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Ports & Logistics Advisory

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Freight Transport in Europe: Facts & Challenges

*Understanding port hinterlands; findings from an
empirical analysis of Spain*

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Purpose

- This paper analyses the determinants of a port's competitiveness in hinterland regions, based on an empirical study of Spain.
- This study extends previous work by including novel potential explanatory variables for the market shares of ports in hinterlands.
- The empirical analysis shows that all hypothesized variables influence the market share of a port in a specific hinterland region with the signs as expected.

Introduction and literature review

- The analyses of what hinterlands are served by ports has attracted scholarly attention since early 20th century (Chisholm et al., 1915, *Handbook of Commercial Geography*).
- Previous works have found that the hinterland distance from the port, maritime connectivity, and freight rates are a determinant of port choice.
- Other works show that intermodal connections influence the size of port hinterlands..
- The case of Spain has also attracted interest over the years due to the fierce competition between a large number of ports and the interesting feature of Spain as a peninsula.

Determinants of markets shares of ports in hinterland regions

- Road distance to the region relative to the distance from other ports.
- Maritime distance relative to the maritime distance from other ports.
- Maritime connectivity of the port.
- Intermodal connectivity: only rail transport in Spain, as it has no inland waterways.
- Presence of a lock, which affects the maximum size of ships and the time to reach the port.
- Transshipment orientation. A variable is added for ports with >90% of transshipment.
- Throughput volume of the port, based on the notion of scale economies in port operations, leading to higher productivity and lower costs in larger ports.

Database based on data for Spain

- Our database was constructed with data obtained from Spanish Customs Agency, that provides yearly data on shipments (imports/exports) between all Spanish provinces and all third countries, including the volume, value, transport mode, Spanish port of departure, and destination country.
- The number of observations was determined by the number of Spanish peninsular provinces, the number of ports that handle containers, and the number of destination country regions.
- Data do not include information on how goods are shipped; i.e. whether by bulk, Ro-Ro, or container cargo.

Empirical analysis based on data for Spain

$$U_{p,h,wr} = \alpha_0^{p,h} + \alpha_1 RD_{p,h} + \alpha_2 MD_{p,wr} + \alpha_3 MC_p + \alpha_4 IC_{p,h} + \alpha_5 Lock_p + \alpha_6 TS_p + \alpha_7 TEU_p$$

Model	Coeficientes no estandarizados		Coeficientes tipificados	T	Sig.
	B	Error típ.	Beta		
(Constant)	-,389	,051		-7,607	,000
RDRel	-,299	,011	-,356	-26,715	,000
MDRel	-,037	,010	-,050	-3,766	,000
MC	,119	,018	,189	6,518	,000
IC	,130	,012	,144	10,809	,000
Lock	-,040	,010	-,053	-3,974	,000
TS	-,136	,012	-,181	-11,451	,000
TEULog	,707	,066	,314	10,779	,000

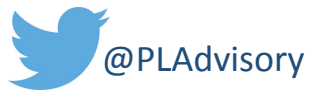
- R-squared: 0,368
- Adj. R-squared: 0,366

Discussion of the findings

- Road distance has a significant negative effect on the market share of a port.
- Maritime distance also significantly affects the market share of a port for a specific region.
- The higher maritime connectivity, the higher the market share.
- The presence of an intermodal service increases the market share.
- The presence of a lock and transshipment focus are also significant reducing the market share.
- Total throughput (TEU) is also significant (economies of scale).

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