
36 Competition and regulation in seaports

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INTRODUCTION

Port competition, especially at the level of freight handling, has become an important topic in transport economics. This is due not only to the enormous volumes of freight involved, but also to derived effects, including in relation to employment and investments. Port competition unfolds at various levels. Within a given country, ports may compete for freight flows as well as for investment in additional infrastructure. Within a port cluster, they may vie for the same hinterland. And between port ranges, there is growing competition for investments and traffic.¹ Port competition is a fascinating and complex phenomenon, not in the least because of the international nature of the goods-handling groups involved.

In general, competition is good for society resulting in lower prices, more output and better services. However, in the presence of economies of scale and scope, production by a single firm will lead to lower average costs than production by many, smaller companies. This natural monopoly can result in an abuse of market power because the monopolist can realize additional profits by raising the price and reducing the output. To avoid this abuse of market power, the regulator can intervene by designing mechanisms which will prevent the monopolist taking advantage of his dominance.

Regulation makes sense in the case of market failure, when there is a natural monopoly, and when it can improve sector performance. This implies that the consumer surplus will go up, production will be more cost-efficient, the range of services offered will be wider, prices will reflect the equilibrium between supply and demand, quality will improve, the rate of innovation will go up and so forth. As a consequence, it might become easier to attract capital to the sector and boost investments.

The port sector has, as many utility industries, been subject to a wave of privatization and deregulation with consequences for competition within as well as outside the sector. At the same time, the sector has to face increased cooperation and merger activities driven by the search for scale economies and control over the logistics chain. The resulting concentration may result in abuses of market power, hampering and counteracting the advantages of the deregulation process. Due to the complex and highly dynamic nature of the port sector and the diversity of the players involved in port activities, understanding and safeguarding port competition is a difficult task. Therefore, this contribution starts with the definition of a seaport, port activities, port players and port competition. The next part focuses on two major forces which impact the port sector: changes in organisational structures of the ports as a consequence of privatization and deregulation, and the striving of shipping companies for control over the logistics chain. Finally, a number of evolutions which will impact the port competition game in the near future are presented.

DEFINITION OF PORT COMPETITION

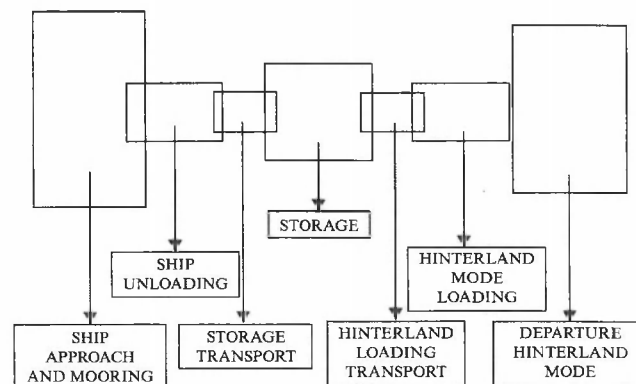
To understand the nature of competition in the port sector, it is necessary to start with a correct definition of a port. This will help to delimit the different types of port activities and their relevant markets.

The focus in this contribution is on large seaports that are characterised by three important elements:

- the maritime aspect, that is, location on the shore and/or the capacity to handle ocean-going vessels;
- the goods-handling function;
- the distribution function, including hinterland connections.

A port's maritime accessibility depends not just on its proximity to the sea, but also, primarily even, on its capacity to handle ocean-going vessels. Most seaports may be categorized as such merely on the basis of the location criterion. Some, like the port of Antwerp, are located further inland but are nevertheless accessible to sea-going ships, so that they too may be regarded as 'seaports'. In addition, there are inland ports which are not accessible to sea-going vessels, but which nevertheless fulfil an important function in accommodating goods flows.² The distinction between seaports and inland ports is however becoming increasingly blurred, due to the deployment of feeder vessels, short-sea shipping services, estuary shipping services and the like.

Definitions of a seaport used to stress the goods-handling aspect. The definition proposed by Flere (1967, p. 3) is a case in point: 'A port exists to provide terminal facilities and services for ships, and transfer facilities and services for waterborne goods and/or passengers'. This formulation suggests that one of the principal functions of a seaport is the transfer of freight from ship to land or onto other vessels. This aspect also comes to the fore in the functional models from that period. Jansson and Shneerson (1982), for example, distinguish between the functions represented in Figure 36.1. The emphasis is clearly on the approach and mooring of the vessel and on subsequent loading and



Source: Based on Jansson and Shneerson, 1982

Figure 36.1 Principal activities in a seaport according to Jansson and Shneerson

Table 36.1 *The world's largest ports in 2002 and 2007*

2002		2007	
Port	Cargo turnover (million metric tonnes)	Port	Cargo turnover (million metric tonnes)
Singapore	335.2	Shanghai	561.4
Rotterdam	321.9	Singapore	483.6
Shanghai	238.6	Ningbo-Zhoushan	471.6
South Louisiana	196.4	Rotterdam	401.1
Hong Kong	192.5	Guangzhou	341.3
Houston	161.2	Tianjin	309.4
Chiba	158.9	Qingdao	265.0
Nagoya	158.0	Qinhuangdao	246.0
Gwangyang	153.4	Hong Kong	245.4
Ningbo	150.0	Busan	243.5

Source: AAPA, 2009.

unloading. Table 36.1 compares the largest seaports in the world in 2002 and 2007 based on the goods-handling function. Quite noticeable is the sharp increase in volume handled in all ports and the strong growth achieved in Asian ports in particular.

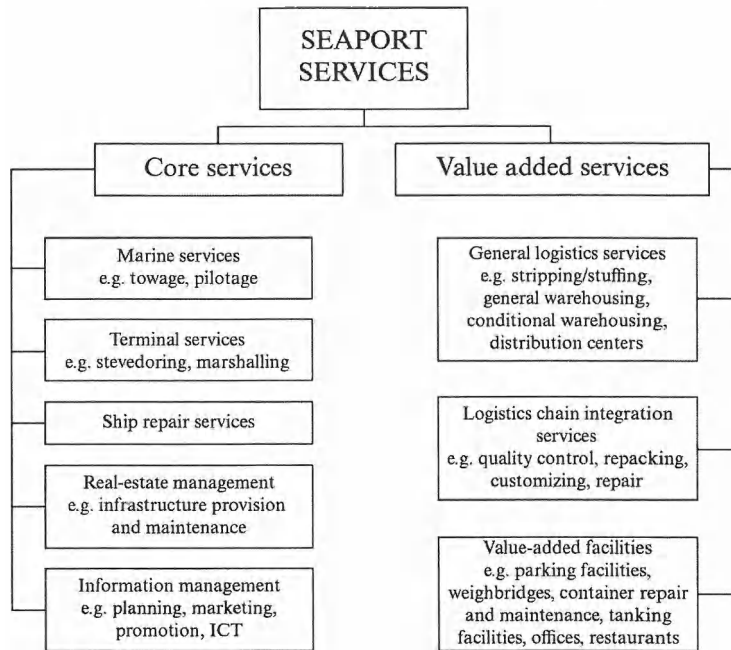
However, some ports are more than a place for freight transfer between vessel and quay or from one vessel onto another. In the definition proposed by Branch (1986, p. 1), the connections with the hinterland and the distribution function are also emphasised:

A sea port has been defined as a terminal and an area within which ships are loaded with and/or discharged of cargo, and includes the usual places where ships wait for their turn or are ordered or obliged to wait for their turn, no matter the distance from that area. Usually, it has an interface with other forms of transport and in so doing provides connecting services.

In fact, loading and unloading operations in seaports are an entirely derived effect of those ports' inherent mercantile function. In the course of the 1950s, many seaports acquired an additional function besides trade and freight handling. Due to agglomeration effects (primarily economies of scale, localization benefits and urbanization benefits), ports came to be seen as excellent locations for certain industrial activities. In this manner, they developed into important links, not just in the trade and transport chains, but also in industrial chains. The significance of the industrial function also comes to the fore in the seaport definition formulated by the EC Working Party on Seaports from 1975, particularly in the latter part:

A seaport is understood to be a ground and water surface, featuring superstructures and cranery, which primarily enable receiving sea vessels, unloading and loading them, freight storage, receipt and expedition of those commodities using land transport modes, and which also allow enterprise activities, which are in line with sea transport.

Modern seaports are important nodes in the logistics chain and therefore the focus has shifted to so-called value-added activities (Figure 36.2), an indication that the perception



Source: Based on World Bank, 2001.

Figure 36.2 Principal roles of seaports according to the World Bank

of seaports is becoming more and more complex. This has led to the involvement of a large amount of actors which interact in a variety of ways and for whom the coordination of their activities is crucial to guarantee a smooth and efficient flow of goods and documents. The key players are the shippers, the shipping lines, the intermediaries such as agents and forwarders, the terminal operating companies and the hinterland transport providers.

In Figures 36.3 and 36.4, an attempt is made to structure the various market players within a port (marked with boxes) and to show who provides services to who (marked with arrows). This structure is applied from two entirely different perspectives.

Figure 36.3 takes a commodity flow approach. The shipper engages an agent and/or forwarder in order to get his goods loaded onto the vessel of a shipping company. Shipping companies call on stevedores or terminal operators for throughput and storage. Dotted lines indicate that certain parties can be skipped or are incorporated in another chain company. Figure 36.3 confirms that shipping companies in particular rely on services provided by third parties (for example, pilots, towage services, ship repairers, provisioning, waste reception facilities and bunkers).

In the second case (Figure 36.4), the port authority occupies a central position. A port authority can roughly divide the other market players into two groups: the port users and the service providers. Among the port users are, first and foremost, the shipping companies. Other port users are shippers and industrial companies that are located within the port perimeter and have taken a concession on land. The service providers are

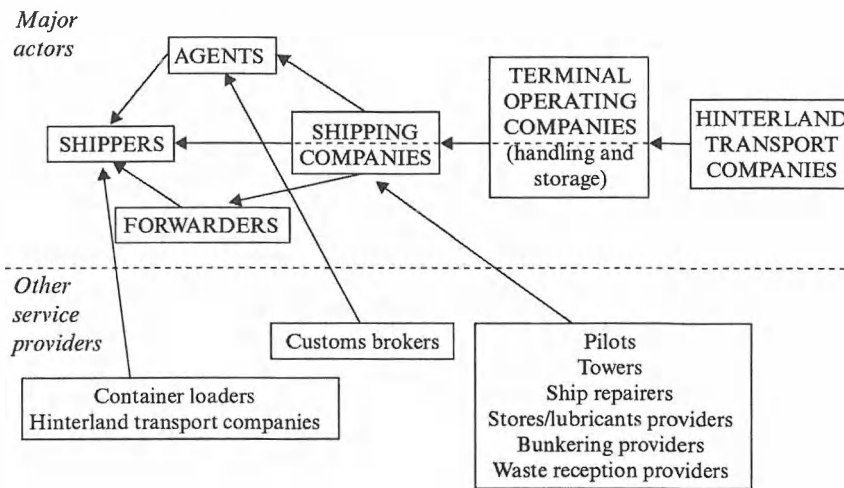


Figure 36.3 Subprocesses of cargo throughput, commodity flow point of view

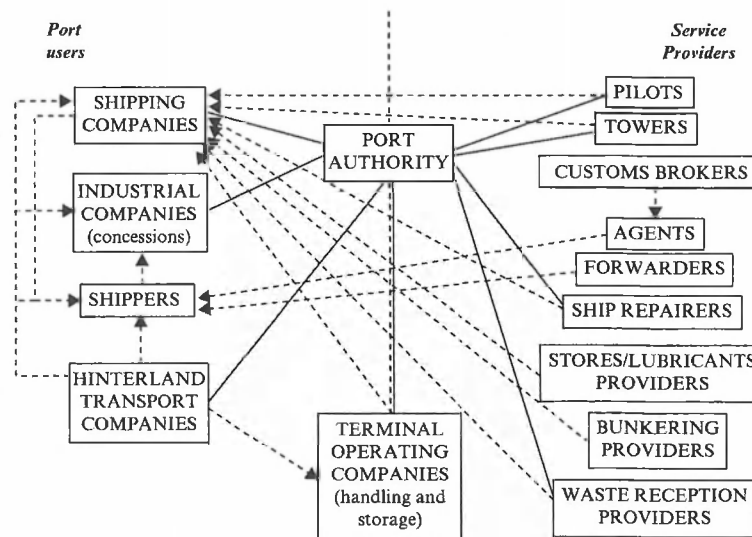
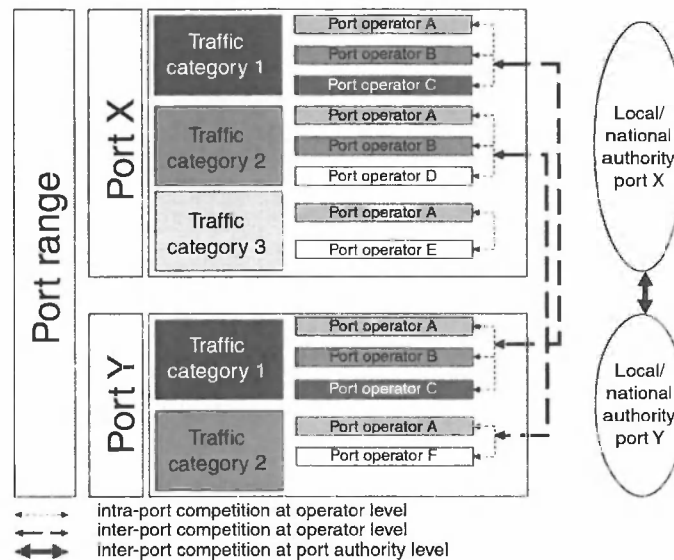


Figure 36.4 Subprocesses of cargo throughput, port authority point of view

a heterogeneous group that includes pilotage and towage services, agents, forwarders, ship repairers, suppliers of food and spare parts, waste reception facilities and bunkering firms. Special cases are the stevedores, who are increasingly evolving towards terminal operating companies. They provide services (transshipment, storage, stripping, stuffing and so forth) to shipping companies and shippers for which they receive payment. At the same time, they pay the port authorities for a concession. Links with the port authority in terms of concession or permissions to operate are marked with full lines, whereas dotted arrows mark links between parties without port authority involvement.



Source: Based on Van de Voorde and Winkelmanns (2002, p.12).

Figure 36.5 Different levels of port competition within a port range

Both figures illustrate how the large number of parties involved in port activities, each of which has its own objectives, gives rise to a strong heterogeneity, both within the port and between ports. The major challenge is to organize this complex playing field such that the market forces can guarantee an unhindered flow of goods through the logistics chain in the most efficient way. The multi-product multi-actor character of the modern ports requires a dynamic view on port competition.

Traditionally, port competition is regarded as competition between and within ports. Verhoeff (1981) considers four levels which result in different potential markets for different types of port services:

- competition between port undertakings focuses on activities of specific service providers in a port such as towing, stevedoring, warehousing and so forth;
- competition between ports for traffic in a certain range;
- competition between port clusters which are groups of ports in each other's vicinity with common geographical characteristics;
- competition between port ranges which group ports located along the same coastline or with a large common hinterland.

Van de Voorde and Winkelmanns (2002) consider three levels or types of port competition, which are illustrated in Figure 36.5.

The first level is the intra-port competition at operator level between operators within a given port with regard to a specific traffic category. The inter-port competition at operator level occurs between operators from different ports mainly within the same range and serving more or less the same hinterland. And finally, there is the inter-port

competition at port authority level focusing on the utility mission of seaports. There is an additional, higher level of port competition, which is the one of the logistics chains. Ports will try to become a node in the most successful logistics chains and take advantage of the cost effectiveness of this chain to increase their market share and improve their economic impact. It is especially at this level that modern port competition plays.

PORT ORGANIZATION AND PORT EFFICIENCY

Over the past decades, evolution in port privatization had as its main target to stimulate competition and improve efficiency at the different levels. All ports have, in the course of time, undergone a profound evolution, physically and in terms of organization. These changes have come in response to new needs and new demands from customers, that is, shipping companies and terminal operators, but also as a consequence of a more general privatization and deregulation wave.

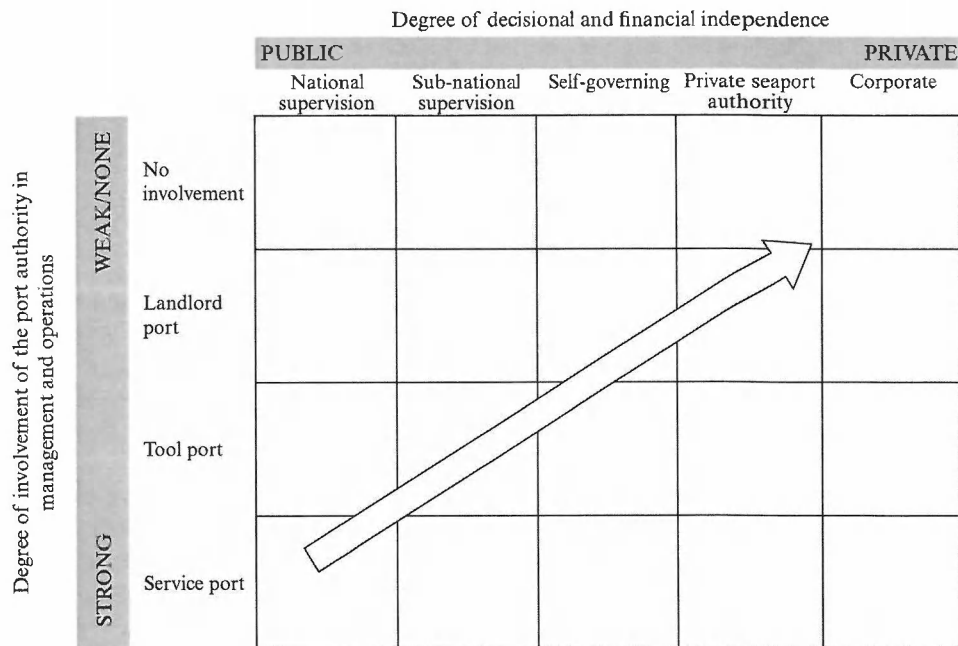
The involvement of national or regional governments in the port sector has a long tradition and has always been justified by strategic, social and/or economic interests. Strategically countries are eager to control their gateways to the rest of the world. Historically, ports played a crucial role in the defence, safety and development of a region. They were indispensable for the conquest and exploration of new regions and were links to large trading areas. Even today, ports are crucial for the development of a region as is illustrated clearly by the situation of the landlocked developing countries. Their lack of territorial access to the sea and high transit costs continue to impose serious constraints on their overall socioeconomic development.

From an economic point of view, port regulation was mainly justified by the argument that the port industry had the characteristics of a natural monopoly with large sunk infrastructure costs and economies of scale. However, following the evolution of other utility industries, the possibility of unbundling port services increases competition in the port industry and changes the role of the regulator.

The major concern is the coordination of all the privatized port activities in such a way that the goods move smoothly from the ship to the hinterland and vice versa. This can materialize by a better organizational structure which will improve the efficiency of the port and by the control of different stages of the logistics chain. The latter often materialises by forms of cooperation between shipping companies, stevedores, port authorities and logistics services providers, impacting the market structure and the competition game.

The main dimensions for distinguishing between port organizational types are the degree of decisional and financial independence on the one hand and the degree of involvement of the port authority in the commercial management and day-to-day operations on the other (Bichou and Gray, 2005; Op de Beeck, 1999, pp. 35–48). Decisional and financial independence of the seaport authority institution are a function of the degree of public involvement, which corresponds to the institutional setting in which the port is embedded. Op de Beeck (1999, pp. 11–23 and 50–73) considers a number of alternatives for each of the two dimensions which are represented in Figure 36.6.

With respect to decisional and financial independence, five port organizational types are distinguished:



Source: Based on Op de Beeck (1999, pp. 11–23 and 50–73).

Figure 36.6 Seaport organization matrix

- Seaports under direct national jurisdiction are incorporated into a national government department. The seaport is often used as an instrument to generate a more general national policy objective. Profits are not necessarily reinvested in port infra- and superstructure but can be retained to cross-subsidise other public sectors. Losses will be borne by the government.
- Seaports under sub-national jurisdiction are fully dependent on a lower-level government which can be at a state, provincial or local level.
- In self-governing public seaports, the port authorities have some power to regulate, control and improve the seaport's operations, development and financial undertakings. Their independence from the public authorities is reflected in the fact that the seaport commissioners and director are appointed rather than elected. In order for it to be 'autonomous', the seaport authority should at least be able to regulate labor in the port.
- Shares are found in corporate seaports which allow limited liability and easy transfer of ownership. Shares can be owned by the government and/or the private sector. Major goals of corporate seaports are of a commercial nature, although in the case of a government corporation socio-economic interests can also impact the management and decision process.
- Fully privately owned and operated non-corporate seaports are totally independent from any public government. They are subordinate to laws on private enterprises. They often are a subsidiary of an industrial undertaking. Such a

seaport may also be part of a company exploiting a complementary mode of transport.

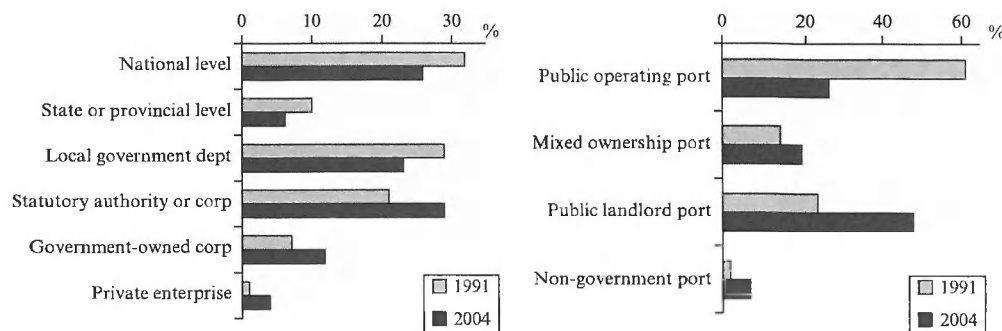
With respect to the degree of involvement of the port authority in the commercial management and day-to-day operations of a port, especially in the cargo-handling activities, four port organizational types are distinguished:

- A service port owns and operates all the port assets, infrastructure as well as superstructure and is traditionally fully public. The port authority takes care of all the operations, although it is frequently the case that the cargo handling activities are managed and organized by a separate public entity.
- A tool port also owns the port infrastructure and superstructure, but the actual cargo handling is executed by private cargo-handling companies
- In a landlord port there is no intervention of the port authorities in the organization and management of the cargo-handling operations. The port authority is responsible for the infrastructure and acts as a regulator. The infrastructure is leased to private companies or industries which will provide and maintain the necessary superstructure. The lease can take different forms (Asian Development Bank, 2000, p. 20). A land lease grants the concessionary the right to use and operate a port area on payment of a fixed amount. In the case of a lease to operate and manage, the management and operation of a seaport site, its equipment and administration are transferred to a management company, against a share of cargo-handling charges. A lease to build makes the lessee financially responsible for all infra- and superstructure improvements and constructions, transferring these to the lessor, usually the port authority, upon termination of the lease contract, but allowing the lessee to earn a toll on facilities constructed.
- In a fully privatized port there is no direct government interference, although there can be an official port regulator to control monopolistic behavior.

From the late 1980s on there was a wave of port reforms towards a larger involvement of the private sector in the financing and management of ports and port operations. In Figure 36.6 this means a movement away from the bottom left corner in the direction of the upper right-hand corner. This evolution is illustrated by Figure 36.7 which gives the evolution of the share of different corporate and ownership structures for 97 of the major world container ports between 1991 and 2004 (Cheon et al., 2009). The authors use a slightly different classification, but this has no impact on the general tendency towards less government involvement.

Suykens and Van de Voorde (1998, p. 254) summarize a number of socioeconomic and technological pressures which induced governments to introduce organizational change to seaports. Society in general, and therefore also transportation as a derived economic activity, has been tending towards less public involvement in operational matters. This trend was strengthened by, for example, European transport policy, which aimed at eliminating state aid that distorts competition, including in the domain of transportation. Technological changes partly imposed by the rise of a global economy, forced container-handling activities to increase productivity in order to remain competitive.

Specific reasons for a shift away from predominant public involvement in container-



Source: Based on Cheon et al. (2009).

Figure 36.7 Corporate and ownership structure of major world container ports, 1991–2004

handling operations are that public port operators were usually barely cost-effective, that they relied on old technologies, responded hardly at all to customer requirements, provided only limited services, offered limited capacity and exhibited little labour discipline (Asian Development Bank, 2000). The ultimate goal of this deregulation wave was to stimulate competition in order to improve the productivity and efficiency in the port sector.

In a survey of empirical work on efficiency measurement in the port industry Gonzalez and Trujillo (2007, p. 28) come to the conclusion that ‘there is no agreement on whether shifting from a public to a private property system improves efficiency. . . However, the evidence shows that changes in regulation, introduced by port reforms, have had positive effects on all activities and countries analyzed.’

Although a lot of the empirical work takes into account the multi-product nature of port activity, the links with the logistics chain are generally neglected. A port can be highly cost-effective in the cargo-handling from ship to quay, but can lose all its advantages when the hinterland connections are poor.

COOPERATION, MERGERS AND CONCENTRATION

As ports are links in logistics chains, it does not always make sense to consider the productivity of a terminal or port as an isolated entity. Resolving a pressure point in one link may simply transfer the problem to another. In this manner, productivity improvement in one section of the logistics process can actually increase cost elsewhere (Valleri and Van de Voorde, 1996, p. 127). Increasing the capacity of vessels, for example, will spread the cost of sailing over more containers, but at the same time it requires a greater processing capacity and thus the deployment of more substantial means at the terminal. Otherwise, the bottleneck will simply be shifted from the maritime route to the port and hinterland section of the transport chain.

The various port actors usually manage one or several links in the logistics process. The fact that goods-handlers, shipping companies and port authorities tend to hold

different views on productivity is due to the specific inputs and outputs in their part of that process. However, it is not always possible to ascertain unequivocally for each actor what precisely their input and output status is, as there are inevitably company-specific factors to take into account. A terminal operator, for example, may service several shipping companies. Conversely, a shipping company may call at different terminals in the same port.

Shipping companies are large, strategically important customers of seaports. On the one hand they attract traffic and industrial activity to the port, while on the other they are attracted by such industrial activity. There have been also substantial scale increases on the part of shipping companies in recent times. Economies of scale have been achieved internally by operating larger vessels, and externally through horizontal cooperation and/or mergers and takeovers. Additionally, shipping companies have set their sights on terminal operators and inland transport services, as operations are increasingly approached from the perspective of complex logistics chains, whereby each link must contribute to the constant optimisation of the entire chain. This has altered the competitive balance in the market, as shipping companies have gained in power through their overall control of logistics chains.

In the case where a shipping company, through vertical integration, has gained control of the container terminal where its vessels are loaded and unloaded, that company will, of course, find it relatively easy to determine in which links of the chain the greatest cost savings may be achieved by distributing resources differently so that the productivity level of the different links is modified. What is then required is for the various links to be geared to one another in such a way that productivity gains are maximized in links where the greatest cost reduction is achieved. This way, the shipping company is able to increase the productivity of the chain as a whole. In the case where a shipping company has not achieved vertical control, the impact of each action depends on the prevailing relationship between shipping lines and terminal operators.

Within the ports themselves, there has been an important structural evolution: traditional stevedoring firms are increasingly developing into more complex terminal operating companies, as a lack of working capital induces mergers, takeovers and externally funded expansion projects. External capital is sometimes also provided by shipping companies. Port authorities, for their part, initially chose to watch rather passively from the sideline as this evolution unfolded but are getting more actively involved in the cooperation and concentration evolution.

Quite enlightening in this respect is the work of Heaver et al. (2001), in which the various forms of cooperation and concentration in the maritime sector are examined. The observed configuration still exists today, with some parties engaging more actively than others in the search for partnerships. Table 36.2 provides an overview of the various forms of cooperation that characterize the sector and in which shipping companies, terminal operators and port authorities can be involved. The diagonal blocks are mainly forms of horizontal cooperation, whereas the off-diagonal blocks contain forms of vertical cooperation.

The reasons for respectively horizontal cooperation and vertical cooperation are often quite different. In the case of horizontal cooperation, the companies' optimal shape depends on the benefits of scale and scope. These are present for as long as large-scale production and service provision results in economies. Such scale and scope effects

Table 36.2 Strategic cooperation in the maritime sector (with examples)

Market players	Shipping companies	Stevedores	Port authorities	Hinterland transport operators
Shipping companies	<ul style="list-style-type: none"> * Vessel sharing agreements (e.g. Maersk Line and CMA-CGM on its WestMed service as from March 2009) * Joint-ventures (e.g. Alhmark Lines and Svenska Orient Linien under the name SOL Alhmark Lines AB to run a multipurpose operation between Sweden/Finland and Western Mediterranean ports) * Consortia (e.g. North Europe-South Africa SAECS consortium, comprising of vessel operators Deutsche Afrika-Linien (DAL), Maersk Line, MOL and Safmarine) * Alliances (e.g. Grand Alliance: Hapag Lloyd, NYK and OOCL) * Mergers/acquisitions (e.g. Qatar Shipping Company and Qatar Navigation as announced May 2009) * * Conferences (e.g. ESPMC-WITASS Conference: Container Cargo Lines, CMA CGM, CSAV, Hapag-Lloyd, Hamburg Süd and 'K' Line, liquidated October 2008) 			
Stevedores	<ul style="list-style-type: none"> * Joint-ventures (e.g. CHKY Alliance carriers (Coscon, Hanjin, 'K' Line, Yang Ming) and ECT (Hutchison) at Rotterdam Euromax from September 2008) * Dedicated terminals (e.g. MSC in Bremerhaven) * Share (e.g. Tangier Med Gate: 50% Eurogate Tanger (itself 20% CoMaNav, 40% Contship Italia, 40% Eurogate) and 20% CMA CGM, 10% CMA CGM subsidiary CoMaNav, as well as 20% MSC from May 2008) * Consortia (e.g. Pacific International Lines (PIL) and Container and Terminal Services (CTS) at Chittagong Container Terminal (CCT) from July 2008) 	<ul style="list-style-type: none"> * Mergers/acquisitions (e.g. MSC 51% from NYK Ceres Terminals in New Orleans Terminals) * Joint-venture (e.g. National Container Company (NCC, 80%) and Eurogate (20%) at Baltic Container Terminal, open 2009) 		

Table 36.2 (continued)

Market players	Shipping companies	Stevedores	Port authorities	Hinterland transport operators
Port authorities	Concessions for dedicated terminals (e.g. APM Terminals at Lazaro Cardenas from 2008).	* Concessions (e.g. Antwerp Deurganckdock by PSA and DP World since 2004) * Joint-ventures (e.g. Odessa Port Authority and Hamburg Port Consultants at Odessa)	Alliances (e.g. Port of Rotterdam and Humber Trade Zone since 2004)	
Hinterland transport operators	CMA-CGM operating its rail arm CMA-CGM Rail, operating block trains from various ports	DP World owning the Germansheim inland rail and barge terminal	Port of Rotterdam being shareholder in Betuweline operator Keyrail	SNCF buying over road operator Geodis

Source: Own processing of data from various shipping companies, stevedores and port authorities; based on Heaver et al. (2001).

Table 36.3 Top 8 global terminal operators: financial results and market share (2007)

	Turnover	EBITDA	Throughput	
	million USD	million USD	TEU ^a	share
HPH	4864	1649	66.3	14
PSA	3009	1462	58.9	12
DP World	2731	1100	43.3	9
APM Terminals	2519	404	31.4	6
HHLA	1857	597	7.2	1
ICTSI	361	118	3	1
APL Terminals	609	113	4.5	1
Cosco Pacific	51	29	39.8	8
World total			485	

Notes: ^a TEU figures based on capital shares.

Source: Containerisation International.

are instrumental to companies' merger and diversification strategies. They also affect pricing, entry and exit behavior, and whether or not a long-term sustainability of the competitive advantage is feasible.

The question arises whether recent horizontal mergers in the maritime and port industry have confirmed the existence of economies of scale and scope. The past decade saw two evolutions: on the one hand, shipping companies have become ever larger through mergers, takeovers and organic growth, which has led to greater concentration; on the other, there has been closer cooperation through strategic alliances. In both cases, the purpose was clearly to benefit optimally from economies of scale and scope within the boundaries set by antitrust legislation.

Table 36.3 shows that in the terminal operating business, merging groups have been more successful in increasing market share and obtaining good financial results. The top company in 2007, HPH, realised a market share of 14 percent with a worldwide throughput of more than 66 million TEU,³ on a total throughput by all operators of 485 million TEU. The top eight companies together represent 52 percent of the worldwide market. However, the picture is mixed depending on the company considered. It is striking that HPH has obtained a turnover which is relatively a lot higher than that of PSA, whereas its throughput is not that different. The difference in EBITDA is even smaller. A similar difference between turnover and EBITDA balance can be found between DP World and APM Terminals.

In the case of vertical cooperation, the central question is how the vertical chain can be organized in the most efficient way. As Table 36.2 clearly demonstrates, the maritime and port industry is characterized by a variety of forms of vertical cooperation and integration, ranging from controlled market transactions to full vertical integration. The impact of vertical integration on competition has been the subject of much industrial economic research, and it presents a constant challenge to the regulating authorities. As far as the maritime and port industry is concerned, insights into the objectives and outcomes of horizontal and vertical cooperation are still rather limited. There is a need for further

Table 36.4 Overview of fleet sizes and vessels ordered on May 30, 2008, and October 09, 2009

Owner	Operational fleet				Orders			
	Ships		TEU		Ships		TEU	
	30/5/08	9/10/09	30/5/08	9/10/09	30/5/08	9/10/09	30/5/08	9/10/09
Maersk Line	550	538	2006	2028	71	66	325	357
MSC	396	403	1289	1508	54	49	578	590
CMA CGM	392	358	936	1026	76	59	631	499
Evergreen	179	156	628	575	10	0	109	0
APL	127	138	428	547	33	20	234	143
Hapag-Lloyd	139	115	505	468	14	14	123	123
Coscon	146	144	454	466	73	56	528	425
China Shipping	133	140	421	461	34	16	234	144
NYK	121	109	410	414	38	18	213	107
Hanjin	87	92	365	411	40	30	315	270

Source: DynaLiners.

empirical research into, among other things, the existence of economies of scale and scope.

FUTURE MARKET POWER AND COMPETITION IN THE PORT SECTOR

In order to understand how port competition may evolve further, greater insight is required into the maritime context as a whole. In which direction will the maritime sector move in the foreseeable future? Which position should port authorities adopt? Will players presently acting within the port perimeter, such as terminal operating companies, be able to survive independently? These are crucially important questions to the sector and its players, yet all are shrouded in uncertainty. Moreover, the market is not static, but extremely dynamic. One may therefore reasonably assume that each market player will try to anticipate on likely strategic moves by other players.

Shipping Companies: Further Reorganization, Mergers and Scale Increases?

Thus far, there has been a strong integration movement mainly in the container business. Yet, precisely in this dynamic sub-sector, that one can make a peculiar observation: despite the fact that shipping companies have been complaining for some time about relatively low freight rates due to overcapacity, they continue to invest steadily in additional capacity. Table 36.4 provides an overview for May 2008 of the operational fleets of and vessel orders placed by the leading shipping companies.

The underlying strategy of these shipping companies is clear to see: in response to already low freight rates, they are attempting to deploy additional capacity at a lower

operational cost per slot. Moreover, they consider a mixed fleet as a means of spreading risks. Additional cost control can be achieved through mergers and takeovers, and the entailed capacity reduction. Strategic and financial considerations by the holdings that control the shipping companies will keep capacity further in check, through strategic alliances, new partnerships, the rerouting of vessels. These evolutions may/will result in shifts in terms of direct port calls, which will in turn affect the volume of freight to be carried to and from the hinterland. On the other hand, it is perfectly conceivable that a port may compensate largely or even wholly for a drop in direct port calls through additional (maritime) feeder services.

This evolution will have important consequences for the rest of the maritime logistics chain, including ports and their hinterland services. In the short to medium term, the pressure of such reorganizations will result in a profound reshuffle of services offered. New alliances will be formed, leading to further mergers and takeovers. On the side of the shipping companies, the market will stabilize, though there will of course be fewer players following the inevitable rationalization and concentration drive.⁴

In the very short run, overcapacity mainly due to falling demand as a consequence of for instance an economic and/or financial crisis, leads to the cancellation or slowdown of orderings where contractually possible, and to modified sailing schemes. In the cases where none of these are possible, for whatever contractual reason, shipping companies keep on operating their regular sailing schemes at a loss if they have enough back-up cash. But for none of the companies, such situation is sustainable in the longer run.

The further increases in vessel sizes may also have a profound impact in the longer-run evolution. Whether there will be a further evolution towards ships of 10 000 to 12 000 TEU, or even up to Malaccamax-sized vessels of 18 000 TEU will depend on the context, but certainly there is no denying that the new generation of Maersk vessels, with a capacity of over 13 500 TEU, represent another step in that direction. The question arises how far one can/should go in order to achieve economies of scale and scope. For example, in the deployment of 8000-plus TEU vessels, the number of calls is restricted to main ports handling large volumes and serving as 'hubs'. When the additional handling costs in the hub-and-spoke system become too large, one may reasonably assume that it will then become interesting for non-main-ports to attract smaller ships, for example, in the order of 1500 to 2000 TEU, offering direct origin-to-destination services. However, as Hopman and Nienhuis (2009) indicate one should anticipate on further developments in the field of automated throughput, in combination with the introduction of tracking and tracing of containers. If throughput is fully automated, the capital costs increase, while the operational costs become negligible. Larger volumes will result in a lower average cost which will be an incentive for organizing hub-and-spoke port systems involving increasingly large vessels.

The present state of science suggests that increasing vessel size will lead to a different cost function, among other things because of the necessity of a second engine. Moreover, shipping companies have had some unpleasant experiences with scale increases in tanker shipping, including the imposition of higher port dues. The expectation is therefore that they will not allow themselves to become captured by a port where port authorities are all too aware that the shipowners' price elasticity is extremely low. Finally, economies of scale realised at sea may be lost through higher terminal and hinterland transportation costs due to the greater freight volumes involved.

Table 36.5 Recent and planned expansion of container capacity in the Hamburg – Le Havre range

Port	Terminal	Free capacity / Planned increases
Amsterdam	no structurally idle capacity, no specific plans	
Antwerpen	Deurganckdok terminals	2009: 4 000 000 TEU idle
	Saeftinghedok terminals?	2015? 7 000 000 TEU additional
Bremen	CT 4	2009: 1 900 000 TEU idle
Hamburg	Eurogate Container Terminal	2010: 1 900 000 TEU additional
	Hamburg CTH	
	HHLA Container Terminal	2010: 2 400 000 TEU additional
	Burchardkai CTB	
	HHLA Container Terminal	2010: 600 000 TEU additional
	Altenwerder CTA	
	HHLA Container Terminal	2010: 1 050 000 TEU additional
	Tollerort GmbH CTT	
Le Havre	Port 2000	Phase 2: 2 quay walls in a tidal terminal (2008–2009), 500 000 TEU increase Phase 3: 6 quay walls in a tidal terminal (?), 500 000 TEU increase
Rotterdam	EUROMAX terminal	2009: 2 300 000 TEU
	Maasvlakte 2	2014: 17 000 000 TEU
Vlissingen	Westerschelde Container Terminal	2 000 000 TEU, no specified date
Wilhelmshaven	Jadeweserport	2009: 2 900 000 TEU additional
Zeebrugge	no structurally idle capacity, no concrete plans	

Source: Based on data from various port authorities.

Additional Capacity and Scale Increases at Landside

The economic benefits shipping companies seek through far-reaching scale increases and the corresponding cost reduction must not be wasted through bottlenecks on the quay, in the terminal or during connecting in-land transport. Port authorities and terminal handling companies are well aware of this and try to maintain sufficient available capacity.

Many Northern European ports intend to further expand in the short to medium term, albeit almost entirely in terms of container throughput capacity. Table 36.5 provides an overview of these expansion plans. It is not always clear whether the capacity expansion is motivated to relieve congestion, to cope with increasing demand, and/or to pre-empt expansion by competing ports. The result is quite predictable: any substantial growth in capacity will further aggravate the overcapacity in the global market and at certain European terminals, where operational quays are already lying idle.⁵

Besides these plans for additional capacity, there is also the issue of the organization of freight handling at terminals. Here, too, there is a concentration movement, inspired in part by the growing need for investment capital, which the original owners are often no longer able to supply themselves. This concentration movement has also created a buffer against any attempt at vertical integration on the initiative of the shipping companies.

Obviously, the prospect of even further concentration among terminal operators poses an economic threat to shipping companies, as reduced competition may lead to lower productivity growth, longer vessel-handling times and, perhaps most importantly of all, higher handling rates. The latter evolution is primarily a consequence of the fact that shipping companies no longer have a choice among any number of rival terminal operators, but are increasingly dependent upon large players who operate in different locations and are therefore able to negotiate longer-term package deals for services in those different ports. This way, the focus of port competition is gradually shifting from the level of individual port authorities to that of terminal operators, that is, large groups that are able to offer regional networks of services.

Shipping companies will not be prepared to continue to undergo this evolution. As their relative market power is at stake, it seems logical that they should put greater effort into acquiring so-called dedicated terminals, be it under joint ventures with locally active terminal operators or otherwise. This needs not be detrimental to the port authorities' cause, as it will at least make shipping companies less footloose, in the sense that a long-term relationship is forged that makes them less likely to relocate (Heaver et al., 2001). In the short term, such dedicated terminals may however lead to lower utilization rates of available capacity.

Scale increases and expanding ports have also consequences for the hinterland connections. Especially in densely populated areas where the hinterland traffic interacts with other freight and passenger traffic, the scale advantages generated at the maritime side might get fully lost due to congested or inappropriate hinterland connections. As a consequence a port with good and reliable hinterland connections will have a strong competitive advantage.

A New Role for the Regulator and the Port Authorities?

The involvement of port authorities in commercial activities within the logistics chain is declining. Consequently, the market power of those port authorities and, as the case may be, the public authorities that control them is also decreasing.⁶ In other words, managerial control over the maritime logistics chain now lies only partly with the ports and the undertakings located in those ports.

According to Estache and Trujillo (2009), the question is not so much whether the port authorities will survive, but rather how views on the management of ports will develop. There are, after all, various new reasons why port authorities may continue to play a role, even if it may be a very different one from today's. They will certainly continue to play an important facilitating role, including in relation to infrastructure and intermodal integration, and perhaps also in respect of superstructure.

In the current negotiation game between shipping companies and terminal operators, those same port authorities do, however, hold a strong trump card: they have the power to grant concessions and to determine their duration. Once a long-term concession has been awarded, they lose much of their market power, though. It has, for example, hitherto proven very hard to penalize concession holders who fail to achieve the objectives of their business plan. Consequently, there is an economic incentive for port authorities to award long-term concessions (for example, 30 years), but in conjunction with mandatory interim objectives agreed upon beforehand with the concession holder.⁷

Otherwise, the negotiating strength of port authorities has become quite limited, certainly when compared to that of the major shipping companies, who often join forces in strategic alliances, and terminal operators, among whom the past decade has seen a concentration trend towards a limited number of global players. If port authorities wish to enhance their market power, they must proceed proactively and cooperate intensely to attain common or parallel goals. This may be achieved through cross participation in one another's capital. From that moment, every tonne or TEU that is loaded or unloaded generates profit for each participating port authority. Ruinous competition between port authorities can thus be avoided. Moreover, the negotiating strength of those port authorities will be significantly enhanced, not only because cooperation implies that they are effectively a larger player, but also because it will be much harder for shipping companies and terminal operators to play port authorities off against one another. Furthermore, such cooperation would undoubtedly result in less excess capacity.

However, the concentration waves in the port and shipping sector and the reduced power of the port authorities bring with it the danger of limited competition which requires still the intervention of a regulator. Economists generally distinguish between economic and social regulation. The former is the control of prices, service quality, and entry conditions in specific sectors. The latter is the regulation of risks to health, safety, and the environment.

The role of the regulator in the port sector is clearly summarised in the Port Reform Toolkit of the World Bank (2001, pp.267–8): 'Ensuring the efficient and competitive functioning of a port in a context of limited or weak competition is the purpose of economic regulation of ports'. Although this is a clear formulation, in practice the story is more complicated due to the different levels at which competition plays in the port sector. Each level may require a specific regulatory mechanism. The competition between terminal operating companies within a port plays mainly at the level of the concession policy which has to be fair, transparent and open towards all the companies. Once the concession is granted and when there is for instance only one single terminal operating company, there should be control mechanisms to avoid the abuse of market power of the natural monopolists. Traditionally the economic regulatory mechanisms are designed to reduce, remove or compensate for barriers to entry, to regulate tariffs and prices, and to guarantee a good quality of service.

Europe has a relatively long tradition of public regulation and intervention in seaports. Nevertheless, it is surprising that the Treaty of Rome, establishing the European Economic Community, makes no mention of seaports. However, according to a subsequent judgment by the European Court of Justice (April 4, 1974) in a dispute between the European Commission and the French government, the general stipulations of the Treaty are applicable to maritime transport. Consequently, many port-related issues (for example, rules of competition, subsidising) may be approached from the perspective of these general stipulations. With the 1992 reform of the Treaty, with a view to the creation of the European single market, it was stipulated that maritime transport was subject to the terms of the Treaty.

In addition, seaport policy is also a function of industrial policy. Whatever the European Commission decides in that field has direct consequences for port policy (for example, energy policy, agricultural policy, social policy, taxation, transport

policy, maritime policy). In recent time, the European Commission has devoted much closer attention to transport in general and seaports in particular. On December, 10, 1997, the European Commission published a 'Green Paper on Seaports and Maritime Infrastructure'. The purpose was to launch a debate on seaports and their efficiency, their integration into multimodal networks and the rules of competition that should apply.

In early 2001, the European Commission issued a draft guideline concerning access to the market of port services. The purpose was to ensure the right to free entrepreneurship in the port services sector, in accordance with the basic treaties of the European Union. However, in November 2003, the European Parliament rejected the proposed compromise. In 2004, an amended guideline was put forward that strove to regulate goods-handling, towage, pilotage, mooring and unmooring. But again, the proposal was rejected. No subsequent, explicit action was taken, apart from a wide-ranging stakeholder consultation, six workshops which the Commission held and a communication from the Commission (Commission of the European Communities, 2007) which gives an overview of planned initiatives and which seeks to promote greater dialogue between all stakeholders.

CONCLUSION

The port sector has been subject to a wave of privatization, deregulation and re-organization with consequences for competition within as well as outside the sector. In recent years, it had to face increased cooperation and merger activities driven by the search for scale economies and control over the logistics chain.

The largest players, that is, the shipping companies, drive competition and they benefit maximally from evolutions in global trade. Within the shipping sector, there has been a spectacular scale increase and a far-reaching concentration movement. A similar concentration trend exists among terminal operating companies, where one can witness the entry of foreign capital in what were originally local or national companies. This implies greater market power for terminal operators because shipping companies now face global terminal operators who are operating in origin as well as destination ports.

Next to horizontal integration, a trend of vertical cooperation and merger activity is clearly present. Shipping companies are participating strongly in port-related activities in various ways, ranging from contractual agreements to full integration. The resulting concentration may entail abuses of market power, which may hamper and counteract the advantages of the deregulation process. As shipping companies and terminal operating companies continue to grow in size, the relative market power of port authorities is declining. Their remaining tools are the provision of freight-handling capacity, the concession policy and the port dues. However, they can take a more active position in the concentration movement by joining forces in strategic alliances of their own.

The concentration waves in the port and shipping sector and the reduced power of the port authorities bring with it the danger of limited competition which requires still the intervention of a regulator to reduce, remove or compensate for barriers to entry, to regulate tariffs and prices where necessary, and to guarantee a good quality of service.

NOTES

1. The hinterland of a port consists of the areas from which cargo originates, as well as the areas where cargo moving through the port is destined. A port cluster groups ports in each other's vicinity with common geographical characteristics. A port range is a group of ports located along the same coastline or with a large common hinterland.
2. Among the largest European inland ports are Duisburg (110 million tons in 2007), Paris (22 million tons), Liège (21.2 million tons) and Cologne (11.1 mn tons).
3. TEU is the abbreviation for 'twenty-foot equivalent unit'. A standard forty-foot ($40 \times 8 \times 8$ feet) container equals two TEU (each $20 \times 8 \times 8$ feet).
4. As far as the forming of alliances is concerned, there is a certain parallel to be drawn with the air transport industry. The main difference lies in the fact that, in the airline business, all major carriers belong to alliances and only the smaller companies have stayed on the sidelines, while in the maritime sector, some of the large companies have not joined an alliance (see for example MSC and CMA-CGM).
5. Typical examples are Amsterdam, Cagliari, Zeebrugge and Sines.
6. The question of where market power actually resides cannot be answered unequivocally, as the situation varies from port to port. In the case of such mainports as Rotterdam and Antwerp, it is already the case that terminals are given in concession, albeit mostly under a joint venture between a shipping company and a terminal operator. From this, we draw the following conclusions:
 - a. The shipping companies and terminal operators involved appear to adhere to the saying 'If you can't beat them, join them'. Rather than engaging in an all-consuming competitive struggle, they prefer to collaborate. The immediate effect is, however, a new decline in the relative power of port and public authorities;
 - b. Revenues from a dedicated terminal may be higher, but now they need to be divided. In the case of a 50/50 terminal, the operator must, unlike in the past, give up 50 percent of profits to the shipping company. On the other hand, terminal operators thus acquire greater certainty that freight flows will be retained or may even increase in the future
7. The proposed strategy is in any case purer than that previously applied by some port authorities in an effort to enhance their competitive position. A case in point was the move by the port authority of Rotterdam in 1999 to acquire a 35 percent stake in terminal operator ECT. Such action, be it temporary or on a more permanent basis, raises the specter of conflict of interest, not in the least because the port authority continues to hold power of decision when it comes to the granting of concessions.

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