



**HAL**  
open science

## Port regions and globalization

César Ducruet

► **To cite this version:**

César Ducruet. Port regions and globalization. Ashgate. Ports in Proximity: Competition and Coordination among Adjacent Seaports, Ashgate, pp.41-53, 2009, Transport and mobility. halshs-00458071

**HAL Id: halshs-00458071**

**<https://shs.hal.science/halshs-00458071v1>**

Submitted on 19 Feb 2010

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## CHAPTER THREE

## Port regions and globalization

*César Ducruet*

**Published in: Notteboom, T.E., Ducruet, C., De Langen, P.W. (Eds), *Ports in Proximity: Competition and Coordination among Adjacent Seaports*, Aldershot, Ashgate, pp. 41-53.**

**Introduction**

In an age of rapid coastal industrialization and urbanization, the general manager of the Port of Antwerp (Vleugels, 1969) expressed an optimistic view: “*port regions seem always to have been at an advantage when compared to those regions which not situated by the sea or on rivers*”. Since then, increased globalization has revealed the fallacy of such deterministic arguments defining seaports as naturally growing areas. Neoclassical theories on growth poles and industrial location fell short explaining the decreasing regional benefits derived from seaports, notably when observing the limited local impacts of containerization (Vallega, 1996). Although ports may still be seen as structuring elements within their surrounding urban region (Wakeman, 1996), their economic ties with the outlying regional economy seem to diminish (Boyer and Vigarié, 1982; Grobar, 2008). However, we lack of a consistent definition of the port region (Guillaume, 2001) that would help understanding the regional challenges of contemporary port development, and provide a base for comparing various contexts.

The first part of this chapter explores the existing definitions of the port region, both in terms of its geographical extent and of the underlying relational process between port and region. The second part reviews some possible methodologies for analyzing and comparing port regions of different countries, notably based on OECD’s territorial database. The third part proposes a comparison of port regions based on two distinct geographical levels. Finally, conclusive remarks open the discussion for further research.

## **The definition of port regions**

*The port region, a coherent concept?*

*The region: a relevant spatial unit for the study of ports?* Geographers have defined various types of regions except the port region. Throughout port studies, the relevant spatial unit outside the port area has varied over time, resulting in a variety of functional levels such as the Maritime Industrial Development Area (Vigarié, 1981), the European estuary (Brocard et al., 1995), and the Extended Metropolitan Region (Rodrigue, 1994). Such levels are often analyzed separately and successively from the local to the international, as seen for instance in the cases of Zeebrugge (Charlier, 1988) and Marseilles (Borruey and Fabre, 1992; Bonillo, 1994) providing a critical assessment of national port policies, regional growth pole strategies, and local planning constraints. Another distinct approach emphasizes the emergence of new territories of port governance and port development whose dimensions vary depending on the players involved and the projects at stake (Kreukels, 1992; Hoyle, 1996; Rodrigues-Malta, 2001, Lavaud-Letilleul, 2007). Finally, some scholars consider that port activities do not belong to a specific spatial level because they integrate transport chains and networks on various scales simultaneously (De Roo, 1994; Frémont and Ducruet, 2004; Ducruet, 2005; Debrie et al., 2005).

While such variety has considerably enriched our knowledge on port development, it has also prevented the emergence of a consensus about the definition of the port region concept. There is no definition of the port region in human geography dictionaries. Searching for this term on Internet<sup>1</sup> provides limited results: only one work related to seaports (Fleming, 1988) appears on the fifth page, and it describes a specific context (i.e. the role of Portland port as a planning entity for the entire port region)

---

<sup>1</sup> [www.google.com](http://www.google.com)

rather than defines the concept itself. The port region remains a broad term, and is rarely given central concern by scholars<sup>2</sup>, as seen in the limited score of port region compared with other regions (e.g. administrative, urban, agricultural, economic, and industrial). While research is dominated by a hierarchical approach (e.g. city, metropolitan, central, core, and capital regions), the port region is less explored than coastal, border, peripheral, remote, maritime, and gateway regions. Only very specific regions such as political, trade and creative regions have fewer results than the port region. Throughout port studies, the port region has a better position, as it scores higher than port range, port district and port hinterland but it scores less than port city and port terminal. Overall, the port region seems to be a rather descriptive term with no clear content or operational explanative power, recalling other unidentified real objects (Brunet, 1997) such as medium-sized cities.

The perception of ports by scholars themselves is one possible explanation to this theoretical lack. The critique of the dominant central place theory constitutes the starting point of the works of James Bird (1977; 1983) for whom gateway functions<sup>3</sup> make port regions and port cities different from other regions and cities. Indeed, ports were often excluded from regional classifications as in taxonomic geography (Vallega, 1983), while most geographers consider functional regions to be structured and polarized by cities: “*seaports in general have been under-examined in recent regional development literature*” (Hall, 2003). Although Bird’s works have given ports a wider recognition throughout urban and regional geography, his efforts remained hindered by the absence of a thoroughly elaborated theory or model. Thus, the port region still remains a multifaceted concept embracing different realities such as the economic area

---

<sup>2</sup> <http://scholar.google.com>

<sup>3</sup> Bird (1983) defines gateway functions as “*those that link a home region to other regions in the nation state and the nation state to the rest of the world via international transport. Gateways therefore stand in contrast to central places which serve the ‘land around’ – the umland*”.

around a port (i.e. the port region *stricto sensu*), the logistics area connecting the port (i.e. the hinterland), and the area in which inter-port relations take place (i.e. façade, range, or system of ports): those are explored in the following sections.

*Port regions as port hinterlands*      Port region and port hinterland may be confounded in the same simple definition of a piece of land immediately next to and inland from the coast, which geographical coverage may vary extensively: “*it seems difficult in practice to give an exact definition of a port region (...) It can in some cases stretch beyond national borders*” (Vleugels, 1969). The port region can be distinguished from the hinterland based on its specific economic structure: it is a “*district in which the port is situated and the economic life of which is to a great extent determined by the activity carried on by the port and in the port area*” (Vleugels, 1969). The hinterland, as part of the port triptych (Vigarié, 1979), is only defined by a group of locations connected to the port through related goods flows. Distant locations may not be influenced by port activities directly and thus may not be considered part of the port region. Hinterland differs from city-region (i.e. daily commuting area polarized by an urban centre) because it comprises all connected locations, whereas port region and city-region are limited to an area within which the economic influence of the core (port or city) is predominant. However, the lack of precise data on inland freight movements often hampers a clear cartography of hinterlands (Charlier, 1979; McCalla et al., 2004a).

Hinterlands have reached beyond port regions mostly due to improvements in transport systems’ connectivity. The trend of *port regionalization* indicates an increasing complexity with the shift of logistics activities inland within a *greater seaport region* (Notteboom and Rodrigue, 2005) and the haphazard development of satellite terminals in the vicinity of ports and inland cities (Slack, 1999). Such changes

have definitely eroded the “*rule of thumb (...) which averred that the amount of cargo handled by the port was strictly proportional to the number of clients in the area surrounding it*” (Todd, 1993). Numerous examples confirm this process, as seen in United Kingdom (Hoare, 1986) and ex-USSR (Thorez, 1998), but it seems that less-opened economies keep a close association between port traffic and regional economies (Ducruet and Jo, 2008).

#### *Port regions as port systems*

The port region may also be considered as a port system, or a system of two or more ports (and terminals), located in proximity within a given area. A review of three decades of port system analysis shows a growing stability or even a decreasing traffic concentration due to several factors such as carriers’ strategies and congestion in large load centres (Ducruet et al., 2009). One typical example of a port system is the *port range* as defined by Vigarié (1964) in his work on the North European range. The port range differs from the *maritime façade* since the latter is more descriptive (a coastal alignment of ports) while the first is more systemic (a coastal system of ports). Thus, a range assumes that the given ports enjoy not only geographical proximity but also functional interdependence through sharing sea and land services. The conditions of crystallization “*of formerly disjointed ports into a ports system rests ultimately on the conditions of trade, conditions which wax and wane in correspondence with global business cycles*” (Todd, 1993). Also crucial are local and regional characteristics but they are often ignored by port specialists who tend to consider the port as an isolated entity connected by cross-border networks. The following section will complement this overview with more specific works on the linkages between port activities and regional economies.

### *Ports and regional development*

*Ports as enablers of economic development*      The vast literature on ports and regional development can be classified in two categories. The optimistic approach sees the port as an engine for local and regional economic growth, while for the pessimistic approach, ports simply respond to demand through the physical transfer of freight flows. This echoes the lively debate about whether infrastructures foster or follow development (Rietveld, 1989).

The optimistic approach defines ports as growth poles and enablers of economies of scale for production and trade and, therefore, they provide comparative advantages to regions and cities where they are located (Fujita et al., 1999; Clark et al., 2004). This general statement based on location theories<sup>4</sup> implies that port efficiency creates more economic benefits because it will allow more cargo throughputs, while “*inefficient ports (...) may place a country or region further away from sources of cheaper inputs or markets for good produced*” (Haddad et al., 2006). Earlier empirical studies have showed the importance of multiplier effects locally and regionally in developing countries (Omiunu, 1989) and developed countries (Witherick, 1981).

The pessimistic approach puts in question local and regional benefits of port investments (Goss, 1990), and the *structuring effects* of transport infrastructures (Offner, 1993). This is particularly true in the case of ports located away from core economic regions (Stern and Hayuth, 1984; Fujita and Mori, 1996). Improved hinterland connectivity and handling efficiency may accentuate the *tunnel effect* defined by lower local benefits and higher throughput volumes destined to distant areas. Several scholars have observed the negative effects of traffic growth locally such as congestion and lack of attractiveness (Mc Calla, 1999; Rodrigue, 2003; Rozenblat et al., 2004; Grobar,

---

<sup>4</sup> see Haddad et al. (2006) and Hall (2003) for a review of the literature on transport infrastructure and regional development.

2008). Several cases indicate a large drop in port-related employment in recent decades, as seen in Liverpool, Plymouth, and Hamburg city-regions, due to the weakening *spatial fix* of transport nodes for manufacturing activities, the reorganization of port traffics and hinterlands, and the changing location patterns of port-based service economies (Damesick, 1986; Gripaios, 1999; Hesse and Rodrigue, 2004).

A moderate approach proposed by Vallega (1983) interprets port development and regional development as two distinct processes with episodic and indirect interactions. This approach has been much complemented by the works of Langen (2004) about ports as clusters of economic activities. Far from drawing a direct line between port activity and industrial development, the concept of port cluster depends on institutional arrangements and on the presence of leader firms in particular economic activities. The remainders of this chapter opt for this moderate approach.

*Measuring port-region interdependence*                      Several studies have attempted measurements of port-related benefits on local and regional levels, using a wide variety of methodologies, but while “*the regional planner is interested in the benefits that a port brings to a city or region (...) the difficulty resides in quantifying the benefits*” (Bird, 1971). Port impacts studies have flourished since the 1950s in the United States and elsewhere (Hall, 2003), with many case studies measuring the multiplier effects of port activities on surrounding areas (Taylor, 1974; Witherick, 1981; Omiunu, 1989). Regional development literature has extensively focused on performance (Porter, 2003) but with few works related to transport infrastructure or port activities (Rietveld, 1989)<sup>5</sup>.

Due to the lack of comparable data internationally, such measures are often limited to national datasets on regional units, as seen in the study of De Langen (2007)

---

<sup>5</sup> See Hall (2003) and Haddad et al. (2005) for a synthesis on port impact studies and regional development versus transport infrastructure.



on US port regions providing a statistical definition based on the dominance of port-related industries in a given county or state. The work of Vigarié (1968) on the *maritime dependence* of countries simply divided deadweight tonnage by population. A better option is to compare seaborne traffic with demographic or economic characteristics (Table 1). Based on 116 maritime countries, figures show significant correlations with trade and GDP. Correlation with population is lower but stable, while it decreases with trade volume. This may stem from traffic concentration at transit and hub ports in several countries (e.g. Italy, Spain, Malaysia, and Jamaica) during the 1990s, causing imbalance between trade flows and transshipment flows. Also, the improvement of continental transport, through logistics systems, land bridges, and intermodal solutions, cause a higher complexity in transport systems and contributes to increased dissociation between economic and transport patterns.

[Insert table 3.1 about here]

For the local level, Figure 3.1 shows that port traffic and demographic size underwent two distinct periods: association (1975-1985) and dissociation (1990-2005). This confirms the increased flexibility of transport systems and trade routes worldwide, and the combined effects of urban constraints (e.g. lack of space for port development), port planning initiatives (e.g. new port and terminal development), and shipping lines' strategies (traffic concentration, port selection, and route rationalization). Although large urban concentrations continue concentrating the world's major container flows worldwide, the rise of hub ports in the 1990s has dramatically altered the traditional and symbiotic port-city relationships (Ducruet and Lee, 2006). While general trends can be

highlighted using basic local or national attributes, more research is needed on the regional level based on the aforementioned definition of the port region.

[Insert figure 3.1 about here]

## **An international comparison of port regions**

### *Selecting regions and indicators*

*The OECD Territorial Database* The OECD Territorial Database (TDB)<sup>6</sup> was elaborated to assist the OECD Territorial Development Policy Committee and its Working Party on Territorial Indicators. Data collection is undertaken by the Territorial Statistics and Indicators Unit, in the OECD Directorate of Public Governance and Territorial Development. Statistics are collected through the National Statistical Offices of OECD member countries and Eurostat. Its main objective is “*to provide an internationally comparable database for the analysis of economic, institutional and environmental issues at the sub-national level*”. Data are drawn from censuses on population and housing, labour force surveys, household surveys, social security accounts, and regional accounts. In the end, the main advantage of the database is to provide harmonized data covering about 2,200 regions within 30 OECD member countries. Available indicators exist on two geographical levels, T3 (small units), and T2 (large units), from 1980 to 2006.

Port traffic is collected from two different sources: Lloyd’s Marine Intelligence Unit (sum of container vessel capacities), and Containerisation International (port container throughputs). Traffic is agglomerated by regional unit depending on the location of container ports (Table 3.3). Although other traffic such as general cargo or

---

<sup>6</sup> see <http://www.oecd.org/dataoecd/7/3/2483473.doc>

solid bulk would better relate with the size and dynamism of regional economies (Charlier, 1994), container traffic is more widely available internationally. In addition, container traffic in TEUs<sup>7</sup> is a good measure of port performance and competitiveness.

[Insert table 3.3 about here]

*Preliminary results: container traffics vs. regional indicators* Figure 3.2 shows correlations between container traffics and gross regional product (GRP) in 1996 and 2006 for each spatial scale. Correlation is higher for larger regions in 1996 (0.49 and 0.36), probably due to better spatial homogeneity and wider hinterland coverage than smaller regions. Correlations decreased in 2006 for both spatial scales (0.20 and 0.21) for the same reasons than in Figure 3.1.

[Insert figure 3.2 about here]

The results are also distorted by imbalances between port traffic and economic weight. For instance, some regions generate more traffic than their economic size would predict, as seen with Upper Normandy (Le Havre), Gyeongnam province (Busan), Liguria (Genoa, La Spezia), Nova Scotia (Halifax), and Colima (Lazaro Cardenas). They are often large gateways connecting inland core regions with maritime networks (e.g. Paris, Seoul, Rome, Montreal, and Mexico). Due to the lock-in effect of urban systems, these gateway regions remain poorly attractive despite their strategic situation. Conversely, the economic weight of some regions exceeds by far their port traffic. It is the case of several US states (e.g. Florida, California, and Texas) but also of Asian regions such as

---

<sup>7</sup> Twenty-Foot Equivalent Units

Kanto (Tokyo-Yokohama), Seoul-Gyeonggi (Incheon), Stockholm, Istanbul, Roma, and Noord-Holland. In such regions, the port function is very secondary compared with other functions in the tertiary sector, while many freight movements occur inland instead of by sea. This analysis confirms the reciprocity between regional economies and port activities, but this association has become more complex and less direct than in the past. Therefore, further analysis may focus on relative characteristics rather than absolute weights.

One simple statement is that port regions differ by their relative demographic and economic weight nationally (Figure 3.3). In continental countries, the share of port regions remains low, such as in Poland, Germany, Mexico, and France. The opposite case is composed of countries which main cities locate on their dominant coastline (e.g. New Zealand, Ireland, Australia, Japan, United Kingdom, Norway, Denmark, Finland, Sweden, South Korea, and Greece). The intermediate profile shows a balance between port regions and other regions (e.g. Italy, Portugal, Spain, Turkey, United States, Canada, Belgium, and the Netherlands). Depending on such configurations, port regions embrace varying degrees of political priorities. In addition, economies which concentrate at port regions do not necessarily possess big ports (e.g. Scandinavia), while continental countries may have developed large gateways (e.g. Germany).

[Insert figure 3.3 about here]

### *The analysis of port-region linkages*

#### *Traffic growth and regional specialization*

This analysis wishes to highlight some possible correspondence between traffic growth and regional characteristics.

Regional data is changed to location quotients<sup>8</sup> as a means accentuating the specificity of port regions compared with the national trend in four indicators: employment in the industrial sector, employment in the service sector, unemployment, and gross regional product. In Table 3.4, results correspond to the ratio between average traffic growth rates in port regions with high location quotient and average traffic growth rates in port regions with low location quotient. Values higher than one indicate a higher growth when port regions are more concentrated or specialized than the rest of their country, while values lower than one indicate lower port performance. Although this methodology faces the “*risk of attributing to port-related differences what are in fact differences in regional economic structure*” (Hall, 2003), it avoids the problems comparing directly regions having distinct economic structures.

One clear result is the lower port performance in regions with a specialization in the industrial sector. Conversely, regions with higher unemployment and which concentrate gross product and services enjoy higher traffic growth in general. Those results confirm the general trends faced by port regions in developed countries:

- **Globalization:** the weakened role of industrial areas stemming from global shifts of factories to less-developed countries due to cheap labour, shrinking transport costs, and deregulation. Western traditional coastal regions for export are facing economic crisis resulting in less demand for international transport;
- **Containerization:** the negative effects of technological improvements (e.g. containerization), port competition, and selection (e.g. hub and spoke strategies, traffic concentration, and service rationalization), with dramatic drops in port-related benefits;
- **Tertiarization:** the polarization of advanced regional economies, notably those concentrating economic wealth (GRP), and for which the availability of higher-level and knowledge-based activities has become more important than manufacturing or heavy industries. Higher purchasing power and

---

<sup>8</sup> Location quotient: share of A in region X<sub>1</sub> divided by share of A in country X

consumption levels tend to foster traffic growth, of which the import of manufactured goods from emerging economies.

[Insert table 3.4 about here]

*Towards a transcalar analysis of port regions* Making use of the relative concentration index (RCI) is a fruitful method when comparing ports in terms of specialization and performance rather than volume or weight (Ducruet and Lee, 2006). For the two distinct datasets of smaller and larger port regions, it divides the percentage of container traffics of a port region by its share of population or labour force within its belonged macro-region. This index is interpreted in this study as a revelatory of the performance of ports in relation to their macro and micro regional environments. For every port region, the higher its relative concentration index, the more concentrated are container traffics compared to its demographic or economic concentration. This RCI is compared through correlation coefficients to the different specializations of the port regions within their country as in previous section (Table 3.5).

[Insert table 3.5 about here]

For both regional scales, there is a confirmation that industrial specialization goes with lower port performance. For smaller port regions, most European port regions except Scandinavia and Baltic show a negative correlation with industrial specialization, notably in the Southwest. Specialization in the service sector has significant correlation with port performance in Western Europe and, to a lesser extent, in Northeast Asia. An interesting difference within Europe is the different role of GDP in port performance, negative in the South and positive in the North. One possible explanation is that port

performance in southern European port regions is more recent, and has taken place within more deprived or peripheral areas due to traditional urban site congestion. Notably, Southeast Europe (e.g. Eastern Italy, Greece, and Turkey) has a stronger relation between port performance and unemployment surplus.

For larger port regions, trends are often similar with those of smaller port regions, but the better data availability brings out more evidence of port-region interaction. For instance, although British Isles share the similar negative relation with industrial specialization with other macro areas in Europe, port performance is more likely to happen within areas where unemployment is lower, i.e. the southeast of England, as opposed to other port regions where de-industrialization and social crisis go together. It confirms indirectly the increased polarization of London within this large port region of GRP and service concentration. This is also the case for Northwest America and Scandinavia & Baltic, where the relation with unemployment is negative and for the latter, unlike other macro areas, where the relation with industrial specialization is positive. Perhaps, the very scarcity of industrial activities outside port regions may explain this different trend. In other macro areas, port performance may have more easily shifted from traditional industrial regions to more sophisticated and accessible service port regions.

## **Conclusion**

The regional environment in which container ports operate greatly matters. Ports are not isolated entities connecting to virtual value chains. They are part of a regional economy, and the evolution of the regional economy strongly affects the performance of the port. In particular, industrial specialization constitutes a weakness for port performance in an age of globalisation. Conversely, service specialization and the concentration of

economic wealth foster traffic. This confirms recent studies about the shift to post-fordist economies, defined by flexibility and the importance of knowledge-based activities such as education (De Langen, 2007). Whether the relationship between port activities and regional environments is direct or indirect needs, of course, further research and better analytical tools.

Intense globalization that provokes industrial shifts across macro regions and, in turn, rising unemployment – notably in OECD countries, also affects port activities and the way ports get inserted in trade and transport networks. This research could have paved the way towards a critique of a large literature that considers transport players and networks as increasingly disconnected from the characteristics of the territories in which they are embedded. Indeed, regional (and also local) milieus do influence, at least partially, the competitiveness of ports in a global environment. In turn, weaker economic rents of regions (Kaplinsky, 2004) tend also to weaken the performance and competitiveness of container ports.

## References

- Bird, J. (1963), *The Major Seaports of the United Kingdom* (London: Hutchinson).  
 ——— (1971), *Seaports and Seaport Terminals* (London: Hutchinson).  
 ——— (1977), *Centrality and Cities* (London: Routledge).  
 ——— (1983), ‘Gateways: Slow Recognition but Irresistible Rise’, *Tijdschrift voor Economische en Sociale Geografie* 74:3, 196–202.
- Bonillo, J.L. (1993), ‘Les Différentes Echelles d’Aménagement de la Métropole Portuaire’, Paper presented at the 4<sup>th</sup> International Conference Cities and Ports, October, Montreal, Canada.
- Borruey, R. and Fabre, M. (1992), ‘Marseille et les Nouvelles Echelles de la Ville Portuaire’, *Annales de la Recherche Urbaine* 55/56, 53–62.
- Boyer, J.C. and Vigarié, A. (1982), ‘Les Ports et l’Organisation Urbaine et Régionale’, *Bulletin de l’Association des Géographes Français* 487, 159–82.
- Brocard, M. et al. (1995), ‘Le Chorotype de l’Estuaire Européen’, *Mappemonde* 3, 6–7.
- Brunet, R. (1997), ‘Villes Moyennes: Point de Vue de Géographe’, in: Nicole Commerçon and Pierre Goujon (eds.), *Villes Moyennes: Espaces, Société, Patrimoine* (Lyon: Presses Universitaires de Lyon).



- Charlier, J. (1979), 'Pour une Approche Géographique des Arrière-pays Portuaires', in CNRS (ed.), *Villes et Ports, Développement Portuaire, Croissance Spatiale des Villes* (Paris: Centre National de la Recherche Scientifique).
- (1983), *Ports et Régions Françaises. Une Analyse Macro-Géographique* (Louvain: Université Catholique de Louvain-la-Neuve).
- (1987), 'Les Problèmes d'Aménagement Suscités par la Croissance du Port de Zeebrugge', *Norois* 133/135, 239–51.
- (1994), 'Sur le Concept de Tonnages Pondérés en Economie Portuaire. L'Exemple du Northern Range', *Cahiers Scientifiques du Transport* 29, 75–84.
- Damesick, P.J. (1986), 'Service Industries, Employment and Regional Development in Britain: A Review of Recent Trends and Issues', *Transactions of the Institute of British Geographers* 11:2, 212–26.
- De Roo, P. (1994), 'Marseille: de l'Aire Portuaire à l'Aire Métropolitaine', in Michelle Collin (ed.), *Ville et Port XVIIIe – XXe Siècles* (L'Harmattan: Paris).
- Debrie, J. et al. (2005), 'A Transcalar Model of Port Nodalities and Polarities. Application to the Port of Hamburg', *Mappemonde* 79:3, <<http://mappemonde.mgm.fr/num7/articles/art05304.html>>
- Ducruet, C. (2005), 'Spatial Structures and Trends in Port Cities: From the Local to the Global', *Mappemonde* 77:1, <<http://mappemonde.mgm.fr/num5/articles/art05106.html>>
- (2007), 'A Metageography of Port-City Relationships', in James J. Wang et al. (eds.), *Ports, Cities, and Global Supply Chains* (Ashgate: Aldershot).
- (2008), 'World Typology of City-Port Relationships', *Cybergeo* 417, <<http://www.cybergeo.eu/index17332.html>>
- et al. (2008), 'Coastal Cities, Port Activities and Logistic Constraints in a Socialist Developing Country: The Case of North Korea', *Transport Reviews* 28:1, 1–25.
- et al. (2009), 'Going West? Spatial Polarization of the North Korean Port System', *Journal of Transport Geography* (forthcoming).
- and Lee, S.W. (2006), 'Frontline Soldiers of Globalization: Port-City Evolution and Regional Competition', *Geojournal* 67:2, 107–22.
- Fleming, D.K. (1989), 'On the Beaten Track: A View of US West-Coast Container Port Competition', *Maritime Policy and Management* 16:2, 93–107.
- Frémont, A. and Ducruet, C. (2004), 'Logiques Territoriales et Réticulaires au Sein de la Ville Portuaire: le Cas de Busan, Corée du Sud', *L'Espace Géographique* 33:3, 196–210.
- Fujita, M. and Mori, T. (1996), 'The Role of Ports in the Making of Major Cities: Self-Agglomeration and Hub-Effect', *Journal of Development Economics* 49:1, 93–120.
- Fujita, M. et al. (eds.) (1999), *The Spatial Economy: Cities, Regions and International Trade* (Cambridge & London: MIT Press).
- Goss, R. (1990), 'The Economic Functions of Seaports', *Maritime Policy and Management* 17:3, 207–19.
- Gripaios, R. (1999), 'Ports and Their Influence on Local Economies: A UK Perspective', *The Dock and Harbour Authority* 79, 235–41.
- Grobar, L.M. (2008), 'The Economic Status of Areas Surrounding Major U.S. Container Ports: Evidence and Policy Issues', *Growth and Change* 39:3, 497–516.
- Guillaume, J. (2001), 'Propositions Méthodologiques pour une Définition Géographique des Régions Portuaires', in IACP (ed.), *Les Territoires de la Ville Portuaire* (Le Havre: International Association Cities and Ports).

- Haddad, E.A. et al. (2005), 'Port Efficiency and Regional Development', Unpublished paper, Associação Nacional dos Centros de Pós-Graduação em Economia, Niteroi RJ, Brazil, <http://www.anpec.org.br/encontro2006/artigos/A06A050.pdf>
- Hall, P.V. (2002), *The Institution of Infrastructure and the Development of Port-Regions* (Berkeley: University of California).
- Hesse, M. and Rodrigue, J.P. (2004), 'The Transport Geography of Logistics and Freight Distribution', *Journal of Transport Geography* 12:3, 171–84.
- Hoare, A.G. (1986), 'British Ports and Their Export Hinterlands: A Rapidly Changing Geography', *Geografiska Annaler* 68B:1, 29–40.
- Hoyle, B.S. (1996), 'Ports, Cities and Coastal Zones: Competition and Change in a Multimodal Environment, in Brian S. Hoyle (ed.), *Cityports, Coastal Zones and Regional Change* (Chichester: Wiley).
- International Road Transport Union (1996), *World Transport Data* (Geneva: Department of Economic Affairs).
- Kaplinsky, R. (2004), 'Sustaining Income Growth in a Globalising World: The Search for the N<sup>th</sup> Rent', Working Paper (Sussex: Institute of Development Studies), <<http://www.ids.ac.uk/ids/global/pdfs/RKrentJan04.pdf>>
- Kreukels, A. (1992), 'Ville, Port, Région, la Rupture d'Echelle: Rotterdam', *Cahiers de la Recherche Architecturale* 30/31, 163–77.
- De Langen, P.W. (2004), 'Analysing the Performance of Seaport Clusters', in David Pinder and Brian Slack (eds.), *Shipping and Ports in the 21st Century* (London: Routledge).
- (2007), 'The Economic Performance of Seaport Regions', in James J. Wang et al. (eds.), *Ports, Cities, and Global Supply Chains* (Aldershot: Ashgate).
- Lavaud-Letilleul, V. (2007), 'Le Delta d'Or Autour de Rotterdam, Anvers et Zeebrugge: l'Emergence d'une Véritable Région Portuaire Face au Défi de la Mondialisation?', *Les Cahiers Scientifiques du Transport* 51, 61–96.
- Mc Calla, R. (1999), 'Global Change, Local Pain: Intermodal Seaport Terminals and Their Service Areas', *Journal of Transport Geography* 7:4, 247–54.
- et al. (2004), 'Dealing With Globalisation at the Regional and Local Levels: The Case of Contemporary Containerization', *The Canadian Geographer* 48:4, 473–87.
- Notteboom, T. and Rodrigue, J.P. (2005), 'Port Regionalization: Toward a New Phase in Port Development', *Maritime Policy and Management* 32:3, 297–313.
- Offner, J.M. (1993), 'Les Effets Structurants du Transport: Mythe Politique, Mystification Scientifique', *L'Espace Géographique* 3, 233–42.
- Omiunu, F.G.I. (1989), 'The Port Factor in the Growth and Decline of Warri and Sapele Townships in the Western Delta Region of Nigeria', *Applied Geography* 9, 57–69.
- Porter, M.E. (2003), 'The Economic Performance of Regions', *Regional Studies* 37:6/7, 549–78.
- Rietveld, P. (1989), 'Infrastructure and Regional Development', *Annals of Regional Science* 23:4, 255–74.
- Rodrigue, J.P. (1994), 'Transportation and Spatial Development in the Singapore Extended Metropolitan Region', *Singapore Journal of Tropical Geography* 15:1, 56–74.
- (2003), 'The Port Authority of New York and New Jersey: Global Changes, Regional Gains and Local Challenges in Port Development', *Les Cahiers Scientifiques du Transport* 44, 55–75.
- Rodrigues-Malta, R. (2001), 'Les Echelles de la Décision dans la Reconversion des Espaces Portuaires: Approche Comparée', in IACP (ed.), *Les Territoires de la Ville Portuaire* (Le Havre: International Association Cities and Ports).

- Rozenblat, C. et al. (ed.) (2004), *Les Villes Portuaires en Europe, Analyse Comparative* (Montpellier: CNRS).
- Slack, B. (1999), 'Satellite Terminals: A Local Solution to Hub Congestion?', *Journal of Transport Geography* 7:4, 241–46.
- Stern, E. and Hayuth, Y. (1984), 'Developmental Effects of Geopolitically Located Ports', in Brian S. Hoyle and David Hilling (eds.), *Seaport Systems and Spatial Change* (Chichester: Wiley).
- Taylor, M.J. (1974), 'The Impact of New Zealand's Secondary Ports in Their Associated Urban Communities', *New Zealand Geographer* 30:1, 35–53.
- Thorez, P. (1998), 'Le Transport Maritime dans les Pays Issus de l'Ex-URSS', *Le Courrier des Pays de L'Est* 426, 18–52.
- Todd, D. (1993), 'The Interplay of Trade, Regional and Technical Factors in the Evolution of a Port System: The Case of Taiwan', *Geografiska Annaler* 75B:1, 3–18.
- UNCTAD (2002), *Review of Maritime Transport* (Geneva: United Nations).
- United Nations (2000), *Statistical Yearbook 44* (New York: Department of Economic and Social Affairs, Statistics Division).
- Vallega, A. (1979), 'Fonctions Portuaires et Polarisation Littorales dans la Nouvelle Régionalisation de la Méditerranée, Quelques Réflexions', in CNRS (ed.), *Villes et Ports, Développement Portuaire, Croissance Spatiale des Villes* (Paris: Centre National de la Recherche Scientifique).
- (1983), 'Nodalité et Centralité Face à la Multimodalité : Eléments pour un Relais entre Théorie Régionale et Théorie des Transports', in Calogero Muscara and Corrado Poli (eds.), *Transport Geography Facing Geography* (Rome: International Geographical Union).
- (1996), 'Cityports, Coastal Zones and Sustainable Development', in Brian S. Hoyle (ed.), *Cityports, Coastal Zones and Regional Change* (Chichester: Wiley).
- Vigarié, A. (1964), *Les Grands Ports de Commerce de la Seine au Rhin. Leur Evolution devant l'Industrialisation des Arrière-pays* (Paris: Sabri).
- (1968), *Géographie de la Circulation* (Paris: Genin).
- (1979), *Ports de Commerce et Vie Littorale* (Paris: Hachette).
- (1981), 'Maritime Industrial Development Areas: Structural Evolution and Implications for Regional Development', in Brian S. Hoyle and David A. Pinder (eds.), *Cityport Industrialization and Regional Development* (Oxford: Pergamon Press).
- Vleugels, R.L.M. (1969), 'The Economic Impact of Ports on the Regions They Serve and the Role of Industrial Development', Paper presented at the 6<sup>th</sup> Biennial Conference of the International Association of Ports and Harbors, Melbourne, Australia, March.
- Wakeman, R. (1996), 'What is a Sustainable Port? The Relationship Between Ports and Their Regions', *Journal of Urban Technology* 3:2, 65–79.
- Witherick, M.E. (1981), 'Port Developments, Port-City Linkages and Prospects for Maritime Industry: A Case Study of Southampton', in Brian S. Hoyle and David A. Pinder (eds.), *Cityport Industrialization and Regional Development* (Oxford: Pergamon Press).

**Table 3.1 Correlation evolution between port traffic, population, trade and production at country level, 1990-2000**

Traffic type	Population		Trade		GDP	
	1990	2000	1990	2000	1990	2000
Tonnage	0.654	0.669	0.867	0.758	0.856	0.802
Containers	0.579	0.589	0.840	0.767	0.782	0.830

Source: author, calculated from United Nations (2000), International Road Transport Union (1996), and Containerisation International (various years)

**Table 3.2 Distribution of ports and regional units by country**

Country	Number of small port regions	Number of large port regions	Number of container ports
Belgium	2	1	2
Netherlands	2	1	2
Greece	3	3	3
Poland	2	2	3
Portugal	3	3	3
Ireland	4	2	4
Denmark	5	2	5
Germany	5	4	5
Canada	5	5	6
France	6	6	7
New Zealand	7	2	8
Turkey	7	7	8
Mexico	10	8	11
Australia	11	7	13
South Korea	10	6	13
Finland	9	3	14
Sweden	8	6	15
Italy	16	12	16
Norway	9	5	18
Spain	17	8	22
United Kingdom	23	9	27
Japan	26	9	31
United States	28	20	42
Total	218	131	278

Source: author, calculated from OECD TDB and Containerisation International

Table 3.3 Regional specializations and traffic growth, 2000-2005

Regions	Average growth of container traffics							
	Industrial specialization		Unemployment concentration		Service specialization		GDP concentration	
	Small regions	Large regions	Small regions	Large regions	Small regions	Large regions	Small regions	Large regions
All higher / all lower	0.89	0.64	0.87	1.16	1.05	1.71	1.19	0.89
10 higher / 10 lower	1.39	0.49	1.59	1.94	1.32	3.18	1.73	1.10
20 higher / 20 lower	1.16	0.81	0.99	1.62	0.78	2.02	1.89	0.74
30 higher / 30 lower	0.84	0.72	0.78	1.24	1.00	1.49	1.41	0.88
40 higher / 40 lower	0.82	0.70	1.18	1.32	1.13	1.71	1.41	1.17
50 higher / 50 lower	1.04	0.74	1.00	1.27	0.97	1.62	1.37	1.22

Sources: realized by author based on OECD TDB and Containerisation International

*N.B. values higher than 1.1 are highlighted in darker than values lower than 0.9*

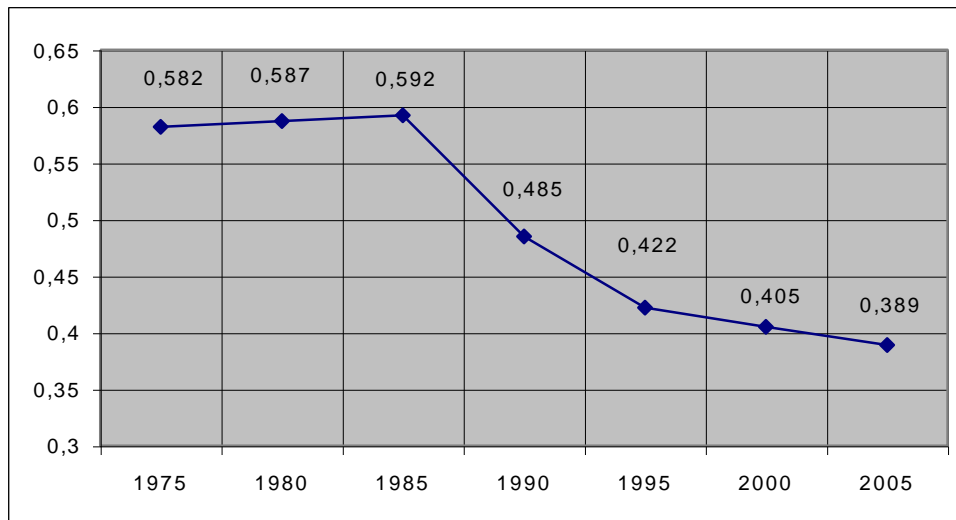
Table 3.4 Regional specialization and port performance, 2005

Regional areas		RCI Labour force				RCI Population			
		Unemp.	GDP	Indus.	Serv.	Unemp.	GDP	Indus.	Serv.
Oceania	Smaller regions	0.11	-	-	-	0.74	-	-	-
	Larger regions	0.72	-0.68	0.05	-0.36	0.69	-0.68	0.06	-0.36
Northwest Europe	Smaller regions	0.16	0.77	-0.20	0.50	0.17	0.79	-0.23	0.52
Southwest Europe	Larger regions	0.45	0.85	-0.57	0.72	0.43	0.88	-0.60	0.75
	Smaller regions	0.17	-0.19	-0.47	0.24	0.14	-0.16	-0.45	0.24
Northeast America	Larger regions	0.09	-0.15	-0.35	0.15	0.03	-0.10	-0.30	0.15
	Smaller regions	-0.03	-	-	-	0.20	-	-	-
US Gulf coast	Larger regions	0.18	-0.10	-0.11	0.16	0.17	-0.10	-0.12	0.17
	Smaller regions	-0.21	-	-	-	-0.10	-	-	-
Northwest America	Larger regions	0.47	0.11	-0.17	-0.03	0.55	0.23	-0.07	-0.13
	Smaller regions	-0.53	-	-	-	-0.51	-	-	-
Scandinavia & Baltic	Larger regions	-0.19	0.11	-0.46	0.57	-0.17	0.12	-0.46	0.57
	Smaller regions	-0.07	0.11	0.04	-0.06	-0.06	0.10	0.04	-0.07
Southeast Europe	Larger regions	-0.33	0.13	0.40	-0.21	-0.37	0.09	0.38	-0.24
	Smaller regions	0.41	-0.22	-0.24	0.02	0.35	-0.21	-0.29	0.12
Northeast Asia	Larger regions	0.41	0.10	-0.34	0.74	0.29	0.11	-0.30	0.80
	Smaller regions	0.17	-0.02	-0.12	0.17	0.16	-0.01	-0.12	0.18
British Isles	Larger regions	0.06	0.29	-	-	0.05	0.30	-	-
	Smaller regions	-0.11	-0.08	0.02	0.04	-0.13	-0.09	0.04	0.03
All regions	Larger regions	-0.42	0.61	-0.29	0.33	-0.43	0.62	-0.31	0.35
	Smaller regions	-0.01	-0.05	-0.17	0.04	0.01	-0.03	-0.15	0.04
	Larger regions	0.11	0.15	-0.28	0.28	0.08	0.18	-0.27	0.28

Source: author, calculated from OECD TDB and Containerisation International

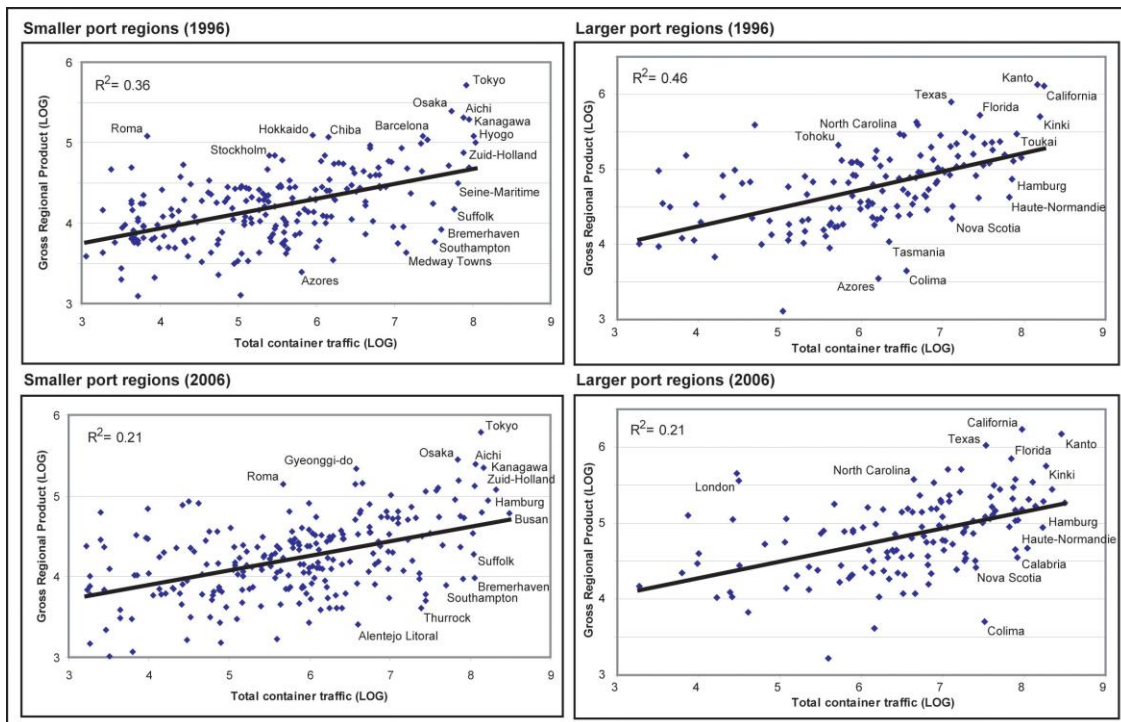
*N.B. coefficients higher than 0.1 are highlighted in darker than coefficients lower than -0.1*

Figure 3.1 Correlation evolution between population and container traffics at port city level, 1975-2005



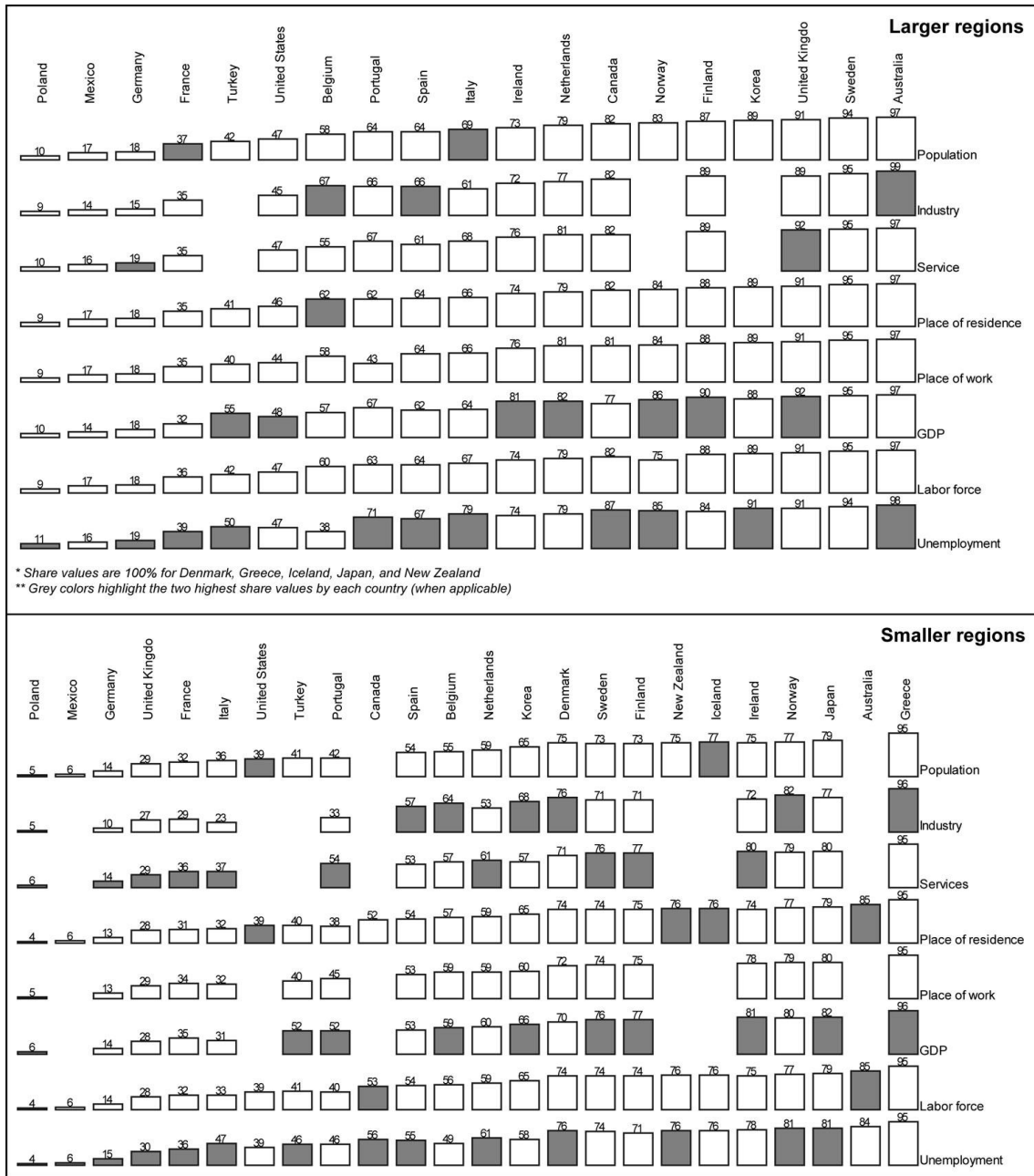
Source: author, adapted from Ducruet and Lee, 2006

Figure 3.2 Gross Regional Product and port traffic by region size, 1996-2006



Source: author, calculated from OECD TDB and Lloyd's MIU

Figure 3.3 National importance of port regions by indicator, 2005 (Unit: %)



Source: author, calculated from OECD TDB and Containerisation International