heterogeneous impact on trade flows for sectors linked with tourism. We can interpret the non-significance or small impact of distance as indicating the following: once we have controlled for the trips of persons travelling neither to their homeland nor to a host region where co-nationals have settled, distance generates negligible friction on trade flows. This result seems consistent with the tendency of populations from high-income, highly populated regions such as Madrid to travel to coastal regions for their vacation. It is also important to highlight, however, that the coefficient for contiguous regions is

[2] In a previous analysis, immigration and emigration stocks and the business network variable were included first separately and then simultaneously in the regression analysis. We have carried out the same analysis with the addition of origin-time fixed effects and destination-time fixed effects. The results are basically the same and available upon request. The results will be available upon request.

positive and significant. This signals that short trips to contiguous regions on weekends play a role, and that the negative effect of distance is somehow driven by this kind of trip. Moreover, the coefficient for contiguity and distance drops in magnitude when migration variables are included, because a share of the interregional migration takes place between contiguous or proximate regions. However, as shown in **Figure 3**, there are large stocks of immigrants moving from Andalucía to Cataluña or from Extremadura to Madrid, not for geographic reasons but because of historical differences in per capita incomes between the regions. This pattern of migration flows reduces the gravity of migration stocks in the case of Spanish regions. As shown below, in fact, this loss of significance caused in the distance coefficient by the inclusion of migration is not found when we analyze bilateral trade flows of goods.

Table 2. Results for trade in Accommodation and Restaurants.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variables	Tij	Tij	Tij	Tij	Tij	Tij	Tij
Estimation method	PPML	PPML	PPML	IVPPML	IVPPML	IVPPML	IVPPML
Distance	-0.340**	-0.135	-0.112	-0.125***	-0.108	-0.104**	-0.088
	(0.139)	(0.106)	(0.136)	(0.04)	(0.06)	(0.04)	(0.07)
Share a common border	0.628***	0.240*	0.234	0.229***	0.306***	0.228***	0.301***
	(0.159)	(0.133)	(0.161)	(0.05)	(0.08)	(0.05)	(0.08)
Emigrants		0.0571	0.0512	0.003	0.044	-0.009	0.035
		(0.0984)	(0.0758)	(0.04)	(0.08)	(0.04)	(0.08)
Immigrants		0.323***	0.334***	0.392***	0.336***	0.406***	0.348***
		(0.101)	(0.0887)	(0.05)	(0.08)	(0.05)	(0.09)
Services business networks		0.0754**		0.073***	0.063***		
		(0.0305)		(0.01)	(0.02)		
Business networks			0.228			0.217***	0.201**
			(0.152)			(0.04)	(0.07)
Constant	13.83***	7.554***	5.874***	0.427	1.097	-1.112	-0.372
	(0.923)	(1.160)	(2.226)	(0.43)	(0.75)	(0.58)	(-0.95)
Period	2000-2009	2000-2009	2000-2009	2000-2009	2007-2009	2000-2009	2007-2009
Observations	2,720	2,720	2,720	2720	816	2720	816
R-squared	0.824	0.877	0.872	0.878	0.889	0.873	0.886

Clustered robust standard errors by country pairs in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Origin fixed effects, destination fixed effects and time fixed effects are included. All variables in log form, except the dummy variables.

Regarding the emigration and immigration effects only the last one is confirmed. As for the effect of business-plant links, column (2) shows that, when the endogeneity issue was not treated, the effect for services business networks was small, but significant, contrary to the estimate obtained when all firms are included in the business-network variable. However, the latter turns to be significant in the IV approach, suggesting the main channel through which business networks affect trade in the services considered: namely, business trips in all industries.

Once we have analyzed the general characteristics for the aggregate of *Hospitality Industry (Accommodations)* and *Restaurants*, we analyze each sector separately to test the differences in their characteristics and determine which variables have the largest influence on each. **Table 3** reports the results for *accommodations*. For the distance and contiguity variable we find a negative coefficient. This becomes non-significant when the networks variables are included and the endogeneity is not completely controlled for. As with the aggregate of the two sectors, when we include both migrant stocks simultaneously, only the stock of immigrants remains significant and obtains a positive coefficient. Moreover, for *accommodations* the negative and significant sign in the emigrants variable suggests that a certain level of substitutability may exist between social networks and firms that provide lodgings. As explained in the previous section, one person's traveling to a place because of personal ties could increase demand in the destination region for certain products, but if the social network is providing a service free of charge not all sectors will necessarily be affected. Such is the case in *accommodations*, where demand is basically driven by other factors. At the same time, business networks have a positive effect on *accommodations*, higher when the business links in all the firms are included, but also positive and significant when we restrict these networks to service industries.

Table 3. Results for trade in Accommodation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	Tij-h	Tij-h	Tij-h	Tij-h	Tij-h	Tij-h	Tij-h
Estimation method	PPML	PPML	PPML	IVPPML	IVPPML	IVPPML	IVPPML
Distance	-0.367**	-0.215	-0.179	-0.191***	-0.156	-0.160**	-0.122
	(0.153)	(0.137)	(0.166)	(0.05)	(0.08)	(0.05)	(0.08)
Share a common border	0.420**	0.205	0.198	0.182***	0.298***	0.183***	0.287***
	(0.165)	(0.141)	(0.171)	(0.05)	(0.08)	(0.05)	(0.08)
Emigrants		-0.0740	-0.0805	-0.216***	-0.206*	-0.232***	-0.218*
		(0.111)	(0.0923)	(0.05)	(0.09)	(0.05)	(0.09)
Immigrants		0.274**	0.284**	0.448***	0.411***	0.465***	0.422***
		(0.114)	(0.117)	(0.06)	(0.1)	(0.06)	(0.1)
Services business networks		0.0914**		0.085***	0.069***		
		(0.0361)		(0.01)	(0.02)		
Business networks			0.313			0.277***	0.283***
			(0.193)			(0.05)	(0.08)
Constant	13.62***	9.762***	7.404***	2.358***	3.226***	0.352	1.072
	(1.018)	(1.499)	(2.706)	(0.54)	(0.93)	(0.7)	(1.14)
Period	2000-2009	2000-2009	2000-2009	2000-2009	2007-2009	2000-2009	2007-2009
Observations	2,720	2,720	2,720	2720	816	2720	816
R-squared	0.821	0.853	0.844	0.854	0.865	0.846	0.860

Clustered robust standard errors by country pairs in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Origin fixed effects, destination fixed effects and time fixed effects are included. All variables in log form, except the dummy variables.

Table 4 shows the results for *restaurants*. The strong positive effect of a shared boundary that appears in the first column is mitigated when network variables are

included, but still significant when the IV approach is used to control the endogeneity. Here, as opposed to with *accommodations*, both migration variables the effects of both emigration and immigration are positive and significant. This is because a large share of consumption in *restaurants* can somehow be linked with trips to homelands and contiguous regions, as is not the case with *accommodations*. For *restaurants*, although non-significant effects for the service business links were found when the endogeneity was not controlled, we do find a small and positive effect for business networks in the services considered with the IV approach, but not for the total business networks.

Table 4. Results for trade in Restaurants and the like.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	Tij-r	Tij-r	Tij-r	Tij-r	Tij-r	Tij-r	Tij-r
Estimation method	PPML	PPML	PPML	IVPPML	IVPPML	IVPPML	IVPPML
	-0.285**	-0.0985	-0.104	-0.108***	-0.111*	-0.112***	-0.116*
Distance (logged)	(0.124)	(0.0713)	(0.0791)	(0.03)	(0.05)	(0.03)	(0.05)
	0.883***	0.203	0.212	0.226***	0.257**	0.234***	0.266**
Share a common border	(0.158)	(0.137)	(0.161)	(0.05)	(0.09)	(0.05)	(0.09)
		0.212**	0.213***	0.275***	0.328***	0.274***	0.326***
Emigrants (logged)		(0.0916)	(0.0725)	(0.04)	(0.08)	(0.04)	(0.08)
		0.410***	0.418***	0.323***	0.268**	0.333***	0.281***
Immigrants (logged)		(0.0977)	(0.0804)	(0.04)	(0.08)	(0.04)	(0.08)
Services business networks		0.0318		0.035***	0.038*		
(logged)		(0.0246)		(0.01)	(0.02)		
			-0.00803			0.005	-0.001
Business networks (logged)			(0.115)			(0.04)	(0.08)
Constant	12.26***	3.570***	3.733***	-3.009***	-2.574***	-2.939***	-2.453**
	(0.827)	(0.859)	(1.443)	(0.33)	(0.61)	(0.51)	(0.91)
Period	2000-2009	2000-2009	2000-2009	2000-2009	2007-2009	2000-2009	2007-2009
Observations	2,720	2,720	2,720	2720	816	2720	816
R-squared	0.836	0.929	0.928	0.927	0.926	0.926	0.925

Clustered robust standard errors by country pairs in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Origin fixed effects, destination fixed effects and time fixed effects are included. All variables in log form, except the dummy variables.

Finally, in **Table 5** we see a similar analysis for trade in goods, which looks for differences in the influence of the same factors on domestic trade in our selected goods and services (*accommodations* and *restaurants*). Note that here we use the business-network variable for all firms, not the variable for service firms exclusively and that the results remain fairly stable with the IV approach.

We find several differences between our results for services and our results, in **Table 5**, for goods. First, the coefficient for distance and contiguity remains significant when the network variables are included, while for the case of services or it became non-significant or it is significant just at the 10%. Second, although the stock of *immigrants* seems to have a trade-creation effect for services (with *emigrants* having a positive effect on *restaurants*, but negative on *accommodation*), the stock of *emigrants* appears

to have a trade-creation effect for goods. This confirms the taste effect, but not the information effect described in previous literature. Third, and importantly, the effect of business networks is higher for trade in goods than for trade in services. We obtain a higher coefficient for business networks than Garmendia et al. (2012) (coefficient of 0.31, with intraregional flows included) or Combes et al. (2005) (coefficient of 0.23, with a similar specification for domestic trade in goods in France).

Table 5. Results for trade in Goods.

	(1)	(2)	(3)	(4)
Dependent variables	Tij-g	Tij-g	Tij-g	Tij-g
Estimation method	PPML	PPML	IVPPML	IVPPML
Distance (logged)	-0.385***	-0.198**	-0.197***	-0.156***
	(0.0860)	(0.0940)	(0.03)	(0.05)
Share a common border	0.975***	0.572***	0.567***	0.567***
	(0.0928)	(0.118)	(0.04)	(0.07)
Emigrants (logged)		0.177***	0.225***	0.168*
		(0.0656)	(0.04)	(0.07)
Immigrants (logged)		0.0586	0.018	0.087
		(0.0530)	(0.04)	(0.07)
Business networks (logged)		0.691***	0.685***	0.718***
		(0.168)	(0.05)	(0.09)
Constant	17.11***	7.480***	0.539	0.272
	(0.576)	(2.131)	(0.55)	(1.01)
Period	2000-2009	2000-2009	2000-2009	2007-2009
Observations	2,720	2,720	2720	816
R-squared	0.839	0.887	0.8873	0.8771

Clustered robust standard errors by country pairs in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Origin fixed effects, destination fixed effects and time fixed effects are included. All variables in log form, except the dummy variables.

In sum, social networks (friends and relatives) and the ownership of second homes in the homeland are somehow substituting for service provision in *accommodations*, while flows for *restaurants* are highly and positively affected by the attractive power of family ties, which seem to increase the number of consumers in this sector. We find business networks, meanwhile, to have a smaller effect on trade in services than on trade in goods (0.72). The effect we find, moreover, is smaller than that found by Garmendia at al. (2012) or Combes et al (2005). It is non-significant for *restaurants* and 0.28 for *accommodations*. This can be explained by the focus of our analysis: consumer services. Establishments belonging to the same business groups but operating in different regions undoubtedly drive some share of business-trip demand (5% of total trips). Also, tour operators or big business groups controlling supply in this market give some preference to establishments with which they have commercial agreements (i.e., business networks). For goods, on the other hand, a larger share of trade is intra-industry or intra-firm trade.

As a robustness check, we present in the appendix a similar analysis using Ordinary Least Squares. There our general conclusions still apply. In fact, if we use the linear estimator, both social-network variables (emigrants and immigrants) are significant when introduced together for restaurants, whereas for trade in accommodations either variables alone has a positive and significant effect. This effect does not hold when they are introduced together. For the case of goods, we find no significant effect. For goods, the effect of business networks is stronger. Here as with the PPML, we find that business networks have a positive and significant effect on accommodations services, but only for relevant service sectors. This is not the case for all firms.

5. Conclusions

In this paper, we have examined the determinants of interregional trade flows on services from a gravity perspective that includes distance, social networks produced by the stock of interregional migration in each region, and links between firms. It is reasonable to expect that social and business networks parallel their positive effect on trade in goods by fostering trade in services as well. The motivation for this analysis is threefold. First, it is well known that services account for the largest share of total economic activity in all developed countries. Second, because of the lack of information on bilateral trade in services, it is difficult to find empirical studies on this subject. Thus the relation between trade in services, distance and informal barriers has long remained an open question. Given the characteristics of services (intangibility, inseparability, heterogeneity, difficulty of evaluation, etc.), we would expect tastes and the reduction of information costs to play a greater role in services than in goods. However, there might be an additional force at work in the case of certain services, such as those provided by the *Hospitality Industry* (*accommodations*): namely, the substitution of social networks for firms as services providers. Third, data restrictions have driven most studies to focus on the link between international migration and international trade. They have thus ignored the bulk of the flows in people and trade, which occurs between regions of a same country. This relates also with the previous comment: at least in some sectors a large numbers of tourists or trips do not always have economic consequences. This analysis determines which of the two effects predominates in each service sector. The results are compared with those obtained for trade flows of goods.

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 and preferences. The novelty of this analysis resides in its unique dataset on interregional trade flows for two important service sectors linked to tourism, *accommodations* and *restaurants*, for the period 2000–2009 (see www.c-intereg.es).

Results show a low negative effect for distance and a positive effect for shared boundaries. They confirm that the effect of distance diminishes once we control for social networks. This is consistent with the idea that the presence of a social network in homelands and the personal ties that it generates could mitigate the effect of distance on flows of services, an effect that nevertheless remains present in bilateral flows to and from contiguous regions. We could also interpret this result as a consequence of gravity in migration, but it does not appear when trade flows in goods are analyzed.

We find that the effect on the network variables differs for each separately analyzed sector. For the emigration and immigration variables the effect is positive in the r*estaurants* but limited in *accommodations*. This shows that the potential trade gains from migration links in *accommodations* are narrowed (or even eliminated) by a high presence of second homes and the free provision of accommodations by a social network (relatives, friends, second homes, etc.). However, trips partly favored by lowered expenditures in *accommodations* result in higher consumption in *restaurants*. The effect of business networks on trade flows is limited in services as compared with goods. That said, if we control for potential endogeneity, we find that total business networks have a positive effect on *accommodations* alone, reflecting the effect of business trips.

We expect these results to vary for other services, in accord with the characteristics of each industry, and remark the need to analyze each service separately, and not just in aggregation. The inclusion of transport-cost measures or travel times would also improve the analysis by making it possible to analyze the effect of public infrastructure investment in terms of regional integration and competitiveness. It would be interesting in the future to analyze the extent to which these results differ not just by sector but also by accommodations type.

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Appendix. Results using OLS

Table A1. Results for trade in Accommodation and Restaurants.

	(1) Tij	(2) Tij	(3) Tij	(4) Tij	(5) Tij	(6) Tij	(7) Tij	(8) Tij
Distance	-0.295***	-0.168***	-0.170***	-0.159**	-0.283***	-0.137**	-0.236***	-0.139**
	(0.0592)	(0.0606)	(0.0610)	(0.0614)	(0.0583)	(0.0647)	(0.0652)	(0.0672)
Share a common border	0.814***	0.402***	0.403***	0.371***	0.801***	0.338***	0.768***	0.364***
	(0.0972)	(0.101)	(0.104)	(0.103)	(0.101)	(0.104)	(0.106)	(0.107)
Emigrants		0.314***		0.187***		0.191***		0.182***
		(0.0448)		(0.0539)		(0.0546)		(0.0538)
Immigrants			0.310***	0.149***		0.155***		0.145***
			(0.0442)	(0.0488)		(0.0479)		(0.0482)
Services business networks					0.0316*	0.0479**		
					(0.0183)	(0.0192)		
Business networks							0.197**	0.0788
							(0.0815)	(0.0711)
Constant	13.35***	8.973***	9.025***	8.666***	13.13***	8.189***	11.36***	7.991***
	(0.452)	(0.799)	(0.788)	(0.823)	(0.448)	(0.909)	(0.970)	(1.166)
Observations	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720
R-squared	0.924	0.938	0.938	0.939	0.925	0.941	0.926	0.940

Robust standard errors, clustered by region – pair, *** p<0.01, ** p<0.05, * p<0.1, exporter fixed effects, importer fixed effects, year fixed effects included. Period of analysis: 2000-2009.

Table A2. Results for trade in Accommodation.

	(1) Tij-h	(2) Tij-h	(3) Tij-h	(4) Tij-h	(5) Tij-h	(6) Tij-h	(7) Tij-h	(8) Tij-h
Distance	-0.256***	-0.206***	-0.206***	-0.202***	-0.237***	-0.175**	-0.209***	-0.173**
	(0.0620)	(0.0710)	(0.0715)	(0.0721)	(0.0633)	(0.0757)	(0.0719)	(0.0790)
Share a common border	0.578***	0.416***	0.415***	0.403***	0.557***	0.362***	0.542***	0.393***
	(0.0851)	(0.0901)	(0.0936)	(0.0933)	(0.0846)	(0.0950)	(0.0939)	(0.0990)
Emigrants		0.124**		0.0713*		0.0770*		0.0647
		(0.0460)		(0.0417)		(0.0419)		(0.0420)
Immigrants			0.123**	0.0614		0.0687		0.0554
			(0.0470)	(0.0436)		(0.0438)		(0.0420)
Services business networks					0.0525***	0.0594***		
					(0.0163)	(0.0188)		
Business networks							0.157*	0.114
							(0.0892)	(0.0829)
Constant	12.73***	11.00***	11.01***	10.88***	12.37***	10.29***	11.14***	9.905***
	(0.458)	(0.903)	(0.914)	(0.949)	(0.492)	(1.041)	(1.095)	(1.377)
Observations	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720
R-squared	0.940	0.943	0.942	0.943	0.942	0.945	0.941	0.943

Robust standard errors, clustered by region – pair, *** p<0.01, ** p<0.05, * p<0.1, exporter fixed effects, importer fixed effects, year fixed effects included. Period of analysis: 2000-2009.

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Table A3. Results for trade in Restaurants.

	(1) Tij-r	(2) Tij-r	(3) Tij-r	(4) Tij-r	(5) Tij-r	(6) Tij-r	(7) Tij-r	(8) Tij-r
Distance	-0.358***	-0.135**	-0.144**	-0.123**	-0.353***	-0.103	-0.284***	-0.113*
	(0.0719)	(0.0583)	(0.0593)	(0.0593)	(0.0691)	(0.0625)	(0.0724)	(0.0637)
Share a common border	1.093***	0.370***	0.389***	0.326**	1.087***	0.298**	1.036***	0.323**
	(0.136)	(0.124)	(0.128)	(0.124)	(0.142)	(0.126)	(0.145)	(0.126)
Emigrants		0.550***		0.368***		0.372***		0.366***
		(0.0521)		(0.0696)		(0.0702)		(0.0694)
Immigrants			0.531***	0.214***		0.219***		0.212***
			(0.0513)	(0.0594)		(0.0588)		(0.0593)
Services business networks					0.0139	0.0417*		
					(0.0271)	(0.0216)		
Business networks							0.246**	0.0369
							(0.0925)	(0.0685)
Constant	12.68***	5.004***	5.272***	4.565***	12.58***	4.149***	10.19***	4.248***
	(0.557)	(0.808)	(0.799)	(0.825)	(0.527)	(0.926)	(1.019)	(1.097)
Observations	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720
R-squared	0.866	0.906	0.903	0.907	0.867	0.908	0.869	0.907

Robust standard errors, clustered by region – pair, *** p<0.01, ** p<0.05, * p<0.1, exporter fixed effects, importer fixed effects, year fixed effects included. Period of analysis: 2000-2009.

Table A4. Results for trade in Goods.

	(1) Tij-g	(2) Tij-g	(3) Tij-g	(4) Tij-g	(5) Tij-g	(6) Tij-g
Distance	-1.024***	-0.888***	-0.876***	-0.871***	-0.556**	-0.492*
	(0.213)	(0.247)	(0.250)	(0.254)	(0.220)	(0.254)
Share a common border	1.115***	0.675	0.631	0.616	0.754***	0.489
	(0.189)	(0.399)	(0.409)	(0.429)	(0.251)	(0.445)
Emigrants		0.335		0.0885		0.00197
		(0.250)		(0.182)		(0.186)
Immigrants			0.366	0.290		0.212
			(0.257)	(0.205)		(0.199)
Business networks					1.557***	1.480***
					(0.465)	(0.471)
Constant	21.61***	16.93***	16.51***	16.34***	5.861	3.657
	(1.537)	(3.957)	(4.057)	(4.269)	(4.475)	(5.434)
Observations	2,720	2,720	2,720	2,720	2,720	2,720
R-squared	0.703	0.707	0.708	0.708	0.729	0.731

Robust standard errors, clustered by region – pair, *** p<0.01, ** p<0.05, * p<0.1, exporter fixed effects, importer fixed effects, year fixed effects included. Period of analysis: 2000-2009.