Revisiting inter-port relationships under the New Economic Geography research framework

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REVISITING INTER-PORT RELATIONSHIPS UNDER THE NEW ECONOMIC GEOGRAPHY RESEARCH FRAMEWORK

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1. INTRODUCTION

Port geographers and port economists all look basically at the way a port develops and performs. While this may seem rather trivial, the simple fact that 90% of world trade volumes are ensured by maritime transport is in itself a sufficient argument assessing the importance of ports in shaping the world economy. The core intention of port specialists is thus to explain *why some ports grow while others stagnate or decline*. The complexity of the answer stems from the intermingling of multiple historical, geographical, economical, and political factors on various scales.

Throughout port studies, particular attention has been paid to the study of inter-port relationships. Just like cities became conceptually defined as elements in urban systems rather than isolated elements serving their dedicated region (Pumain, 1982); ports have become identified as parts of port systems (Robinson, 1976). This new way of thinking opened many research opportunities in the fields of competition, cooperation, and integration. It has improved our understanding about *how different ports accomodate different traffic* but also *how port activities impact - and are influenced by - local and regional economic growth*. However, port research has become too much industry-specific, as recent works point at the need to be better integrated within economic geography as a whole (Hall et al., 2006; Olivier and Slack, 2006).

In this chapter, the New Economic Geography (henceforth NEG) is seen as a possible bridge through which such integration may be envisaged. The NEG has distanced itself from traditional economic geography in the early 1990s by applying a modelling approach to the explanation of changing spatial structures, and by attempting to put economic geography in the economic mainstream (Krugman, 1998). By bringing together international trade theories,

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micro-economic theories, and spatial analysis, it proposes a renewed framework explaining the uneven distribution of activities across geographical space, understood in terms of agglomeration, dispersion, and regional integration.

Following a brief synthesis of NEG core ideas, notably about the development of transport nodes, this chapter confronts it with two important sets of port research: the *changing concentration of traffic within a port system*, and the *uneven agglomeration of economic activities around port areas*. Finally, a critical assessment of respective findings allows for outlining a possible common research agenda, enriched by the other contributions of the book.

2. AGGLOMERATION AND DISPERSION FORCES: THE N.E.G. APPROACH

2.1 GENERAL FRAMEWORK: SCALES, ACCESSIBILITY, COSTS

The main purpose of economic geography is to explain the uneven distribution across places on various geographical scales (Anas et al., 1998). Agglomeration of firms or populations occurs due to unequal levels of accessibility to spatially dispersed markets (Fujita and Thisse, 2002). This accessibility depends on trade costs - of which transaction costs, tariff and non-tariff costs, transport costs, and time costs - that are inherent to exchanges across locations (Behrens, 2006; Spulber, 2007). While the analysis of the consequences of decreased distance-related costs on the spatial economy have been made on a national level (Bairoch, 1997), NEG is designed to operate on a sub-national or *regional* level, with special reference to interregional relationships.

NEG focuses primarily on the trade-off between increasing returns in production and transport costs (Koopmans, 1957; Krugman, 1995). It also borrows from human geography the law of Tobler (1970) according to whom “everything is related to everything else, but near things are more related than distant things”. This principle has been given remarkable relevance with regard to the emergence of core-periphery patterns during the industrial revolution due to falling transport costs. Based on such principles, NEG proposes an alternative approach to the neoclassical model that neglects the interpretation of international (and interregional) discrepancies. It proposes a framework aiming at determining the nature and intensity of agglomeration and dispersion forces that push and pull both consumers and firms (Papageorgiou and Smith, 1983), together with the interplay between such forces and transport costs (Krugman, 1991).

The difficulty is to ascertain whether regions with large markets will always attract more firms than regions with small markets. Indeed, the concentration of firms may result in intensified local competition and decreasing profits, causing a dispersion force from the core to the periphery. Dispersion may be challenged by the *home market effect* deriving from the size advantages of the core region (Helpman and Krugman, 1985; Combes et al., 2008). In a context of economic integration as in the E.U., firms are likely to exploit intensively scale economies while avoiding geographical isolation in the periphery, leading to increased agglomeration in the core region. This explains why improving transport infrastructure may exacerbate regional disparities and lead to over-agglomeration in the core region (Ottaviano and van Ypersele, 2005). Complementarily, interregional flows are also composed of individuals (e.g. workers and consumers). According to Krugman (1991), the increase in market size leads to a higher demand for manufactured goods, then to an over-agglomeration of firms, and to a push of nominal wages. As a result, the greater variety of local products leads to lower local prices, resulting in increased real wages and, in turn, in-migration of new workers, giving birth to a core-periphery pattern. The *snowball meltdown* occurs when wages decrease in the destination region, while new workers (who are also new consumers) increase the demand for manufactured goods and, thus, for labour, resulting in the spatial dispersion of firms and workers.

One main principle to retain from NEG is that high transport costs create spatial equality by sustaining the dispersion of activities, while low transport costs foster core-periphery inequalities by fostering their agglomeration (Krugman, 1991; Fujita et al., 1999; Combes et al., 2008). It is assumed that individuals are less footloose than firms, because individuals need more complex networks of interaction that are available only in agglomerations. A very important aspect of NEG is that it considers the planner and the market as being equally concerned by the issue of agglomeration. For both public and private players, agglomeration may be socially efficient, notably if the inhabitants of the periphery are guaranteed a good access to firms' products. Such issue has motivated the analysis of skills distribution across regions (Duranton and Monastiriotis, 2002; Combes et al., 2008), notably showing that agglomeration leads to low prices and low wages due to the fact that the *net effect* is negative when transport costs take intermediate values.

Another important aspect of NEG is the diachronic approach to the relationship between growth and location. The growth of the global economy depends on its spatial organization (Fujita and Thisse, 2002). More precisely, the change from dispersion to agglomeration fosters innovation. Recent studies (Tabuchi and Thisse, 2002) demonstrate that

the relation between agglomeration degree and transport costs results in a bell-shaped curve of spatial development, in which the second phase marks the re-dispersion of the manufacturing sector while non-economic factors become dominant. In fact, these non-economic considerations tend to make residents stickier, especially in rich economies. However, given the fact that living costs (e.g. land rent, commuting and housing costs) increase in the city or region accommodating newcomers (Fujita, 1989), dispersion occurs only if transport costs become lower than commuting costs (Tabuchi, 1998; Ottaviano et al., 2002). Morphological changes in US cities that lead to polycentric urban areas are directly driven by the succession of agglomeration and dispersion (Anas et al., 1998; Henderson, 1997; Cavailhès et al., 2007).

The complementary forces of agglomeration and dispersion also affect intra-firm organization (Krugman and Venables, 1995). Due to rising incomes in the core region resulting from agglomeration, firms may find advantageous to relocate some activities to the periphery to benefit from lower wages, resulting in dispersion (Puga, 1999). This fragmentation process can be possible only when transport costs and communication costs have reached a sufficiently low level (Feenstra, 1998; Spulber, 2007; Leamer and Storper, 2001). Nevertheless, it results in a separation between firms' strategic functions in the core, and firms' production functions in the periphery (Fujita and Thisse, 2006; Robert-Nicoud, 2008; Faini, 1999).

2.2 TRANSPORT NODES AND AGGLOMERATION ECONOMIES

As stated by most NEG specialists, ports have naturally gave birth to centres of economic activities. Fujita and Mori (1996) propose a new framework analyzing whether a given port may create endogenous urban and economic growth. In this framework, the competitive advantage of the industries located around the port, and the quality of the transport link between the port and the core region are key determinants of local growth. As a result of their model, a port in a peripheral region is likely to attract second-order activities (e.g. manufacturing) while higher-order activities remain concentrated in the core region.

Two main research directions are investigated by the NEG: general theories on the agglomeration dynamics at transport nodes, and empirical verification of the effect of port efficiency on transport costs and trade.

2.2.1 INTERMEDIATE LOCATIONS AND THE DEVELOPMENT OF HUB CITIES

The emergence of so-called ‘hub cities’, which can be port cities or non-port cities, is depicted by NEG as a fundamental result of the agglomeration power of transport nodes of which ports. This phenomenon is mostly due to shrinking transport costs and declining trade barriers within countries and across regions on various scales, resulting in the necessity concentrating trade flows at intermediate locations (Glaeser and Kohlhase, 2004).

During the first stages of transport development, infrastructure tends to naturally select already existing and well established economic centres (Fujita and Mori, 2005). In a later stage, technological improvements in the transport industry combined with the aforementioned factors provoke the emergence of intermediate locations called hubs. This is confirmed by Behrens (2007), for whom “transportation hubs are very likely locations for cities to emerge, even if they are not centrally located”. In the work of Konishi (2000), the hub city is an intermediate location that emerges according due to economies of scale and technological improvements of transportation. Between an agricultural city ‘A’ and an industrial city ‘B’, the hub city ‘C’ is likely to be used as a third location to reroute transport flows. This location may develop into a new city due to the demand for transhipping and handling commodities, which in turn attracts workers and, therefore, stimulates population agglomeration: “as the volume of trade between hubs increases, more workers are needed in order to meet labour demand for shipping and handling commodities, resulting in population agglomeration at such hubs”.

Tabuchi and Thisse (2002) underline the limitations of the core-periphery model by arguing that agglomeration forces are commodity-specific and therefore depend on a certain degree of regional specialization. Notably, heavy industries and industries producing goods with high transport costs are more agglomerated than light industries and industries with lower transport costs.

For more convenience, Behrens et al. (2006) explore the opposing forces exerted on remote regions possessing a transportation gate. On the one hand, remoteness makes imports and exports more costly, thus reducing the locational appeal of the port and region to firms and workers. On the other hand, remoteness provides a shelter for local markets from foreign competition, thus increasing the locational appeal of the port or region. Therefore, a transportation gate does not always attract industries, because it can act as a channel threatening domestic firms through international competition. What makes their work innovative is that the authors take into consideration the level of economic and spatial integration of gateway regions. This provides a multi-scalar approach about how the specific

properties of transportation gates modify the spatial structure of their adjacent region, depending on wider factors such as international trade barriers and intra-national trade costs.

2.2.2 EMPIRICAL INVESTIGATIONS AND POLICY RELEVANCE

In general, NEG specialists provide aggregated measures of general trends that should apply for a large set of locations that are not differentiated. Yet, their results shed important light on the dynamics in which ports operate.

Behrens et al. (2006) show to what extent transportation gateways favour coastal economies versus landlocked countries by reducing distance to trade partners thus creating economic wealth in terms of GDP growth. They elaborate their results based on former studies on the role of coastal gateways in overall transport costs. For instance, the study of Limao and Venables (2001) on US imports and exports shows that in general, coastal countries enjoy 50% less transport costs than landlocked countries. This result may vary depending on the improvement of the infrastructure quality, thus making trade partners theoretically closer of more distant. In the same vein, Clark et al. (2004) evaluate the role of seaport efficiency in terms of infrastructure and cargo handling services quality, showing that shipping costs would reduce by 12% when port efficiency is improved from the 25^{th} bottom percentile to the 25^{th} top percentile. In their study of Brazilian shipments, Haddad et al. (2006) also show to what extent the level of port efficiency determines for an important part the relative distance (and cost) between trading regions and countries.

Some studies also focus on the impact of port policies on maritime transport costs: Fink et al. (2002) demonstrate that liberalizing port services would be equivalent to decreasing maritime transport costs by 9%. Other studies such as the one of Overman and Winters (2005) on UK shipments show the impact of European integration on the traffic shifts to southeast UK from other UK regions.

Finally, other studies that are not directly related to maritime transport or ports also provide useful evidence about the interplay between transport costs, agglomeration, and dispersion forces. Bosker et al. (2007) confirms that the spatial organization at the top of the bell-shaped curve corresponds to the ‘blue banana’ in Europe. For the French case, Combes and Lafourcade (2007) identify that a 30% drop in generalized transport costs would spread employment more evenly across regions but this would result in rising agglomeration within regions.

In the end, results of NEG applications are very consistent and relevant, notably with regard to policy making. For instance, a major outcome is that the development of more efficient transport infrastructure would exacerbate regional disparities, a result opposite to what transport authorities expect (Fujita et al., 1999). The European regional policies, for example, keep being based on the idea that developing corridors will help remote regions to develop (Midelfart-Knarvik and Overman, 2002; Vickerman et al., 1999).

3. PORTS AND AGGLOMERATION DYNAMICS

3.1 SEAPORTS AND NEG THEORIES

The main difficulty applying NEG theories to seaports is the difference in nature between the units of analysis: the *region* and the *city* are places for firms, workers, and residents to locate and prosper, while *ports* are basically intermodal connection points between different transport systems. However, it is possible to analyse ports through the NEG framework by considering the simple fact that *large ports coexist with small ports*. Because not every port can become a global hub or gateway, it is important for geographers to understand the factors fostering port growth - and decline.

Table 1 provides a comparison of the implications of spatial agglomeration (and dispersion) within three main approaches: the NEG general approach, the distribution of traffic within a port system, and the location of economic activities around port areas.

Table 1: Comparison of agglomeration outcomes in NEG and port studies

	NEG theories	**Traffic distribution within port systems**	**Ports as locations for economic activities**
Advantages of agglomeration	Innovation, importance of non-economic factors	Traffic stability, commodity variety, added-value	Captive local market, economic diversity (tertiary), economies of scale
Disadvantages of agglomeration	Regional disparities, lock-in effect of established core regions on the periphery	Congestion, lack of space	Environmental nuisances
Advantages of dispersion	Lower wages, available land, shelter for local markets	Nautical accessibility, land for port expansion, niche market	Extended gateway (logistics), specialisation

Disadvantages of dispersion	Remoteness, higher transport costs	Lack of hinterland coverage	Greenfield development, haphazard urbanisation
Factors of core-periphery shift	Over-agglomeration in the core, increased transport costs	Peripheral port challenge, diseconomies of scale in large load centres, port competition, technological revolution, carrier selection, hub strategies	Globalisation, urban growth, port-city separation, waterfront redevelopment, free-zone or growth pole development, land-use conflicts

Source: authors

While this comparison indicates that NEG and port studies have much in common in terms of conceptual investigations and empirical evidence, NEG models have never been applied systematically, for example to address the issues below:

- bigger port cities are more likely to suffer from congestion and traffic decline than smaller port cities;
- traffic growth stimulates value-added and regional development in the port area;
- port-city separation and land-use conflicts harm port growth;
- new terminals on greenfield sites create economic development.

Far from applying NEG models to port studies, the remainder of this explorative chapter propose a synthesis of the existing literature on the two aforementioned topics.

3.2 TRAFFIC CONCENTRATION IN PORT SYSTEMS

One dominant issue of port geography and economics is the evolving concentration of traffic among sets of ports worldwide (Table 2). This issue is of particular relevance for the study of agglomeration and dispersion forces in NEG theories. Port traffic covers approximately 90% of world trade volumes, but such figure reaches higher proportions in the case of export-led island states (e.g. 99% for South Korean international trade). Based on Table 2, the main factors explaining the lack of NEG-like models in this study field may be explained as follows:

Table 2: Selected studies on port system concentration, 1963-2008

Author(s), year	Year	Area	Concentration factor(s)	De-concentration factor(s)
Taaffe, Morrill & Gould	1963	Africa	Inland transport corridors	
Rimmer	1967a, 1967b	Australia, New Zealand	Inland transport corridors	
Kenyon	1970	United States	Metropolitan dominance (New York)	Hinterland-foreland changes
Ogundana	1971	Nigeria	Sustained port dominance	Port diffusion, diseconomies of scale
Hilling	1977	Ghana	Spatial consolidation and rationalization	
Hayuth	1981, 1988	United States	Development of large load centres, intermodalism	Peripheral port challenge
Slack	1985, 1990	United States	Level of intermodalism	Port selection by carriers
Barke	1986	General		Congestion, lack of space for further expansion
Hoare	1986	United Kingdom	European integration, national connectivity	
Charlier	1988	Belgium	Stable structure of port hierarchy	Traffic specialization
Airriess	1989	Indonesia	Exogenous development through hinterland penetration	
Kidwai	1989	India		New port construction (bulk)
Kuby & Reid	1992	United States	Technological innovations, disappearance of smaller ports	
Todd	1993	Taiwan	Export-led policy and growth poles	Balanced regional development
Starr	1994	United States	Economies of scales in liner shipping, decreased port calls	
Hoyle & Charlier	1995	East Africa	Concentration of investments	
Charlier	1998	Benelux		Hinterland development (railway), port selection (Zeebrugge)
Notteboom	1997	Europe		Traffic shifts to medium-sized (new) ports
Wang	1998	Hong Kong, China	Technological advance of Hong Kong	Port competition, congestion, modal shift, high handling costs
Hoyle	1999	Kenya	Primate city polarization (Mombasa)	New port development
Brunt	2000	Ireland	Metropolitan dominance (Dublin)	National development plans
Wang & Slack	2000	Pearl River Delta		Carriers' pressures, port policy
Slack & Wang	2003	Asia		Strategies of transnational operators
De & Park	2003	World		Port competition, new technologies
Notteboom & Rodrigue	2005	Developed countries		Development of 'off-shore' hubs and inland terminals
Ducruet & Lee	2006	World		Urban growth, regional port competition
Notteboom	2006a	Europe, North America	Stability of concentration	
Notteboom	2006b	East Asia		New port development
Frémont & Soppé	2007	North European Range	Stable traffic concentration	Shipping line concentration
Ducruet	2008	Northeast Asia	Hub dependence	Military control, logistics barriers
Lee, Song & Ducruet	2008	Hong Kong, Singapore	Technological differentials, efficient planning policy	Congestion, lack of space, port competition

Source: adapted from Ducruet et al., 2009

- **The changing significance of performance factors over time**: in earlier studies, the size of the hinterland and the role of ports as natural gateways at the head of inland transport

corridors were depicted as the main factors explaining traffic volumes. However, with the core-periphery shifting factors summarized in Table 1, traffic growth may occur regardless of hinterland size and accessibility. Regional integration and port competition give more importance to nautical accessibility and technological performance within the port. The location nearby core economic regions is far less important than in the past. Yet, there is an overlap between old and new factors of port performance. This is perfectly matching NEG theories for which performance is a trade-off between increasing returns to scale and transport costs. New terminals stemming from the peripheral port challenge are never really far from already established transport corridors, as seen in Zeebrugge and Felixstowe cases that are both close to core regions and traditional gateways (e.g. London, Antwerp). Seaports with good nautical accessibility and well located as prime loading/unloading gateways such as Le Havre may underperform due to the lack of efficient hinterland access towards core economic regions.

- **The exogenous character of port development**: with the growing decisional power of shipping lines, forwarders, and intermodal operators on supply chain spatial design through horizontal and vertical integration, the fate of ports is increasingly dictated from outside. Indeed, Goss (1990) clearly indicated that the risk of port policies is to lean towards over-capacity while traffic may shift only due to the decision of some firms, as seen in many cases such as Maersk shifting from Singapore to Tanjung Pelepas (Malaysia). Albeit recent work has computed shipping lines' decision-making processes (Yap and Lam, 2006), no model has resulted from the empirical investigation yet that would be applicable anywhere in the world. In addition, the large literature about the efficiency of container terminals seems to totally ignore that such efficiency mostly depend on the quality of hinterland connections. Containers terminals are often considered as isolated entities functioning with their own cargo handling equipments, regardless of their relation with other transport modes. Although this has been well addressed in a recent work based on the Rotterdam experience (Horst van der and Langen de, 2008), it has not yet been studied systematically. Thus, the difficulty comparing ports is the necessity to include in the analysis the decisional and managerial dimensions that go far beyond the responsibility and the territory of the port itself.

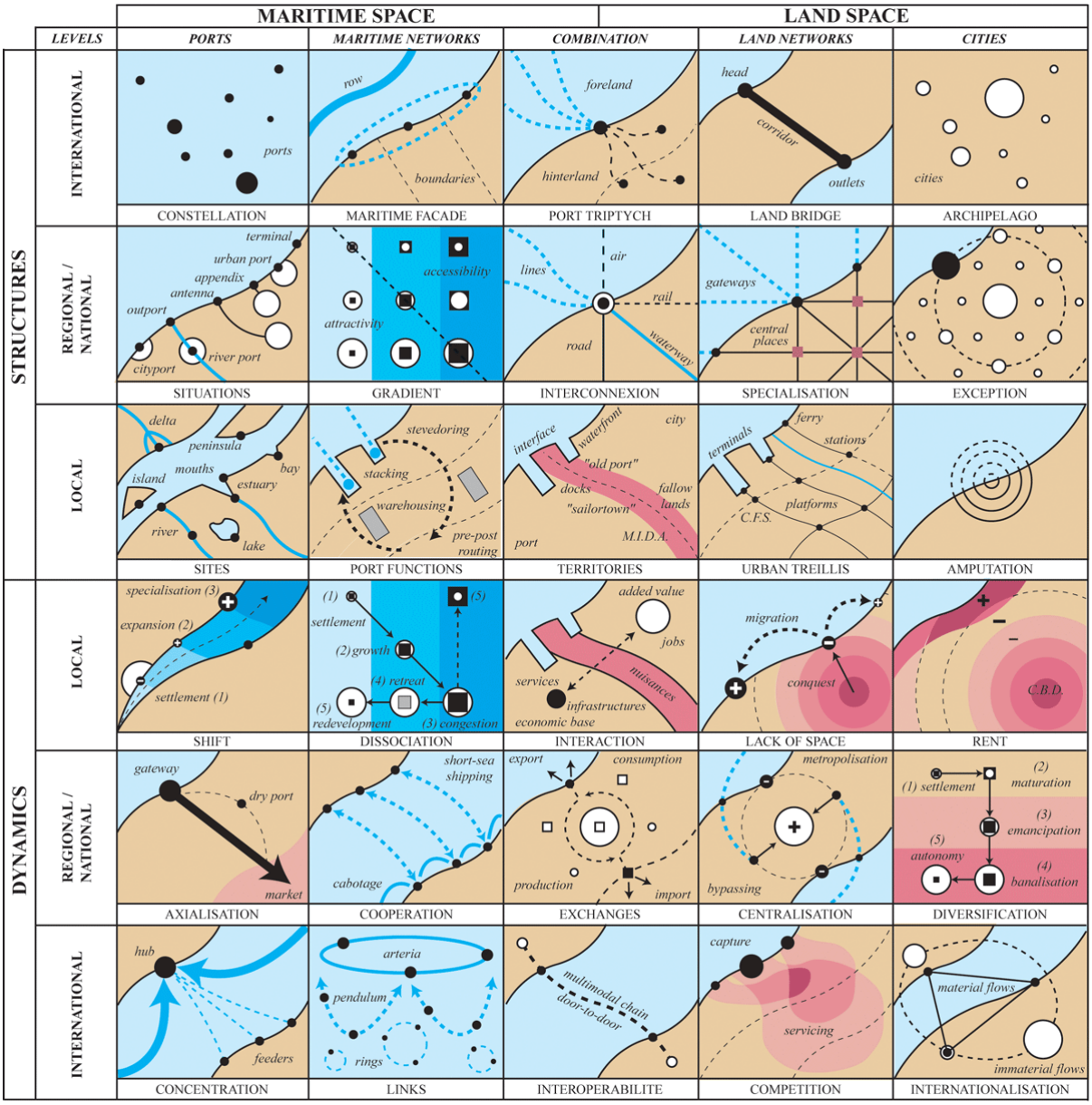
- **The interplay of multiple actors on various geographical scales**: in complement to the aforementioned realities, the complexity of contemporary port development stems from the intervention of multiple actors such as transport companies, port authorities, and governments

involved in port planning. One dominant school of thinking is led by scholars such as Slack (1993) for whom ports have become pawns in the game of such global transport players that insert ports in their networks according to firm-centred considerations (advantageous location, handling costs, and technical efficiency). As a result, there is a need to rethink ports as groups of terminals with their own individual logics, notably with the globalisation of port terminal operations (Slack and Frémont, 2005; Olivier and Slack, 2006). Intra-port competition among terminals and operators in large load centres has become as much important as inter-port competition (Pallis et al., 2008). Thus, terminal, port, port city, port region, country, hinterland, port system, and foreland interplay through a complex synchronisation (Figure 1) while some port activities such as logistics shift to inland locations (Notteboom and Rodrigue, 2005). As mentioned in the review of NEG theories, some spatial dynamics may be commodity-specific, as seen in the geography of automobile imports at US ports (Hall, 2004). This makes difficult for scholars to decide which player and which scale dominate in the development of a given port, and thus to generalize the results to every port in the world. The preference of NEG theories for the regional scale is thus difficultly applicable directly to port studies since ports are intermediate locations between different territories and scales.

- **The growing importance of political factors:** although such factors have always played a role in the decision-making process of port development, there is a growing recognition that sole economic factors are not sufficient to explain current port dynamics. Port selection by ocean carriers is better explained by subjective criteria rather than infrastructural characteristics (Ng, 2006). Performance differentials between Los Angeles and Long Beach that are situated in the same urban agglomeration can only be explained by historical and political factors (Jacobs, 2007). In the case of Dubai, factors of centrality and intermediacy within the Middle Eastern port system have contributed to the success of the globalization policy of Dubai World Ports (Jacobs and Hall, 2007). For Hong Kong, the transition from hub to gateway directly stems from more flexible relationships with China (Wang, 1998), and strategies of terminal operators in mainland China such as Hutchinson (Airriess, 2001) based on cultural and political relationships (Olivier, 2006). In a constrained economy such as North Korea, port development occurs mostly through Chinese support due to war risk, while the country becomes increasingly hub-dependent on South Korean ports due to the good centrality and intermediacy of the latter for accessing the outside world (Ducruet, 2008a). Although it remains impossible to infer direct causal relationship between governance

structure and port performance worldwide (Goss, 1990), the changing fortunes of ports are very much influenced by governance models (Brooks and Cullinane, 2007).

Figure 1: Geographical overview of port spatial analysis



Source: adapted from Ducruet (2005)

3.2 PORTS AND THE LOCATION OF ECONOMIC ACTIVITIES

Since NEG theories confer to transport nodes - of which ports - the property to generate economic growth and urbanisation, it is very interesting to confront them with the longstanding works of port scholars on this issue. Although the overview cannot be

exhaustive, it shows some results of port studies about the direct impact of port activities on local and regional economies (Table 3). Some common trends and points where further collaboration between NEG and port specialist seems fruitful can be listed as follows:

Table 3: Selected studies on economic agglomeration at seaports, 1958-2008

Author(s)	Year	Area	Agglomeration forces	Dispersion forces
Weigend	1958	General	Central location	
Bird	1963	United Kingdom		Technological revolution, congestion of the urban core
Taylor	1974	New Zealand	Containerization	
Bird	1977	General	Gateway functions	Central place functions
Vigarié	1979	General	Port-city interdependence	
Witherick	1981	Southampton	Multiplier effects	
Vigarié	1981	Europe	MIDAs, growth poles	
Vallega	1983	General	Indirect port-urban growth	
Stern & Hayuth	1984	Middle East	Traffic growth at remote ports	Lock-in effect of the inland core economic region
Brocard	1988	General	Long-distance relationships through sea lanes (foreland)	Competition between port city and non-port city
Kidwai	1989	India		New port construction
Hoyle	1989	Developed countries	Waterfront redevelopment	Port expansion, port-city spatial separation
Murphey	1989	Asia	Functional diversification of the urban economy	Loosening of port functions
O'Connor	1989	Australia	City size	
Omiunu	1989	Nigeria		Urban growth
Slack	1989a	Canada	City size	
Slack	1989b	Montreal, Hong Kong	Locational bound of port services in CBDs	Urban redevelopment, firm turnover
Warf & Cox	1989	New York	Metropolisation	Changing commodity mix
West	1989	Developed countries	Amenity of the waterfront	High land rents
Goss	1990	General	Economies of scale	
Campbell	1993	General		Regional diffusion of economic benefits
Gripaios & Gripaios	1995	Plymouth		Port-city separation
Lever	1995	Europe		Wealth differentials
Fujita & Mori	1996	General	Economies of scale	Lock-in effect of already existing centres
Pesquera & Ruiz	1996	Developed countries	Tertiary development	Environmental impact
Gleave	1997	Africa	Spatial fix of CBDs	New industrial districts
Gordon	1997	Developed countries	Waterfront redevelopment	Low accessibility and social diversity of old port areas
Van Klink	1998	Rotterdam	Port network	Diseconomies of scale, subharborisation
Gripaios	1999	United Kingdom		Transport function decline
Dekker et al.	2003	Rotterdam	Direct & indirect benefits	Environmental impact & congestion
Langen de	2003	United States, South Africa, Netherlands	Ports as clusters of economic activities	
Rozenblat et al.	2004	Europe	Relative accessibility	Deindustrialization, unemployment
Lugt van der & Langen de	2005	Asia	Export-led logistics	Import-led logistics
Notteboom & Rodrigue	2005	Developed countries	Corridors, extended gateways	Depolarization, decentralization
Ducruet & Lee	2006	World	Tertiary sector development	Urban growth, lack of space
Jo & Ducruet	2007	Northeast Asia	Transit trade, free-zone	Remoteness, embargo
Lee & Ducruet	2008	Hong Kong, Singapore	Global urban functions	Cross-border integration
Lee, Song & Ducruet	2008	Asia	Efficient planning policies	High rental costs at the CBD
Grobar	2008	United States	National economic growth	Regional negative impacts

Source: realized by authors based on various sources

- **The fading spatial fix of port locations**: the attraction of economic activities by ports is nowadays questioned by a number of scholars (Hesse, 2004). During the colonisation period outside Europe, and during the current global shift of the manufacturing sector from developed to developing countries, ports seem to be prime locations for such activities. However in developed countries, most models of port-city evolution have shown the growing functional and spatial separation between ports and port cities. New terminals do not seem to create such urbanisation and economic growth, as seen in the case of transhipment hubs, outports, and gateways. Numerous case studies and spatial models show how economic activities related to seaports tend to shift from Central Business Districts and 'sailortowns' to outer locations such as inland distriparks, free-zones, and multimodal platforms due to high land rents and lack of space within the traditional industrial port city. Without public intervention, the systematic developmental effects of new port development are highly questionable. Therefore, while NEG theories seem a-temporal, their applicability to any period of time is questionable due to the importance of specific contexts. In turn, port planners shall not ignore the simple realities of spatial organisation when it comes to expect such developmental effects. Port policies should be accompanied by relevant regional development policies that also respond to the contemporary requirements of modern supply and logistics chains. The growing literature on port devolution clearly indicates the need for smaller ports to be embedded within their adjacent territories through public intervention (Debrie et al., 2007). One main problem is the quantification of port economic impacts on a large scale for international comparison, but this is limited due to discrepancies of methods, sources, and outcomes, mostly due to the lack of detailed datasets on port-related activities at urban and regional spatial units (McCalla et al., 2004; Ducruet, 2008b).

- **The regional variations of port-economic relations**: following the previous issue, it seems that port geographers neglect the practice of universal modelling due to the specific regional context in which ports operate. The regional models of hinterlands proposed by Lee et al. (2008) show that in Europe, the continental concentration of core economic regions limits the economic development of coastal gateways, while in the rest of the world, port and urban hierarchies tend to better overlap. Thus, the port-economic relationship differs greatly from one region to the other. In Europe, the core-periphery pattern exerts a lock-in effect on

higher-order activities so that port locations are comparatively less attractive for businesses. In the rest of the world that is dominated by maritime nations, port and urban development are tied together. Nevertheless, common trends are observable such as the rise and decline of port functions within urban economies over time (Ducruet and Lee, 2006). Traffic growth at efficient port nodes may not automatically result in economic benefits for the outlying territory in the same way from one region to another. In faster-growing economies such as emerging countries (e.g. Brazil, China, India), new port development is accompanied by new town policies and the development of adjacent industrial districts. In developed economies where population and economic growth is lower, new terminals have limited impact; the new generation of transhipment hubs in southern Europe developed on the ashes of former growth poles without solving existing social and economic problems such as unemployment and remoteness (e.g. Gioia Tauro, Sines, Fos, and Tarento). This indicates the need to consider different developmental paths in the evolution of port cities, such as tertiarisation in the developed world and industrialisation in the developing world.

- **The specificity of commodity chains**: some activities are more port-related than others. While some empirical studies in various countries indicate that basic daily freight-related activities locate in virtually every port, higher-order activities tend to follow the urban rather than the port hierarchy. For instance, activities with most added-value for local and regional economies, such as banking, insurance, brokering, consulting, also called Advanced Producer Services (APS) are not directly attracted by transport nodes because the logic of their spatial fix is more organisational than physical. In turn, port locations have attracted much heavy industry, notably in Europe during the 1960s before the oil crisis, at a time when economies of scale provided by coastal locations could provide increasing returns to scale for production while reducing transport costs to import raw materials and export manufactured goods. Some ports specialised in the development of petro-chemical complexes (e.g. Rotterdam) while others integrated the port function within their diversified urban economy (e.g. Hamburg). Nowadays, increased globalisation has complexified such patterns, resulting in footloose behaviour of multiple commodity and value chains in which ports remain elements amongst others (Robinson, 2002). Therefore, there is a growing need to understand which ports may attract which commodity chains, and how.

4. PORTS IN PROXIMITY: TOWARDS A NEW RESEARCH AGENDA

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