



Relationship between logistics infrastructure and trade: Evidence from Spanish regional exports



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ABSTRACT

Geographical factors and transport infrastructure are two of the key determinants that influence international competitiveness. In this sense, the quality of such infrastructure and how widespread it is, the distribution and capacity of logistics facilities in a country, as well as the number of private operators and their degree of specialisation, all play an increasingly important role in the design of business strategies aimed at increasing a country's share of the international market. Until recently, however, availability and access to logistics services have been considered secondary factors when defining business competitiveness. This paper estimates an augmented gravity model of trade that specifically includes logistics and transport infrastructure indicators as explanatory variables. The model is estimated by using bilateral exports from 19 Spanish regions to 64 destinations (45 countries and 19 Spanish regions) with data for the period 2003–2007. The findings show that logistics is indeed important for the analysis of trade flows in goods and they highlight the importance of logistics measures at the regional level. In particular, the number, size and quality of logistics facilities positively influence export flows.

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1. Introduction

Geographical factors and transport infrastructure are among the most relevant determinants that affect international competitiveness. In this regard, the geographical distance between a region and its main trading partners, together with trade facilitation,¹ are often considered the factors that explain a region's competitive position in international markets (Wilson et al., 2005; Martínez-Zarzoso and Márquez-Ramos, 2008; Márquez-Ramos et al., 2012; Persson, 2012; Márquez-Ramos and Aparisi-Caudeli, 2013). However, it is important to take into account other physical and geographical aspects that the literature on the topic has largely neglected, namely factors related to access to logistics services. The quality of logistics infrastructure, the distribution of intermodal facilities within countries, together with the number of logistics operators and their specialisation are considered increasingly important as a means of enhancing international competitiveness

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¹ The World Trade Organization (1998) defined trade facilitation as the simplification and harmonisation of international trade procedures where trade procedures are the activities, practices and formalities involved in collecting, presenting, communicating and processing data required for the movement of goods in international trade. For example: the reduction in the number of documents required to export/import, those procedures that reduce the time to export/import, or improvements in management information systems.

and expanding the market share of companies. Within this context, [Jacks and Pendakur \(2010\)](#) state that the most commonly-held perception is that the growth of world trade is strongly associated with technological improvement in the communication and transport sectors. They focus on the United Kingdom to analyse whether transport revolutions over the period 1870–1913 had an effect on trade. Although their results are unable to confirm whether the maritime transport revolution was a primary driver of the late-nineteenth-century global trade boom,² the authors point out that “the differential decline in overland and maritime freight rates across countries might tell a different story”.³ More recently, the findings of [Bernhofen et al. \(2013\)](#) suggest that containerisation⁴ had a considerable effect on world trade over the period 1962–1990. They state that containerisation not only affected the operation and relocation of ports but the entire transportation industry and it has also gone hand-in-hand with the creation of the modern intermodal transport system, facilitating increases in shipping capacities and reductions in delivery times through intermodal cargo movements between ships, trains and trucks.

Indeed, right from the outset, the European Community provided a common transport policy, which was set out in the 1992 White Paper at the same time as the Maastricht Treaty on European Union (EU). According to the new policy, the new objective for transport policy was the creation of a trans-European transport network. In order to achieve this goal, Europe aimed at improving the existing transport infrastructure and building the trans-European transport network by means of various actions in which logistics facilities played a vital role ([Alamá-Sabater et al., 2013](#)).⁵ With regard to EU and Spanish policies, six main guidelines for action were established for the period 2007–2013 with respect to the expansion and improvement of transport infrastructures ([ECORYS Nederland BV, 2006](#)): (1) give priority to projects of European interest; (2) complementary investment in secondary connections; (3) support for rail infrastructure; (4) promote environmentally sustainable transport networks; (5) improve the connectivity of landlocked territories to the trans-European network. In this respect, the development of secondary links, with a focus on intermodality and sustainable transport, should be promoted. In particular, harbours and airports should be connected to their hinterland; and (6) development of the “motorways of the sea” (MoS) and short-sea shipping as a viable alternative to long-distance road and rail transport. With respect to this last guideline, one of the main advantages for Spain in Europe would be the development of the MoS, given Spain’s strategic position in maritime corridors. To this end, the Spanish Association for the Promotion of Short-Sea Shipping was setup in 2002. Since its constitution, this Association has consolidated a series of activities that have contributed to promoting short distance shipping and the coordination between the different agents forming part of the same sea-land chain ([Puertos del Estado, 2014](#)).

Concerning overland transport, the Pyrenees form a major natural barrier between the Iberian Peninsula and the rest of Europe. Unlike the situation in the Alps, the Pyrenees, with the exception of the coastal strips, do not currently possess any significant road or rail infrastructure that connects Spain with France. Nonetheless, the Ministers of Transport of the EU have refused to include the central corridor of the Pyrenees on the list of priority infrastructure projects co-financed by the EU. The proposal made by the [European Commission \(2011\)](#) regarding the future of the European transport network for the 2014–2030 timeframe includes the Mediterranean Corridor, which will link Algeciras with Portbou, as a priority project. This corridor aims to connect the Iberian Peninsula to the rest of Europe and will principally benefit Spanish trade and in turn Spanish economic activity.

As regards Spain’s geographical location, we can identify two contrasting realities. On the one hand, Spain is located on the periphery of Western Europe and this constitutes a clear disadvantage in the longer-distance European freight markets, partly due to the different railway track gauge used in Spain and France, which obviously makes transit across their common border very challenging. On the other hand, Spain is the natural gateway for trade between Europe and the countries in Northern Africa and Latin America, and it also enjoys an excellent strategic advantage on the East–West trade route via the Mediterranean Sea. This paper hypothesises that logistics improvements will greatly benefit Spain and help the country to gain advantages over other competing Mediterranean countries. Consequently, it will be able to position itself as the gateway to Europe. Nonetheless, [Rodrigue and Notteboom \(2010\)](#) argue that in Western Europe the hinterland is intense not only along the coastline but also inland. The hinterland is accessed from coastal gateways by medium-distance corridors involving a variety of combinations of transport modes. Therefore, the present paper also hypothesises that whether the benefits of Spain’s geographical location ultimately outweigh the disadvantages depends to a great extent on the quality of logistics infrastructure. In favour of the argument that logistics enhance competitiveness, previous research that assessed the impact of the trans-European road network using a vector geographic information system showed that the planned new roads would improve the levels of accessibility to economic activity centres, thus reducing the friction of distance and bringing peripheral regions closer to central ones ([Gutiérrez and Urbano, 1996](#)).

The present study simultaneously analyses Spanish domestic and foreign trade in goods. The contribution this paper makes consists of estimating the empirical relationship between logistics and trade. The baseline hypothesis is that improvements in transport infrastructure and in particular in logistics facilities reduce trade costs and boost flows of goods among countries and regions.

² From 1870 to 1913, maritime freight rates fell on average by 50% as a result of productivity growth in the shipping industry, while global trade increased by 400%.

³ Page 753.

⁴ As their data provides information on both port and railway containerisation, their analysis covers the main modes of international transport.

⁵ Such as modernising infrastructure, completing links between existing transport nodes, or using more efficient multimodal services to improve connections between different modes of transport.

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