Trade and Connectiveness between Neighbors across the Strait

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TRADE AND CONNECTIVENESS
BETWEEN NEIGHBORS ACROSS THE STRAIT

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Abstract

We investigate the trade relationship between two neighbors, Spain and Morocco, focusing on the role played by social connectedness, proxied by Facebook connections and migration flows, while controlling for singular geographical, historical, and institutional relations between the two countries, that despite the fact of being located in different continents are tied by special relations. These are partly explained by the enclaves of Ceuta, and Melilla, which share land borders with Morocco and the Saharan provinces that were previous colonies of Spain. We use a novel trade dataset between Spain and Morocco at the province level (NUTS 3) for the period from 2010 to 2018, split into 15 sectors and three transport modes.

Keywords: migration, interregional trade, border effect, difference-in-differences model, Spain, Morocco.

JEL Classifications: F14, F15; R23.

ملخص

نقوم بالتحقيق في العلاقة التجارية بين دولتين، إسبانيا والمغرب، مع التركيز على الدور الذي يلعبه الترابط الاجتماعي، بالوكالة عن طريق وسائل التواصل الاجتماعي وتدفقات الهجرة، مع التحكم في العلاقات الجغرافية والتاريخية والمؤسسية الفريدة بين البلدين، على الرغم من ذلك. بالرغم من حقيقة الوجود في قارات مختلفة مرتبطة بعلاقات خاصة. يتم تفسير ذلك جزئيًا من خلال مقاطعتي سبتة ومليلية، التي تشـترك في الحدود البرية مع المغرب والمقاطعات الصـحراوية التي كانت مسـتعمرات سـابقة لإسـبانيا. نسـتخدم مجموعة بيانات تجارية جديدة بين إسبانيا والمغرب على مستوى المقاطعة للفترة من 2010 إلى 2018، مقسمة إلى 15 قطاعًا وثلاثة وسائط نقل.

1. Introduction

The border between Spain and Morocco is essentially a maritime border. On the one hand, it is comprised by the waters of the Strait of Gibraltar, which separate the Iberian Peninsula from the African continent; on the other, it consists of the fragment of Moroccan Atlantic coast that lies opposite to the Canary Islands. However, the boundaries between the enclaves of Ceuta and Melilla and their hinterlands form short Spanish- Moroccan land borders in the Maghreb. Apart from Ceuta (19.4 km2) and Melilla (13.4 km2), the Canary Islands (7,446.6 km2), Alborán Island (7.1 km2), Peñón de Vélez de la Gomera (2.2 km2), Peñón de Alhucemas (1.4 km2) and the Chaffarine Islands (Congreso 4.5 km2, Isabel II 2 km2, Rey Francisco 0.6 km2) complement the contested and less obvious geography of the Spanish-Moroccan border (Ferrer-Gallardo, 2008).

A wide range of geographical, historical, political, social, cultural, and economic factors are at play in the Spanish-Moroccan border landscape. Nevertheless, the Spanish- Moroccan border has not been scrutinized as much as many other borders (such as the U.S.-Mexican border, for instance) although a growing number of studies have dealt with Spanish-Moroccan border affairs (see Bennison, 2001; Driessen, 1992; Gold, 1999; Ribas-Mateos, 2005). To date, this border has attracted less critical interest than its ''extreme'' nature would seem to invite (Ferrer-Gallardo, 2008).

To the best of our knowledge, our paper is the first to use sub-national bilateral flows of goods between two countries in Europe and Africa, covering a reasonable panel of years, products, and transport modes, which are then linked to institutional and social network relations.

Our results find that interregional trade flows are not just explained by pure geographic factors, or better to say, geographical accessibility should be put in relation to the most efficient transport mode at hand for certain regions. Moreover, when investigating the relationship between trade and different proxies of social connectedness such as Facebook or the bilateral migration flows, we find quite heterogeneous results. Noticeable, when controlling for singular geographical, historical, and institutional relations for Ceuta and Melilla, the capital cities, the Canary and Balearic Islands, or the Saharan provinces', we obtain very interesting and surprising results, such as the presence of strong and persistent trade relations between Spain and the most distant, but heavily historically connected, Saharan provinces.

2. Background

This paper aims to fill the gap in the literature by analyzing the interregional trade flows between two very different countries, Spain and Morocco, that embrace a long list of political and cultural encounters and disagreements.

It is also interesting to put this relationship in the context of the economic interaction between the whole EU and Morocco: the EU is Morocco's leading trade partner, and Morocco is the EU's biggest trade partner among the Southern Neighborhood (Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria and Tunisia). The EU is also the biggest foreign investor in Morocco, accounting for more than half of the country's FDI stock.

The EU and Morocco established a Free Trade Area as part of the EU-Morocco Association Agreement, signed in 1996, which entered into force on March 1st, 2000. The EU and Morocco also signed an Agreement on additional liberalization of trade in agricultural products, processed agricultural products, and fish and fisheries products, which entered into force in October 2012. Trade in industrial products is entirely liberalized, while market opening for agricultural products is also substantial. Both parties agreed upon a protocol establishing a Dispute Settlement Mechanism, which entered into force in 2012 (European Commission, 2021). Average tariffs were progressively downward from 25,8% in 2000 to 5,2% in 2012. (Blanes & Milgram, 2014).

The cooperation between the EU and Morocco was further strengthened under the European Neighborhood Policy (ENP) which was set up in 2003 as a new model of political partnership and economic integration. (Govantes, 2018) analyzes the EU– Morocco relationship in the framework of the ENP during its first five years and concludes that Morocco succeeded in obtaining the leadership on the main strategic interest of the EU, which gives it more weight in the relationship with the EU than it would be expected considering its economic position within the region. Morocco used its geographic and stability assets to become the only fully trustworthy partner in the region for the EU, obtaining the subsequent political benefits.

Another milestone in Morocco's relations with the European Union, albeit of a business nature, was reached in 2007 when the Moroccan authorities and the Renault-Nissan Group signed an agreement to launch the largest automotive project in North Africa. This agreement led to the installation of a production plant in Tangier, with an investment of more than 600 million euros and a production capacity of 400,000 vehicles. The inauguration of the factory in February 2012 attracted a wide network of both local and international suppliers, allowed the emergence of an auxiliary industry close to the factory, and in general terms, served for the development of the automotive sector in the country (VidizanAuktor & Hahn, 2017). In this regard, it is important to remember that Spain is also an important factor for Renault (Valladolid and Palencia) and other French (PSA-Citroën) and German car makers (Volkswagen, Mercedes-Benz, Opel-General Motors…).

In 2008, Morocco consolidated its position as a privileged partner of the EU by becoming the first country in the region to be granted "Advanced Status" by the EU. The two partners decided to re-examine the contractual framework that linked them to map out the future of their partnership and open new opportunities to promote, within the ENP, values such as openness, progress, and

prosperity and to move towards a "privileged partnership" capable of genuinely contributing towards the emergence of a renewed Euro- Mediterranean order. Morocco's request for advanced status was not an attempt to stand out from the rest or to gain exclusive rights, but rather to contribute to the new form of governance that is required in the Euro-Mediterranean space to develop a renewed approach to forging neighborhood ties to effectively address the challenges of globalization, to capitalize on assets, and to overcome collective security challenges and threats (Jaidi, 2009).

Both sides started negotiations in 2013 for a Deep and Comprehensive Free Trade Area (DCFTA). A Sustainability Impact Assessment carried out by an independent contractor accompanied the launch of negotiations. The last negotiating round was held in April 2014. (European Commission, 2021).

3. Methodology

In this section, we use the gravity equation, the workhorse of most of the empirical analysis of bilateral trade using the dataset (at NUTS 3 level). The success of the gravity equation lies in its ability to model trade flows through the interaction of economic and geographic variables, and the capacity to be embedded in micro-funded theoretical models such as the new trade theories (Anderson, 2011; Head and Mayer, 2014). It is also proven to be useful for modeling bilateral flows at different spatial scales, such as countries or regions within countries.

We apply two alternative specifications. The first one uses the standard log-linearized gravity equation and is estimated by Ordinary Least Squares (henceforth OLS). Taking natural logarithms of both sides, the model is set as follows:

$$LnT^{eukt}_{ij} = \beta_0 + \beta_1 LnGDP_{it} + \beta_2 LnGDP_{jt} + \beta_3 LnDIST_{ij} + \beta_4 LnFacebook_{ij} +$$

$$\beta_5 LnMigration_{ijt} + \beta_6 X + \mu_{it} + \mu_{jt} + \varepsilon_{ijt} \tag{1}$$

where the dependent variable LnT^{eukt}_{ij} refers to the log of the export flows from Spanish province i to Moroccan province j in a year t. $LnGDP_{it}$ denotes the GDP of the exporter province in period t and $LnGDP_{jt}$ denotes the GDP of the importing province at period t.

$LnDIST_{ij}$, is log of bilateral distance (from province i to province j) measured in km.

In addition, we included the variable $Facebook_{ij}$ which refers to the Social Connectedness Index which uses an anonymized snapshot of active Facebook users and their friendship networks to measure the intensity of social connectedness between locations. Users are assigned to locations based on their information and activity on *Facebook*, including the stated city on their *Facebook*

profile, and device and connection information. A growing body of research has begun to emerge using data on social connectedness from online social networking services such as *Facebook* (Bailey et al., 2018; 2020). Note that *Facebook$_{ij}$* is a time invariant variable.

In addition, $Migration_{ijt}$ refers to the Moroccan immigrants in the Spanish provinces in a year *t*. We include this variable because Moroccans ranked first as the foreign nationality with more residents in Spain in 2021. Because of geographic reasons, Spain is a commonly chosen destination and there are about 775,000 Moroccan immigrants in Spain. In addition, the Spanish provinces of Ceuta and Melilla are strategic points of immigration due to their geographical location. Note that this variable is defined at the province-to-country level from the Spanish perspective, not having the information corresponding to the Moroccan province of origin (for Moroccan emigrants to Spain) or destination (for Spanish emigrants to Morocco).

Furthermore, our gravity equation is enriched with element *X*, which accounts for a large range of dummy variables aimed to capture special geographical, political, and institutional features of regions in the two countries:

Capital$_i$; Capital$_j$: Dummy variables equal to one when the province of origin (*i*) and destination (*j*) are the country's capitals, and zero otherwise. These variables aim to control the special relations of the regions where the two capital cities are located, Madrid and Rabat.

Baleares$_i$: Dummy variable equal to one when the province of origin is *Balearic Islands* and, and zero otherwise. In this case study it is critical to disentangle the effect of the two island regions in Spain, given the different spatial and sectoral (dis) advantage of each archipelago when trading with Morocco.

Canarias$_i$: Dummy variable equal to one when the province of origin is Canary Islands, and zero otherwise. Although the Canary Islands also faces the typical disadvantages of island regions, its geostrategic enclave close to the Moroccan coast might end up generating an enhancing trade relation. Moreover, it has been said that the Canary Islands can play a key role on the strategic link between the EU and Africa, performing as diffusor of growth within Africa.

Ceuta$_i$ and *Melilla$_i$*: Are two different dummy variables, each one of them takes value one when the province of origin is Ceuta (Melilla) and, zero otherwise. Following a similar approach to the case of the Islands, we also split the effect of Ceuta and Melilla in two different dummy variables. In this case, the aim is to isolate possible differences in the role played by each one of them, also knowing that Ceuta is the closest location to the Iberian Peninsula, situated closer to the Tanger ports.

Sahara$_j$: Dummy variable equal to 1 when the province of destination belongs to the Sahara region, and zero otherwise. The aim of this variable is to try to find a kind of persistence effect on the performance of the Spanish trade with such southern regions in Morocco, with which Spain kept a special relation in the past. More interesting, these regions are the most remote and

inaccessible from the Spanish perspective, so, finding positive relations, as we obtain, clearly points to the presence of historical and institutional linkages going beyond to the pure geographical and economic factors.

The terms μ_{it} and μ_{jt} represent the multilateral resistance terms and are expected to capture the general relation of each trading province i and j concerning the rest of possible provinces, and how this relation can hamper (resistance) each specific bilateral flow. Following the literature (Head and Mayer, 2014), these variables are proxied by origin, destination, and time-varying fixed effects. Alternative specifications are also tested, but for brevity, not included in this analysis.

When calculating the log-linearized OLS, there are two econometric issues to consider that generate inconsistent estimates. First, zero-valued bilateral trade flows led to several unsatisfactory solutions. Second, the heteroskedasticity can lead to different estimates in log-linear models rather than estimated in levels. To address these two econometric issues, we propose a second specification avoiding the log-linearized gravity model and instead estimate the nonlinear gravity model through the Pseudo Poisson Maximum estimator (henceforth PPML) in line with the state of the art in trade modelling using the gravity equation in presence of large number of zero flows (Santos-Silva and Tenreyro, 2003, 2006). This estimation has also the virtue of producing unbiased estimates solving potential heteroskedasticity problems, in contrast to the classical OLS with logs on trade flows. Moreover, when fixed effects are added to the PPML estimation, the estimation is consistent with equilibrium constraints imposed by structural approaches, like the outward and inward multilateral resistance and the equilibrium constraints (Fally, 2015). In this regard, this second specification of the model is defined by the following equation:

$$T^{SMkt}_{ij} = \exp[\beta_0 + \beta_1 LnDIST_{ij} + \beta_2 LnFacebook_{ij} + \beta_3 LnMigration_{ij} + \beta_4 X +$$

$$\mu_{it} + \mu_{jt}] + \varepsilon_{ijt} \tag{2}$$

Our last specification uses equation (2) with an alternative independent variable, defined as the trade flows adjusted by the exporter and importer GDPs. By doing so, the independent variable is re-scaled, and avoids circular-causation problems of having GDPs in the right-hand side. The estimation procedure is also the PPML. The main advantage of this procedure is that trade flows are adjusted with the economic size of the trading provinces. The definition of the explanatory variables is shown in Table 1.

Table 1. Explanatory variables used in the econometric analysis

Variable	Definition
$LnGDP_{it}$	Log of Gross domestic Product of the origin NUTS3 region
$LnGDP_{jt}$	Log of Gross domestic Product of the destination NUTS3 region
$LnDIST_{ij}$	Log of distance (in km)
$LnFacebook_{ij}$	Social Connectedness Index. From NUTS3 to NUTS2 region
$LnMigration_{ij}$	Moroccan immigrants in the Spanish provinces in a year t
$Capital_i$	Dummy variables equal to one when the province of origin (i) and destination (j) are the country's capitals,
$Capital_j$	and zero otherwise
$Baleares_i$	Dummy variable equal to one when the province of origin is Balearic Islands and, and zero otherwise
$Canarias_i$	Dummy variable equal to one when the province of origin is Canary Islands, and zero otherwise
$Ceuta_i$	Dummy variable equal to one when the province of origin is Ceuta and, zero otherwise
$Melilla_i$	Dummy variable equal to one when the province of origin is Melilla, and zero otherwise
$Sahara_j$	Dummy variable equal to 1 when the province of destination belongs to the Sahara region, and zero otherwise.

Source: Authors' elaboration

4. Econometric results

This section shows the results obtained when the gravity model is estimated using the PPML for the period 2010-2018 using the province-to-province aggregated export flows. The main results are displayed in Table 2.

The column of export flows shows a PPML estimation with different fixed effects of time, origin, and destination provinces. The dependent variable is the total export flows divided by the product of the GDPs of the two trading provinces.

The low negative coefficients obtained in the PPML estimation confirms that the trade flows between the two countries is heavily dependent on ship and is not concentrated in the shortest distance. The most intense trade flows are not between Cádiz-Tangier. Instead, 10% and 5% of the total flows in value are between Barcelona-Tangier; and A Coruña-Tangier, respectively. In this line of thoughts, the coefficient obtained for the distance is significant and negative for the Spanish exports (-0.355), a result that should be also interpreted along with the strong positive and significant coefficients registered by the other variables capturing the geographical features (Canarias, Ceuta and Melilla and Sahara).

Table 2. Gravity equation. OLS & PPML. Aggregated export flows

Dep. Variable:	Exports
Ind. Variables	**(1)**
$LnDIST_{ij}$	-0.355**
$LnFacebook_{ij}$	0.190**
$LnMigration_{ij}$	1.775***
$Capital_i$	-0.619**
$Capital_j$	-0.271
$Baleares_i$	-0.136
$Canarias_i$	1.327***
$Ceuta_i$	2.340***
$Melilla_i$	5.111***
$Sahara_j$	5.741***
Observations	19,540
R2/Pseudo R2	0.500
Year FE	YES
$Province_i$ FE	YES
$Province_j$ FE	YES

*Notes: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Period:2010-2018. Exports in €.*

The Facebook variable shows a significant and positive effect on export flows, pointing out to the enhancing trade effect of this proxy of social connections (through internet) between the Spanish provinces with the Moroccan ones.

The Migration variable also shows a significative and positive effect for the Spanish exports. Interestingly, the results obtained for Facebook and Migration for the Spanish exports are positive and consistent. In the case of exports, the positive coefficients indicate that the Spanish regions with more intense exports to Morocco are also the ones with more intense migration and Facebook connections with that country. It could be also connected with the way in which some Moroccans arrived and settle in certain Spanish regions, for example, by means of temporal contracts in the agricultural sector in Andalucía and other southern Spanish regions.

The model includes a set of dummy variables capturing special geographical and institutional situations. In the case of the dummies for Ceuta and Melilla, the coefficients are positive and significant for exports. Regarding the Canary Islands, the coefficient obtained is positive and significant for exports while for the Balearic Islands, the coefficient is negative.

One surprising result is the strong positive effect obtained for the above the average trade observed for the Saharan provinces in Morocco, regions that are located far away from the Iberian Peninsula (although close to the Canary Islands) and can be consider as less accessible and politically stable. Such result points out to the persistence of the colonial ties linking these regions with Spain.

5. Conclusions

To the best of our knowledge, it is the first paper using a dataset at this spatial grid (NUTS 3) connecting a European and an African country, between which the level of integration is growing, not just with respect to the flows of goods, but also of services, capital, and immigration.

The estimation results show how the flows are related with the typical gravity variables, such as GDP and geographical distance, exploring also the relevance of several factors, namely Facebook connections and bilateral migration flows, as well as a set of dummies controlling for singular geographical, historical, and institutional relations. Our study could provide important insights and be of special relevance for other countries that have had strong colonial ties, which have then reverse in different kinds of hostilities and political differences.

Pure geographical distance is not the key driver of trade, and hence, the typical gravity factors should be complemented with additional information about transport mode connectivity, accessibility of certain regions to the coast, and their favored connectivity through ports. Indeed, the results show that the existence of maritime port connections, being the closest region (i.e. Cádiz-Tanger) is not as important as being a region with powerful exporting firms. For instance, our analysis identifies relevant trade linkages between distant regions (A Coruña-Tanger; Zaragoza-Tangier; Zaragoza-Casablanca).

On the contrary, the singular territories that share a ground custom with Morocco, Ceuta and Melilla, show also higher than average trade effects, but are not as prominent as could be expected in a typical situation where the contiguity effect always prevail. The case of the Canary Islands is also relevant since its strategic location raises its trading capacity to Morocco, but not in all types of flows and products. An unexpected, but predictable result is obtained for the Saharan regions, which trade is above the average, showing how the strength of historical ties can compensate actual geographical and institutional disadvantages.

The policy implications of the results obtained here are crucial to understand the current and future economic relations between Spain and Morocco, as well as between the whole macro-Regions that the Gibraltar Strait bridges: Europe and North Africa. For further research, we plan to update and improve the dataset used in this paper, to make it available to the research community. In this regard, it could serve as a "hub" for further investigations. Two examples of potential research use could be generating the first inter- continental inter-sectoral model and simulate the spatial and sectoral spillovers of relevant policies and shocks. The evaluation of the effectiveness of specific economic policies could indicate whether those contribute to compensate the huge differences in wellbeing that this channel of 13 Km represents.

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