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Study on the Port of Rotterdam – Market Definition and Market Power

Final report

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Preface

During this project we were provided with considerable assistance from a number of sources. We would like to thank all that have participated in the survey and in our interviews. We highly appreciate the time and effort spent by HbR to assist with this project. Finally, we would like to thank the project team at the Netherlands Competition Authority for their helpful feedback.

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1 Executive summary

1.1 Background

The Port of Rotterdam is Europe's largest container port: compared to the next largest European port, Antwerp, more than twice the weight of cargo is passed through Rotterdam. The port is important for European export and import activities and it contributes significantly to economic activity in the Netherlands.

In January 2004, the Rotterdam Municipal Port Management became a public limited liability company, Havenbedrijf Rotterdam N.V. (in the following referred to as HbR). The newly founded company remains totally in public ownership. The Dutch Ministries of Economic Affairs and Transport, Public Works and Water Management have asked the Nederlandse Mededingingsautoriteit (NMa) to investigate whether HbR has market power with regard to its economic activities. The NMa conducted a preliminary study determining the economic activities of HbR and formulating an analytical framework to guide the definition of the relevant markets. The NMa study found two main economic activities undertaken by HbR: the renting out of parcels of land and the supply of port infrastructure. The NMa then commissioned CRA to undertake this study, in order to provide further information and analysis that would put the NMa in a position to determine the relevant markets with regard to these economic activities and to assess the position of HbR in these markets.

1.2 Overview

The definition of the "relevant market" is an intermediate step in order to assess market power. It is a tool for aiding the competitive analysis by identifying those substitute services that provide a significant competitive constraint for the services offered by HbR. Market power is usually defined as the ability to price sustainably above some measure of cost. However, in investigations that involve market definition and market power, competition authorities often rely on techniques that do not apply a direct measure of costs of the firms investigated. We use these techniques in this report, adapted to the specific context of the port authority's services analysed here. The various complementary techniques employed include benchmarking, cargo flow analysis (analysis of seaside access, origin and destinations, modes of hinterland transportation, etc.), analysis of switching in response to hypothetical price increases, analysis of past switching in response to price changes, analysis of capacity constraints and consideration of other qualitative evidence. Our analysis shows that there is an important relationship between the renting out of land and the provision of infrastructure. Those tenants that are bound to the port (i.e. those who could not provide their services to the same customers from a non-port location elsewhere) either offer services for which there is a demand derived from the general level of cargo flows in the port, such as ship maintenance,

or services directly associated with a particular cargo type, for example dry bulk terminal handling. To illustrate the link between the market power with respect to the provision of infrastructure and the renting out of land, consider a port that has a monopoly position for a specific cargo type. Generally, port users need to buy at least two complementary services when using the port: access to the infrastructure (which is paid for through the harbour dues) and stevedoring services (paid directly to the terminal operator, who in turn pays the port for the use of infrastructure – i.e. lease prices). A port authority that controls land and access rights can, in principle, extract monopoly rents by setting a high lease price, high harbour dues or a combination of both. Thus a finding of market power for the different cargo types would suggest that there is a potential to exploit market power on the leasing market too. For port-bound tenants access to the port users, which face a port with market power, can only be gained through the port. Thus, we can derive market power for tenants from the market power for the different cargo types.

We also considered a number of studies to compare lease related prices at various ports. It turns out that all studies consistently find that Rotterdam charges more than what is asked for comparable sites at other ports in the Hamburg-Le Havre range. Thus, higher harbour dues in Rotterdam cannot be generally explained by a pricing structure that would involve very low lease related prices.

Although we conceptually find that there may be market power with regard to lease prices for port-bound, it is also important to note that it is unlikely that there will be any major new tenants locating at the port in the near future due to space constraints (the main reason for the planned expansion of Maasvlakte II). For 98% of the surface occupied by existing tenants the port is contractually bound with regard to its price setting.

HbR provides infrastructure to port users that carry different cargo types. We identify the provision of infrastructure to each of ten different cargo types as relevant product markets. We offer a number of arguments for this choice: (1) Although HbR currently applies the same tariffs to some different cargo types, it can differentiate prices by cargo type. Indeed, HbR is currently considering a revised pricing structure. (2) Port authorities have limited possibilities to differentiate by the exact origin and destination of cargo that is handled on vessels calling at their port. Most importantly (3) for most cargo types a large number of the competitive constraints are very similar, although there are some relevant differences that we take into account (e.g. the number of substitute ports depends on the vessel size). Finally, (4) with minor variations, port authorities themselves use the ten cargo types as the main level of disaggregation and most available statistics are based on this level.

We therefore analyse geographic markets and market power on the level of cargo types. For a summary of the key results by cargo type we refer to Section 1.8 of this Executive Summary. Here we provide a general overview of the findings according to the different techniques employed.

1.2.1 CARGO FLOW ANALYSIS

Rotterdam has a favourable position in the Hamburg-Le Havre (HLH) range. It provides fast and unconstrained access from the sea¹, as well as excellent hinterland connections, not least due to its immediate access to the most important European inland waterway, the river Rhine.

This locational advantage, coupled with well-chosen investment decisions in the past, has helped the port to become the leading European port in almost all cargo categories. Through further network effects, large ports typically benefit from their size to attract business and grow even further. With size, the frequency of hinterland connections improves and the emergence of industrial clusters is facilitated.

Although all ports in the Hamburg-Le Havre range have some overlap in their hinterland, and while for the Amsterdam-Rotterdam-Antwerp (ARA) range overlap is considerable, the overlap of the ARA ports with Le Havre is negligible and with the German ports limited.²

1.2.2 ANALYSIS OF HYPOTHETICAL SWITCHING

The finding from our hinterland analysis that Rotterdam's most important rivals are in the ARA range is also confirmed by our survey, which suggests that of that volume that would be switched in response to a 10% lasting price increase in total port related costs (total port call costs plus cargo handling costs), 73% would be switched to other ARA range ports. The German ports would attract only 10% of the switched volume, Le Havre and Dunkerque none. In many markets, the port of Antwerp is the next best alternative to Rotterdam, despite its restrictions due to the longer access time on the river Scheldt and the tidal constraints for larger vessels. The port of Amsterdam is constrained both in terms of sea-side access and with regard to hinterland transport by road. Moreover, it does not offer the network of connections offered by Antwerp and Rotterdam. Smaller ports in the region like Vlissingen and Zeebrugge are evolving and have captured some shares in specific markets but lack the industrial clusters. The port of Rotterdam has a superior position in the HLH range.

Another important consideration for the assessment of market power is that the harbour dues are only a very small part of the all costs that are incurred by HbR's ultimate customer when choosing the port of Rotterdam. With respect to containers, for example, our analysis shows that an increase in harbour dues by 10% increases the total relevant costs of routing the cargo through the port of Rotterdam by at most 0.4%. This increases the incentive to raise prices

¹ Being located at the open sea, Rotterdam does not have any tidal constraints and no draught restrictions for large vessels up to 23 m.

² In this study, we define the ARA range as the range of ports located between and including Amsterdam and Antwerp, i.e. Amsterdam, Vlissingen, Rotterdam and Antwerp. The named ports also control some minor ports that are usually not listed separately. The port of Amsterdam administers also Beverwijk, Velsen/IJmuiden and Zaanstad. The port of Terneuzen belongs – in administrative terms – to the port of Vlissingen. Harbour dues set by HbR in Rotterdam also apply in Moerdijk, Dordrecht and all remaining ports in the Moerdijk/Rijmond area.

above competitive level: Only if at the ultimate customers are extremely price sensitive, the increase will lead to switching. In fact, based on demand elasticities implied by the survey result, we find that HbR could profitably raise current harbour dues for containers and dry bulk.

1.2.3 ANALYSIS OF PAST SWITCHING

Neither HbR nor the port users surveyed could provide convincing evidence of switching in response to increases of harbour dues by a port authority. In fact, we could identify only one example where a port user reported switching in response to an increase in harbour dues.

This underpins the finding that harbour dues are not key factors determining switching decisions. Indeed, a very illustrative example of how other factors outweigh differences in harbour dues in containers is the fact that we have not yet observed any switching of liner services to Amsterdam, although there is empty capacity and pricing of both harbour dues and stevedoring dues is considered to be half the level of Rotterdam since a number of years.

1.2.4 CAPACITY CONSTRAINTS, ENTRY AND COUNTERVAILING POWER

For containerised cargo we find that the current capacity constraints at Antwerp limit the effectiveness of this port as a competitive constraint. This is very relevant as Antwerp is the most important alternative to Rotterdam. The situation will only gradually improve from the second half of 2005 onwards as further container terminal capacity will be added at the port of Antwerp. For all other cargo types we have not received evidence on any major near term expansions that are likely to change the competitive situation.

Based on the analysis above we also conclude that port users cannot outweigh the pricing power by countervailing power. For many cargo types this is also visible through the application of list prices. Only some port users, in particular liner shipping companies, negotiate discounts.

1.2.5 BENCHMARKING

All findings described above suggest that the port of Rotterdam is in a position to price higher than its rival ports for the services it offers, in particular through harbour dues and land lease related prices. This is confirmed by benchmarking studies that compare harbour dues for typical ships. For large ships in particular, Rotterdam charges significantly more than rival ports. More generally, Rotterdam is considered to be an expensive port in terms of harbour dues.

1.2.6 CONCLUSION

Combining these various findings, we conclude that HbR has the ability to profitably charge higher harbour dues and land lease related prices than its rival ports. We also suggest relevant geographic markets for ten cargo types, ranging from the port of Rotterdam itself to ports in the ARA range plus Zeebrugge and Gent.

In our analysis we have not been tasked to investigate the financing of HbR or rival ports, which can have an important effect on pricing. If, for example rival ports price artificially low, for example as a result of state subsidies, then HbR's ability to price higher than rivals as evidenced by higher prices need not indicate excessive pricing above cost at present. The sustained and large price difference we find then do however indicate that apparently customers do not switch away from the port of Rotterdam to the lower priced port services elsewhere. Thus, even though we provide convincing evidence that HbR can and does profitably charge higher prices than rival ports, this is not conclusive evidence that HbR is currently abusing market power by setting excessive harbour dues. It merely reveals HbR's ability to sustain large price differences (whether they reflect costs difference or not) over longer time periods.

Moreover, the conclusions concern the pricing power of the port of Rotterdam in the short-run. Dynamic considerations, of which we offer some, tend to suggest that pricing power of a port at a favourable location can eventually be beneficial to consumers.

1.3 Activities of HbR

As the port authority of the port of Rotterdam, HbR is involved in four main activities:

- The supply of nautical-maritime services.
- The supply of land to tenants of the port.
- The supply of port infrastructure to tenants and port users.
- (Minority) shareholdings in other companies.

Out of these four activities, only the second and third, i.e. the supply of land and the supply of port infrastructure, are analysed in this study. This is in accordance with the brief we received from the NMa.

With regard to the renting out of land, HbR is responsible for the long-term spatial planning of the port, as well as the actual allocation of sites to and negotiation of lease prices with (prospective) tenants. For parcels that include quay walls, HbR does not only charge lease prices, but also quay dues. In many cases, the rented out land includes additional infrastructure set up by HbR, such as stronger quay walls, jetties, roads, or rail tracks. Such investments will be considered in the lease price charged by HbR.

In addition to spatial management, HbR is responsible for the planning, construction and maintenance of the wet and dry infrastructure in the port, which includes for example waterways, port basins, quay walls and roads. HbR charges harbour dues to port customers for the use of this infrastructure.

The yearly expenditure related to investment and maintenance of the port territory and infrastructure is around €150m, which is generally financed out of HbR's total revenues. The port authority is also engaged in the planning of major expansions of the port (Botlek in the late 1940s and early 1950s; Europoort starting in 1958; Maasvlakte I between 1968 and 1974; Maasvlakte II, for which planning is ongoing). These projects are typically financed through loans from the municipality of Rotterdam and co-financed by the Dutch government with specific repayment arrangements.

1.4 Market definition

The definition of the relevant market is an intermediate step in order to assess market power. It is a tool for aiding the competitive analysis by identifying those substitute services that provide a significant constraint for the services offered by HbR.

The analysis of, first, the types of services that are provided by HbR and, second, the alternatives to these services that are available to port users is the first important step of the market definition exercise. It involves identifying the services provided by HbR (distribution of parcels of land and the supply and operation of the port infrastructure), identifying the key participants (in particular port users and tenants), cargo types (like crude oil, coal, etc.), and the origin and destination of cargo handled.

The definition of the relevant market can have several dimensions. It is common to distinguish relevant product markets and relevant geographical markets. The main practical purpose of market definition is to permit inferences about market power to be drawn from market shares. Thus, the relevant market needs to be defined so that it contains all those substitute products and ports that provide a significant competitive constraint to the services of HbR. With regards to the services provided by HbR the following issues are of particular relevance:

- Relevant product markets - The main issues regarding the relevant product markets in the area of ports refer to the level of disaggregation regarding the types of cargo and the origin and destination of cargo. Other possible considerations include the size of the vessels, the types of customers or the modes of transport that are used for part of the transport chain. Products are grouped together if they face similar competitive restraints and if the port authority cannot differentiate between them. In practice, a further consideration is the level of detail at which information is available in order to consider differences in competitive constraints. Often, the categorisations used by industry reflect a level of disaggregation that is sufficient to take strategic pricing decisions.

- Relevant geographic markets - The relevant geographic market with regard to the provision of port infrastructure and with regard to the leasing of land to port bound customers is determined by analysing which ports provide significant competitive restraints to the pricing of HbR. Tenants that are not bound to the port could also locate in regions outside the port. For them the relevant geographic market is much wider.

The approach followed by most competition authorities to determine the relevant markets is the “hypothetical monopolist test,” also called the “SSNIP test” (Small but Significant and Nontransitory Increase in Price). This test goes through the logic of a hypothetical monopolist to determine whether or not pricing on a particular candidate market is constrained by substitute products. The relevant market is the smallest collection of products (regions/ports) such that the hypothetical profit-maximising monopolist would, if he were serving the market on its own, impose a small but significant nontransitory increase in price, assuming the terms of sale of the other products are held constant.

In Section 2.3 we discuss a number of potential pitfalls with regard to market definition. One important potential pitfall is the so-called “cellophane fallacy”. If observed prices already reflect market power the SSNIP test could identify a relevant market that is too wide. Indications that existing prices already reflect market power are therefore important.

1.5 Market power

In academic textbooks, market power is sometimes referred to as pricing above marginal cost, i.e. the cost of producing the last unit of output (in practice average variable cost are often used as a substitute to marginal cost). In practice, this theoretical measure is often not very helpful. If producing the goods involves low marginal cost but high fix costs that result, for example, from investments in infrastructure, some market power in the academic sense would be necessary in order to provide sufficient investment incentives. Regulatory bodies therefore usually take into account the incentives for investment, e.g. when regulating prices. One way to achieve this is to use cost concepts that consider the cost of the investments into the infrastructure. In the context of this study, our focus is not on determining a set of optimal prices that a regulator would set. In investigations that involve market definition and market power, competition authorities often rely on techniques that do not apply a direct measure of costs of the firm investigated. We use similar techniques and explain them further below. If pricing of the rival ports is competitive, these techniques can be used to show that the analysed firm exploits market power. If rivals price below competitive levels (e.g. due to subsidies), the techniques provide evidence on the potential to exploit market power if rival firms were to price competitively. In other words, in a market where all rivals price artificially low, even a firm with market power may be constrained to price at costs. Since we did not look at the financing of HbR and rival port authorities, our results provide direct evidence that the port is currently pricing excessively only to the extent that differences in

financing are of a lower order than those found in pricing across the ports included in our study.

However, we do provide unconditional direct and convincing evidence addressing the question whether HbR can charge higher prices than the most important alternative ports. Such pricing power provides a strong indication that HbR can indeed exploit its dominant position, at least if rival ports do not price below costs, i.e. it suggests that HbR has market power if rivals do not price artificially low.

If firms exploit market power by setting high prices, this will, at least in the short-run, harm customers of the port. The welfare implications for other groups in society depend on a variety of factors. For example, if ports operate at full capacity, high prices may have no effect on the number of calls, implying that there is, at least in the short-run, only a distributive effect to the benefit of the port authority. Since consumers are not direct customers of the port they are affected as higher transport costs lead to higher prices for consumer goods.

Market power can be constrained if barriers to entry are low. In particular, planned capacity expansions at other ports will influence the choice available to port users. We therefore survey several major expansion plans. Furthermore, port customers may have countervailing power that constrains the pricing power of HbR. If such power existed one would expect to see at least some switching stories. Moreover, any power to sustain large price differences relative to rival ports would suggest that countervailing power is limited, for information purposes we nevertheless report available information on the port users. For vertically integrated ports, efficiency considerations of vertical integration may also play a role in the assessment of market power. Given that the port of Rotterdam is by and large a landlord port, not involved in major complementary activities, we have not investigated efficiency considerations. Finally, port authorities may coordinate their behaviour. The analysis of such potential coordinated behaviour has not been a focus of this project.

1.6 Methodologies

In order to pursue the analysis we have employed various complementary techniques including benchmarking, cargo flow analysis (analysis of seaside access, origin and destinations, modes of hinterland transportation etc), analysis of switching in response to hypothetical price increases, analysis of past switching in response to price changes, analysis of capacity constraints and consideration of other qualitative evidence. In this Section we briefly describe the main methodologies used. For a detailed description we refer to Section 2.

1.6.1 BENCHMARKING

In order to address the cellophane fallacy problems and to get a first indication of pricing power, we compare the harbour dues and lease-related prices per unit (we use a standard measure for containers, called TEU, and the weight of the cargo for other cargo types).

The basic service of providing port infrastructure such as quay walls, jetties and roads does not differ significantly between ports, which means that higher pricing of the port of Rotterdam would be an indication of pricing power relative to the relevant alternative ports. In Section 2.5 we present a simple model of spatial competition to show that, absent artificially low prices of some firms, transport cost advantages allow firms to price profitably above cost. If ports are located differently, this may simply reflect some degree of product differentiation that may help port authorities recovering fix costs. If there is a significant asymmetry between ports, the port with the advantage can profitably price above total costs if the competing (disadvantaged firm) prices at costs.

The benchmarking approach is relatively simple for those cargo types for which comparative pricing data exists. Moreover, it is meaningful regarding the assessment of pricing power reflected in existing prices. However, it does not answer the question whether there is scope to increase prices further (which we address in the following sections).

1.6.2 CARGO FLOW ANALYSIS

A complementary approach to the price benchmarking method is to analyse cargo flows. The conceptual approach is as follows. If at given prices³ the routing of a relevant unit of cargo via Rotterdam (considering hinterland transport costs, sea transport cost, cargo handling costs, and call costs, including harbour dues) costs €1,000 and the routing via the next best alternative port costs €1,100, an increase in harbour dues of €50 per unit, i.e. an increase of total costs by 5%, is unlikely to lead to switching. If a €50 increase is higher than five to ten percent of the existing level of harbour dues, this would indicate that the next best alternative port is not to be considered being in the same relevant market for the cargo flow considered.

1.6.3 SWITCHING IN RESPONSE TO A (HYPOTHETICAL) PRICE INCREASE

As a major part of the analysis, we surveyed port users and tenants. We questioned port users how they would respond if total port related costs were to increase by 10 percent.⁴ The answers yield two types of information. First, the answers provide an indication on responsiveness of demand for HbR's services to a price increase. Second, the answers give very helpful evidence on which ports are considered as potential substitutes – which is helpful direct evidence for our market definition exercise.

³ Note that this is subject to the Cellophane fallacy caveat described before.

⁴ Note that this is subject to the Cellophane fallacy caveat described before.

With regard to the responsiveness of demand for HbR's services to a price increase (economists refer to the 'price elasticity of demand') a few important notes are due:

- Since access to the port infrastructure is always part of a bundle of complementary services (e.g. sea transport, other call cost such as pilotage and towage, stevedoring, hinterland transport), an increase in harbour dues only has a minimal effect on total generalised costs of a customer of the port, which include all costs in the transport chain. Thus, a ten percent price increase on harbour dues is much less likely to lead to switching than a ten percent price increase in total generalised cost, making it more likely that a mark-up is profitable. Therefore, it is possible (or even likely) that the market definition for the provision of port infrastructure services leads to narrower markets than the market definition for stevedores, which typically control a more significant part of generalised cost.
- It is also worth pointing out that the combination of several providers of complementary goods leads to a double marginalisation or double mark-up effect in oligopoly markets. Several providers of complementary services add mark-ups to their services, which leads to higher overall prices than if firms were vertically integrated.

These considerations suggest that switching in response to a small increase in harbour dues is less likely than switching in response to a small increase in total route costs. Using survey responses to determine price elasticities is subject to some caveats, including the possibility of strategic responses. These are discussed in full in Sections 2.5 and 3.1.

1.6.4 SWITCHING IN RESPONSE TO PAST PRICE CHANGES (REVEALED PREFERENCES)

We have asked surveyed port users and the port authority to provide evidence on switching in response to past changes in harbour dues. Evidence on past switching is important as it is not subject to the same caveats as statements about hypothetical switching behaviour.

We also looked at a number of other factors that provide evidence on potential switching. Our survey and previous studies show that port users take into account a number of factors when choosing a port. For example, one factor that prevents port users from switching is the existence of good connections. This is sometimes called a network effect. The more connections and the higher the frequencies offered, the more attractive a port. This makes it more difficult for smaller ports to compete against ports that are large and established.

1.6.5 CAPACITY CONSTRAINTS

The responses of the survey respondents to the questions about the potential substitute ports provide important direct information on the relevant market. If the ports that port users would switch to are subject to capacity constraints, these ports are no relevant competitive constraint until capacity is expanded.

1.6.6 OTHER QUALITATIVE EVIDENCE

We also looked at other qualitative evidence. For example, we studied how prices are set, how often they are revised, and what the key pricing principles are and what information is used for pricing. This evidence is helpful to understand and interpret past behaviour of the port authority.

1.6.7 SOURCES OF INFORMATION

In order to undertake the study we engaged in intensive communication with HbR. We furthermore conducted a number of interviews with port users, a competing port (Antwerp), the European Commission and academics at the University of Leuven (see Annex I for a list of interviews). We consulted various resources, including reports and data generated by our own research and those provided by HbR and the NMa (see Annex II for a list of articles, reports and studies used).

A further important element of this study was the design and evaluation of a survey that was sent out to users and tenants of the port authority of Rotterdam. In total 1,315 questionnaires were sent out to addresses in the Netherlands, Belgium, Germany and other countries. In our survey evaluation, we considered 88 companies who filled out the tenants questionnaire and 58 companies who filled out the user questionnaire. Some user respondents answered the questions for several cargo types, which means that we could distinguish up to 67 different responses for some cargo-specific questions. Thus, we evaluated 146 questionnaires in total.

1.7 Renting out of land

The port of Rotterdam is a large industrial complex, which includes some five thousand hectares of land suitable for business and industrial tenants. HbR administers about 2,000 lease and ground rent contracts, which generated revenues of about €173 million in 2003.

1.7.1 TENANT TYPES, LEASE CONTRACTS AND AVAILABLE SPACE

In order to analyse market power with regard to the renting out of land, one needs to distinguish different tenant types. New tenants are typically more flexible with regard to port choice and HbR can negotiate prices with new tenants without contractual restrictions. They may add value to the port, not only by paying rent, but also by attracting cargo or improving the network of services offered to other tenants. In fact, the skilful development of the industrial and logistical clusters can be seen as one of the important tasks of HbR. The large existing tenants that are crucial for the services offered at the port are to a large extent locked in at the port as relocation would involve specific investments, both in facilities and in business relationships that have already been made in Rotterdam. Clearly, if prices were to be

negotiated freely with these large customers, the port would have market power. Potential tenants, however, anticipate these lock-in effects. In order to resolve this issue and to attract tenants and encourage specific investments, the port authority offers long-term contracts. Standard contracts fix the inflation-adjusted rent for a period of 25 years. Most contracts have a renegotiation clause that limits the pricing power of the port authority when it comes to re-negotiation of the contracts. That is, reviewed prices for existing tenants are constrained by what has been agreed on with comparable new tenants.

As a result of this, apart from the few contracts that expire without re-negotiation clause, the potential of HbR exercising market power today depends on land that is or becomes available for new tenants. The analysis of HbR's tenant database shows that, absent the envisaged expansion of Maasvlakte II, space available and suitable for letting is very limited. Until 2007 only about 2% of the suitable surface will become available, adding to about 6% that are currently available but not suitable for, for example, a new container terminal in addition to the planned expansions⁵ or a large industrial cluster. We, therefore, do not expect to see any major new tenants locating at the port of Rotterdam in the near future and for 98% of the surface occupied by the existing tenants the port is contractually bound with regard to its price setting.

1.7.2 RELATIONSHIP BETWEEN RENTING OUT OF LAND AND PROVISION OF INFRASTRUCTURE

In negotiations with new tenants, the bargaining power of HbR also depends on the business of the tenant. Those tenants that are not port-bound, i.e. that do not require access to land at the port in order to provide their services to the port users and/or cargo flows, could locate at various other locations and still serve the users of the port of Rotterdam, which suggests that, unless they are offered market rates, they would locate elsewhere. Moreover, our survey results did not indicate any particular concerns of tenants in this area. Our analysis did therefore not give rise to any competition concerns in this area. Table 1 provides an overview of the different tenant categories and whether they are port-bound or not. Note that our results are indicative. A full analysis would require a case-by-case assessment.

⁵ HbR recently concluded a tenant contract with Euromax, a joint venture of the largest existing terminal operator at the port European Container Terminal (ECT) and P&O Nedlloyd. The site for the new terminal is a site that was reserved for some time.

Table 1: Categorisation of tenant types

Tenant group	Categorisation (bound to the port or not)
Cargo handling companies	Port-bound
Transport companies	To some extent port-bound
Forwarding and shipping companies	Generally not port-bound
Supplies-associated industries (incl. nautical service providers)	Mainly port-bound
Finance and consultancy companies	Generally not port-bound

Source: CRA based on a categorisation contained in HbR "Rotterdam Port Information 2004", p. 289. Note that our categorisation is indicative.

Those tenants that are bound to the port either offer services for which there is a demand derived from the level of cargo flows in general, such as ship maintenance, or services directly associated with a particular cargo type, for example dry bulk terminal handling or processing of cargo flows for which it would be uneconomical to be carried out at a distance from the port. There is, therefore, a link between the market power with respect to the provision of infrastructure and the renting out of land.

To illustrate this link, consider a port that has a monopoly position for a specific cargo type. Generally, port users need to buy at least two complementary services when using the port: access to the infrastructure (which is paid for through the harbour dues) and stevedoring services (paid directly to the terminal operator, who in turn pays the port for the use of infrastructure – i.e. rent).⁶ A port authority that controls land and access rights can, in principle, extract monopoly rent by setting a high rent, high harbour dues or a combination of both. Moreover, for a given rent the port authority will always prefer a tenant that generates harbour dues to one that does not. That HbR is well aware of the link between tenant pricing and harbour dues shows for example in its setting of lease prices, which depend on the expected harbour dues generated by the tenant. The relevant markets for tenants that provide cargo type specific services (like terminal operators) therefore depend on the relevant markets identified for the provision of infrastructure. Those tenants that are port-bound but do not provide services for only one cargo type (e.g. maintenance services for terminals) depend on aggregated findings with regard to the provision of infrastructure that reflect the mix of cargo types.⁷

⁶ Even if a vessel berths at a public quay and not at a terminal, it will need the services of some provider in the port in order to unload the vessel and/or transport the cargo onwards.

⁷ Interested readers may want to note that there is a debate regarding airport regulation whether rents that can be extracted from tenants should be taken into account in the regulatory process or not ("dual till" or "single till").

1.7.3 LEASE RELATED PRICES

We considered a number of studies to compare lease related prices at various ports. It turns out that all studies consistently find that Rotterdam charges more than what is asked for comparable sites at other ports in the Hamburg-Le Havre range (see Table 2). It is also interesting to note that Antwerp is found to be the port with the next highest lease related prices in two out of the three studies considered.

Table 2: Lease and lease-related prices in the port of Rotterdam compared to the port with the next highest price

Source/study and basis for price	Port with the next highest price in the study	Price difference compared to Rotterdam in %	
		Minimum price difference	Maximum price difference
PWC – lease price for wet parcel per m ² in 1998	Antwerp	-5%	-41%
PWC – lease price for dry parcel per m ² in 1998	Antwerp	-29%	-33%
DTZ – lease price per m ² in 2003	Antwerp	-6%	-43%
IBM – lease-related price per container (lease plus quay dues) in 2003	Le Havre	-26%	-26%

Source: CRA calculations based on PriceWaterhouseCoopers, “Case Reebok – Financial considerations including profitability of Distri-park Maasvlakte and the cash compensation”, DTZ “Benchmark Study Le Havre – Antwerp – Rotterdam” and IBM “Concurrentiepositie van de haven van Rotterdam in de containeroverslag”. The PWC study compared lease prices in Rotterdam, Antwerp, Hamburg, Bremen, Dunkerque and Le Havre. DTZ compared Rotterdam, Antwerp and Le Havre, and IBM compared Rotterdam, Antwerp, Hamburg, Bremerhaven and Le Havre. Note that for the analysis of the PWC study, we made the following assumptions: 1) the choice of the port with the next highest price is based on the average price in other ports and 2) we compared the minimum and maximum prices in Rotterdam with the minimum and maximum prices in Antwerp respectively. For more details see Section 5.

Given the link between lease related prices and harbour dues, these findings are important for the analysis of the provision of infrastructure. Higher harbour dues in Rotterdam cannot be generally explained by a pricing structure that would involve very low lease related prices and high harbour dues.⁸ Moreover, a finding of market power for the cargo types would suggest that there is potential to exploit market power on the leasing market. This, however, is currently of limited relevance given the existing capacity constraints and given that Maasvlakte II is years away.

⁸ HbR pointed out that in the 1950s and 1960s low lease prices had been a strategy to attract some of the large refineries.

1.8 Provision of infrastructure

1.8.1 ACTIVITIES OF HbR

Besides the supply of land to tenants of the port, the port authority of Rotterdam supplies nautical-maritime services and has shareholdings in other companies. In accordance with the directions of the NMa, we exclusively analysed the supply of land and the provision of infrastructure. One important question in the study was whether the quality of HbR's activities influences the quality of the supplied basic infrastructure. Clearly, long-term spatial planning is one of the key activities of the port that influences the infrastructure available at the port. Each major expansion of the port involved critical decisions regarding the development of the sites. This applied to the Botlek expansion in the late 1940s and early 1950s, the Europoort project in 1958, and the Maasvlakte I expansion from 1968 to 1974. It will apply again to Maasvlakte II, the envisaged major expansion of the port of Rotterdam.

However, in the short run the ability of HbR to influence the key "quality" parameters that matter for port choice is limited. Some respondents to our survey mentioned that other ports (in particular Antwerp) were better in handling public tasks (like customs). Other quality comments focussed mainly on the services provided by stevedores. There is no evidence that HbR would currently provide services of better quality than other ports that would justify higher prices. However, as the following analysis shows, there is significant evidence to show that the port of Rotterdam (and thereby HbR) benefits from a better "quality" of factors that cannot be influenced by HbR in the short run, e.g. locational and nautical advantages and the superior network of transport links and other network effects.

1.8.2 CARGO TYPES AND PORT USERS

It is common practice of ports to distinguish three cargo categories and a number of cargo types per category:

- Dry bulk: iron ore and scrap, coal, agribulk, other dry bulk;
- Liquid bulk (sometimes referred to as "wet bulk"): crude oil, mineral oil products, other liquid bulk (mainly chemicals, oils and fats); and
- General cargo: containers, roll-on/roll-off, other general cargo.

Table 3 shows the importance of dry bulk, wet bulk, container and general cargo excluding containers by the weight of cargo throughput and the type of revenue generated.

Table 3: Throughput and revenue by cargo category (revenue in million €)

	Container	General cargo ⁹	Liquid bulk	Dry bulk	Other	Total
Throughput (in m tons)	71	8	153	86	11	328
Lease related revenue	50	19	52	19	35	175
Harbour dues (sea going vessels)	46	16	101	38	0	201
Harbour dues (non sea going vessels)	1	0	3	6	0	10
Other	5	3	4	2	2	18
Total revenue	103	38	160	65	37	403

Source: Rentabiliteitsberichtgeving – jaargang 2003. We received the document from HbR on 14 October 2004. The totals may not add up to the totals indicated in the document because of rounding as our totals are based on the percentage share of revenue indicated in the Rentabiliteitsberichtgeving. Other sources of revenue include revenue from customs, development costs (“exploitatie VBS”) and other revenue.

Liquid bulk is the most important source of revenue, followed by containers and dry bulk. Liquid bulk also accounts for the highest throughput.

The users of the port of Rotterdam are shipping companies, freight forwarders and, ultimately, their clients. Harbour dues are generally paid by the shipping companies directly to HbR. In wet and dry bulk, some of the major terminal operators and refineries located at the port are also important users of the cargo.

1.8.3 RELEVANT PRODUCT MARKETS

As discussed above, the port of Rotterdam handles a range of cargoes, port users and provides access to different types of vessels. One task in the market definition exercise is to determine which cargo types should be considered together, e.g. whether the provision of infrastructure to iron ore & scrap port users is in the same “product market” as the provision of infrastructure to coal port users. Applying the methodology described above (Section 1.4), we have analysed the relevant geographical markets on the level of cargo types. Although the current pricing structure does not differentiate all cargo types and although the choice of port users may differ depending on, for example, the exact origin and destination or the vessel size, there are a number of arguments for pursuing the analysis based on cargo types, i.e. choosing them as relevant product markets:

- Although HbR currently applies the same tariffs to some different cargo types, it can differentiate prices by cargo type. Indeed, HbR is currently considering a revised pricing structure that would lead to increased differentiation.

⁹ Other than container.

- Port authorities only have limited possibilities to identify the exact origin and destination of cargo that is handled on vessels calling at their port. This limits the possibilities for differentiating by origin and destination.

For most cargo types, a large number of competitive constraints are very similar. Different ports specialise in different cargo types. Port users are typically similar by cargo type and the main hinterland destinations and transport modes are similar.

- For some cargo types (in particular, crude oil, iron & ore and scrap, coal, mineral oil products, and container) port choice is more restricted for some of the largest vessels used. We note these differences in the analysis as they are relevant for the assessment of market power. However, we concluded that pursuing an entirely separate analysis for small and large vessels for all cargo types would not be appropriate. Port users often use a combination of large and small vessels with various possibilities to substitute. A cut-off point between large and small would always be to some extent arbitrary as it is usually the draught of a vessel that matters most and the draught depends on the amount of cargo on the incoming or outgoing ship. There is only very limited information on other relevant competitive factors by vessel size and, indeed, many factors, like hinterland considerations, are unlikely to vary.
- For some cargo types we have taken into account other potential considerations. For example, with regard to container we concluded not to pursue a separate analysis of transshipment (see Section 7.12).
- Finally, with minor variations, port authorities themselves typically use the ten cargo types as the main level of disaggregation for throughput statistics. Even at this level the allocation of specific cargos to a cargo type is not always straight forward. For example, roll-on/roll-off is sometimes classified as “other general cargo” and containers are also shipped on trailers. But by and large, this classification is standard in the industry.

1.8.4 RELEVANT GEOGRAPHIC MARKETS AND MARKET POWER

Before discussing the main results by cargo type, we summarise the main findings by type of analysis. This allows a more concise presentation of results and highlights common results and differences across cargo types.

1.8.5 BENCHMARKING OF HARBOUR DUES

Port authorities in the HLH range have developed different tariff structures based on the capacity/size of the vessels, the throughput at the port and other criteria. One key difference between the Rotterdam tariff and the tariffs of rival ports like Antwerp, Amsterdam or Hamburg is that the named ports either cap their fees at a certain ship size or offer cheaper rates for larger vessels.

In general, harbour dues can vary by a broad range of characteristics. Possible factors for price discrimination include the type of cargo, ship characteristics (e.g. gross tonnage, length, draft, level of loading), the cargo loaded and/or discharged per call, the origin and destination of the cargo, or whether the vessel operates in liner service or as a tramp vessel. In addition, frequency and other rebates can be offered. In Rotterdam, harbour dues mainly vary by cargo category and by ship characteristics.¹⁰ There is no differentiation by origin or destination of the cargo carried, but a special tariff applies to shortsea/feeder and hinterland vessels. There are special tariffs or rebates for crude oil tankers, agribulk vessels (frequency reduction), vessels operating in liner service (containers and other general cargo), and roll-on/roll-off vessels. For all other cargo types, HbR does not price discriminate, but charges a general tramp vessel tariff.

Tariffs in Rotterdam depend on the vessel's gross tonnage and on the amount of cargo loaded and/or discharged in Rotterdam. If cargo equivalent to more than a specific share of the vessel's GT is loaded and/or discharged in Rotterdam, fixed fee per GT is levied. If less cargo is moved in Rotterdam, the tariff is usually set as a lower fee per GT plus a fixed fee per metric ton of cargo loaded and/or discharged.¹¹

Due to the differences in tariff structures between ports, price comparisons need to be based on tariffs for typical vessels. HbR employs a call cost model that can be used to benchmark harbour dues and other call costs. We have received relevant comparisons between Rotterdam and other ports for all cargo types but liquid bulk (with the exception of a comparison of port call costs for crude oil tankers between Rotterdam and Le Havre). Note that the benchmarking is based on list prices. HbR provides discounts to some port users, in particular to container liners. We therefore requested more detailed information on these discounts. In response, HbR confirmed for the container segment that the data provided represents a good indication of relative prices:

"In our opinion [the benchmarking] gives a good relative pricing picture of the different ports. Just as other ports do we also give incentives to the shipping lines. In 2004 a total of about 16 million euro's is given as incentives to all most all shipping lines. Some are lump sum, others partly dependent on the amount of cargo. The incentives are in most cases between the 20-30%" (information provided by HbR 21 October 2004).

We have, in accordance with this information, assumed that the effects of any discounts to the results of the benchmarking would be negligible.

Table 4 summarises the main results from the benchmarking studies.

¹⁰ There are also special harbour dues for inland vessels, e.g. fishermen and pleasure yachts. However, those are not the focus of this study.

¹¹ See Section 4.2.2 and the different cargo type chapters for a detailed description of the structure of harbour dues.

Table 4: Harbour dues at other ports in the HLH range relative to the port of Rotterdam¹²

Typical vessel/ cargo type	GT (1,000)	Antwerp	Amster- dam	Vlissingen	Hamburg	Bremer- haven	Zeebrugge
Container (Far East Trade)	81	-50%			-50%	-65%	
Container (Transatl. Trade)	53	-38%			-51%	-53%	
Container (Feeder)	6	10%			-33%	-37%	
Roro	48	99%	-23%	-23%	-53%	-54%	-46%
Multipurpose vessel	8	-14%	-1%	-13%	-59%	-58%	-41%
Coal	55	-2%	-18%				
Coal	150	-21%	-54%	-15%			
Agribulk	55	-1%	-1%				

Source: CRA calculations based on information provided by HbR. For details see cargo type chapters.

The table shows that generally Rotterdam is the most expensive port. Two exceptions shown in the table are feeder ships for containers and roll-on/roll-off, where Antwerp is more expensive. The table also shows that within containers and coal the difference becomes larger the larger the vessels. Finally, the German ports are generally much less expensive in terms of harbour dues than Rotterdam.

We conclude from this analysis that the port of Rotterdam has, for a number of cargo types, pricing power relative to its rival ports. The benchmarking also shows that the differences in harbour dues increase with the size of the vessel. This reflects the favourable position of Rotterdam with regards to the hinterland and sea-side access. Indeed, the more favourable sea-side access was stated by HbR as an explanation for the significant price differences between the port of Rotterdam and Antwerp for larger vessels in the container and dry bulk segments. Port users are aware of the increasing gap in prices for larger vessels and we have been pointed to it several times. More generally, Rotterdam is widely perceived as an expensive port, which is confirmed by our analysis.

¹² For some ports we only have very limited information. For Le Havre benchmarking of harbour dues for containers is difficult due to a different charging structure. For crude oil, HbR provided a benchmark that shows that the port charges 18% more than Rotterdam. Based on the Wilhelmshaven tariff scheme we have computed a benchmark for crude oil that shows that harbour dues in Wilhelmshaven are 45% lower than in Rotterdam. Furthermore, we received two benchmarks for a small port Gent. They show that harbour dues in Gent are 1% lower for Agribulk and 3% lower for coal.

1.8.6 CARGO FLOW ANALYSIS

This Section summarises important aspects of the cargo flow analysis, in particular seaside access, the hinterland and hinterland transport modes.

Seaside access

One of the key advantages of the port of Rotterdam is that it is close to the sea and offers unconstrained around-the-clock access for large vessels in terms of draught. Rotterdam's main rival for many cargo types, Antwerp, is much more restricted as tidal constraints limit the access for large vessels for the larger part of the day. Moreover, vessels need first to steam up the river Scheldt for 4 to 5 hours, and back again 4 to 5 hours to the sea, when going to and coming from Antwerp. Some of the largest ships in dry and wet bulk can only call at Rotterdam, Le Havre and Wilhelmshaven, restricting competition from the other ports in the ARA range (Amsterdam, Vlissingen, Antwerp).

Hinterland and transport modes

Rotterdam and the other ports in the ARA range have very good access to the most important inland waterway in Europe, the river Rhine over which further inland transport is efficient and therefore much used for a large category of cargo types. In particular, a large share of the hinterland traffic of these ports is shipped by barge (about 30% in Antwerp and 60% in Rotterdam).

Their superior access to the river Rhine corridor sets the ARA range ports apart from the German and the French ports, which serve different and, for the approach of important parts of the hinterland, inferior inland waterways. This factor is particularly relevant for dry and wet bulk cargo, for which barge transport is attractive. However, containers are also increasingly shipped by barge.

Road connections are also more favourable in Rotterdam than, for example, in Amsterdam, where congestion is a constant problem. Antwerp is closer to some of the most populated areas in Benelux and Germany by truck, which compensates some of the cost of the additional sea transport up the river Scheldt. However, despite its generally good road connections, Antwerp is currently constrained by the construction works on the Antwerp ring.

While the German ports do not have direct access to the Rhine corridor, they still share some of their hinterland with the ARA ports due to good rail and road connections. It is generally known that Rotterdam ships significantly less cargo to and from the hinterland by rail than for example Hamburg. This reflects the importance of rail connections for the German port, also due to less favourable inland waterway connections compared to the ARA ports. However, a more detailed analysis of the destinations of shipments of containers (which is well suited for

rail transport) shows that by far the most important overlap in the hinterland of the port of Rotterdam is with the ARA range ports.

Finally, not least due to its deep-water access, which allows large crude oil and mineral oil tankers to call here, Rotterdam is linked to some of the major pipelines for crude oil, mineral oil and chemical products.

The finding of the hinterland analysis that Rotterdam's most important rivals are in the ARA range is also confirmed by our survey, which suggests that of that volume that would be switched in response to a 10% lasting price increase in total port related costs (total port call costs plus cargo handling costs), 73% would be switched to other ARA range ports. The German ports would attract only 10% of the switched volume, Le Havre and Dunkerque none.

Ranking of cargo types regarding captivity

Cargo that is unlikely to be re-routed to another port in response to a lasting increase in prices can be loosely referred to as 'captive cargo'. As our previous discussion shows, cargo may be captive for a variety of reasons. Cargo may be captive for a port if the port offers the shortest or most economical routing of cargo depending on the origin and destination of the cargo and other logistical considerations. Moreover, cargo can typically be captive if cargo users or shippers invested in facilities (terminals, refineries) at the port. Finally, cargo may be captive because ships cannot economically access other ports for physical reasons – this applies in particular to very large vessels with deep draught. Our analysis suggests a ranking of captivity of the different cargo types, which is also generally confirmed by our survey.

Crude oil is the most captive cargo type, due to sea-side access requirements (large vessels from the Middle East), dependence on existing facilities at the port (four refineries are located at the port of Rotterdam), and access to inland waterways and pipelines. Other bulk products follow in the captivity ranking. Mineral oil products share some of the characteristics of crude oil (linked to refineries, waterway and pipeline transport). However, the vessels used for this cargo type are on average smaller than crude oil tankers. Iron & ore and scrap also involve some very large and deep-going vessels that, within the ARA range, can only access the port of Rotterdam. For this cargo type, there is also vertical integration of some important customers, which reduces the incentive to switch. The cargo type "other general cargo" contains many different freight, ranging from steel to paper or bananas. This diversity means that captivity varies. Our survey puts it in the middle range, together with coal and other liquid bulk. At the lower end of our captivity ranking we have found to be agribulk, containers and roll-on/roll-off cargo. Among other things, this reflects that the last two are often not destined for the industry located at or near to the port.

1.8.7 SWITCHING IN RESPONSE TO A (HYPOTHETICAL) PRICE INCREASE

It is important to note that, although an important source of income for HbR, harbour dues are only a very small part of the generalised cost of a particular route for HbR's ultimate customers. Since access to the port infrastructure is always part of a bundle of complementary services (e.g. sea transport, other call cost such as pilotage and towage, stevedoring, hinterland transport), an increase in harbour dues only has a minimal effect on total generalised costs.

This can be illustrated by using container cargo as an example. A study that has been made available to us by HbR shows that harbour dues at Rotterdam are about €14 per container, which is only a small part of the generalised cost of routing a shipment through a port. The same study provided by HbR shows, for example, that other port related costs are €130 per container in Rotterdam and that hinterland transport cost from Rotterdam to Genk are €191, to Frankfurt/Main €359 and to Prague €735. Using Genk as a lower bound on hinterland cost, the data suggest that harbour dues are at most four percent of the relevant route cost of €335.¹³ Indeed, when including the full cost of the sea-transport this share would be much lower. Thus, an increase of harbour dues by 10% increases the costs of routing the cargo through the port by at most 0.4 percent. Cost simulations provided by HbR for dry bulk cargo show a similar result: Harbour dues account for about 1-2% of total generalised costs of a shipment from overseas to the German hinterland.¹⁴ Hence, an increase in harbour dues by 10% increases the costs of routing dry bulk cargo through the port by at most 0.2%.¹⁵

This relationship between harbour dues and generalised costs of a particular route is relevant for the assessment of the profitability of a price increase by HbR. Generally, if costs do not vary with quantity, a small price increase is profitable if the elasticity of demand for the service provided is below one. However, if customers have to buy a bundle of goods and services, like in the port example, the calculation is different. Using the container example mentioned above, suppose costs of HbR that are related to the provision of infrastructure do not vary with the container throughput. Based on the €14 harbour dues and the total route cost (excluding additional sea transport compared to Le Havre) of €335, one can compute the critical demand elasticity with respect to total route cost. These calculations show that an increase in harbour dues by 10% would be profitable if the firm elasticity of demand with respect to total route cost was below 24. That is, only if less than 24% of the volume is lost in response to a 1% increase of the total route cost of €335, the increase in harbour dues would be profitable. If part of the volume is bound to the port, for instance because the cargo is used at or close to the port, or because of specific investments of the carrier, the critical elasticity on the remaining volume is higher. Moreover, the exemplary calculation is based on the

¹³ The analysis underestimates the potential to increase prices as the current prices are likely to reflect some pricing power as argued above.

¹⁴ The simulations provided by HbR excluded cargo handling costs, which means that the 1-2% share is an upper bound.

¹⁵ Again, the analysis underestimates the potential to increase prices as the current prices are likely to reflect some pricing power as argued above.

observed level of harbour dues. If these reflect pricing power, the required elasticity would be even higher, which is less likely at lower prices. More generally, the point of the calculations is that the fact that HbR controls only a small part of the total route costs, it is more likely to have an incentive to implement a small percentage increase in prices than otherwise.

Using furthermore the switching information generated by our survey we conducted an indicative test whether a profit maximising port authority would have an incentive to raise current prices by 10%.¹⁶ On the basis of the demand elasticities implied by the survey, we find that this is the case for all cargo types analysed (containers and dry bulk). This result suggests that the users of the services provided by HbR constitute a relevant antitrust market.¹⁷ Obviously, there are a number of caveats associated with the use of survey results for the estimation of demand elasticities. In particular, usually only a fraction of total users responds to the questionnaire and there may be a selection bias in the sense that those that have concerns or at least strong positive or negative feelings with regard to the port authority are more likely to respond. Moreover, respondents may make unintended errors or may report strategically. We have therefore not built our conclusions primarily on the findings on the surveys. Rather we have used our profitability test findings as one of many pieces of evidence that, however, seem by and large all to point in the same direction.

1.8.8 EVIDENCE OF SWITCHING AND CAPACITY CONSTRAINTS

The survey technique we applied is much more useful for identifying evidence of past switching and for identifying ports that are considered as relevant substitutes for the port of Rotterdam. Based on the survey responses, we could identify only one example where a port user reported switching in response to an increase in harbour dues.

We also asked those port users that stated that they would switch volume in response to a 10% increase in port related cost to which port they would switch. Table 5 shows the result. It confirms the general perception in the market that Antwerp is by far the most important alternative port compared to Rotterdam and, as already referred to above, on average 73% of the volume would be switched to other ARA range ports.

¹⁶ Beware that current prices may already contain market power.

¹⁷ In Section 4.2 the port authority's traditional approach to pricing is discussed. HbR told us that it does not follow a short-run profit maximising strategy. It is currently reviewing the pricing structure. This may lead, for example, to more price differentiation across cargo types.

Table 5: Share of volume shifted away from Rotterdam that is moved to other ports

	Simple average share of volume moved away from Rotterdam that would be re-routed to this port
Antwerp	48%
Amsterdam	20%
Hamburg	7%
Vlissingen	5%
Zeebrugge	5%
Other*	4%
Bremen/Bremerhaven	3%
Wilhelmshaven	3%
Felixstowe	2%
Gent	2%
Dunkerque	0%
Le Havre	0%

Totals may not add up to 100 due to rounding.

Source: CRA questionnaire. The question was: "Suppose next that the total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) were to increase permanently by 10% while the costs of calling at all other ports stayed at their current levels. Would you shift volume to other ports or would you expect that those who have power over the routing of cargo flows would shift volume from Rotterdam to other ports? If yes, please provide an estimate of the proportion of volume currently shipped through Rotterdam (of the cargo type for which you fill out this form) that you would shift or expect to be shifted to other ports. Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam Rotterdam to other ports you would expect to route or to be routed to each of the following ports."

* Other ports mentioned by respondents included Moerdijk, Dordrecht, "other small ports", Terneuzen, North Killingholme, Thamesport, and Southampton.

In the short-run switching options are, for some cargo types, limited due to capacity constraints. Table 6 shows the estimated throughput capacity for most ports in the HLH-range for containers. It shows that the port of Antwerp is currently facing tight capacity constraints in the container segment.

Table 6: Container terminal capacity and utilisation in 2003

	Capacity (in m TEUs)	Utilisation (%)
Rotterdam	7.5	95
Hamburg	7.2	86
Antwerp	5.4	100
Bremerhaven	3.5	92
Le Havre	2.0	103
Zeebrugge	1.6	62
Amsterdam	1	0
Total capacity (in m TEU)	28.2	

Source: Information provided by the HbR on 25 October 2004. The information source for Amsterdam is the Ceres website, see www.ceresglobal.com/pages/pressre.html, accessed on 21 Oct. 2004.

In the container business, capacities are insufficient to accommodate all traffic in Antwerp, which leads to spillover effects to the benefit of Rotterdam. This will change as various initiatives to increase capacity are underway. In particular, the opening of the Deurgank dock is expected to increase capacity in Antwerp from the end of 2005 until 2007 and eventually double Antwerp's current capacity. This will make Antwerp a much more relevant competitive constraint for Rotterdam.

A very illustrative example of the importance of sea-side access and hinterland connections for the port choice and the limited role of harbour dues is that the port of Amsterdam charges half of the harbour dues and half of the stevedoring dues of Rotterdam for its new container terminal. Still the port has failed to attract any of the shipping lines, despite the capacity constraints seen at Antwerp and Rotterdam in 2004.¹⁸

1.8.9 QUALITATIVE EVIDENCE ON PRICING

Every year, HbR publishes a list of port tariffs that includes the harbour dues payable to the port authority. For most cargo types, harbour dues are charged according to the list prices. There are special tariffs or rebates for some cargo/vessel types. These include:

- Tariff for crude oil tankers;
- Frequency reductions for agribulk vessels (based on calls per year);
- Tariff for container vessels operating in liner service;

¹⁸ In fact, in a recent situation of very high congestion at Rotterdam, a deep-sea vessel with a few thousand containers was diverted to Amsterdam. However, many of the containers were routed back to Rotterdam by truck for logistical treatment at the port or Rotterdam.

- Tariff for vessels carrying other general cargo and operating in liner service (non-shortsea/feeder);
- Tariff for shortsea/feeder vessels (which, by definition, can only carry general cargo and must operate in liner service); and
- Tariff for roll-on/roll-off vessels (whether or not in liner service).

For all other cargo types, HbR does not price discriminate, but charges a general tramp vessel tariff. This means that, for example, coal and mineral oil vessels pay the same harbour dues per GT. This lack of price discrimination by cargo type is not a technical necessity, but represents the traditional pricing approach of the port authority of Rotterdam.¹⁹

For some cargo types, additional discounts are given. For example, in the container business, rebates of up to 30% on list prices are negotiated with the liners.

The level and structure of harbour dues are reviewed annually. Until corporatisation, the port authority would consult port customers and then make a proposal to the municipality, taking into account the views of the port customers and especially the financial situation and objectives of the port. A number of features of this process are noteworthy:

- The consultation of port customers was described as “ritual dancing” by HbR as the arguments of the customer representatives are predictable and these rounds are not seen as decisive for the actual outcome of the pricing decision. Our survey broadly confirmed this perception although some port users felt the consultation rounds did have an effect on the pricing decision.
- During the consultation rounds with customers, HbR is usually not approached regarding the level of harbour dues, but customers are more interested in better infrastructure, port facilities and/or land. Capacity limits and congestion are more important issues for customers than harbour dues.
- Occasionally the municipality would not agree with the port’s recommendations regarding the new level and/or structure of harbour dues. In such cases, the municipality would usually demand higher harbour dues in order to improve its own financial situation.
- It was pointed out by HbR that they do not follow a short-run profit maximising strategy, but seek to maintain a stable long-run pricing policy and establish the port as a “reliable partner” for its customers.
- According to HbR other ports generally wait and see how prices in Rotterdam change before they make their pricing decisions. This was confirmed by some but not by all survey respondents that commented on the sequencing of pricing decisions.
- HbR has repeatedly told us that it intends to maintain its traditional cost-based price decision-making process after corporatisation. The only difference will be that the

¹⁹ Price discrimination can be welfare and consumer welfare enhancing. The use of this term should not induce a negative connotation.

municipality will no longer have to approve prices, which HbR welcomes for it eliminates a level of bureaucracy the port experienced as a professional hinder.

- Harbour dues are not directly related to variable (or marginal) cost of providing services to the port user.²⁰ They are set to generate cash for past and ongoing investments and to generate a return for the owner of the port. Thus, currently the level of investment activity and the conditions of financing these activities influence the pricing at the port of Rotterdam.

Given the current pricing structure, there are limits to the possibilities to price discriminate between different cargo types and destinations. HbR is free to change the pricing structure and to differentiate prices by cargo type. We have been told by HbR that they have discussed possibilities to change the pricing structure, but that no formal plans exist. We have, therefore, not restricted our analysis to the given pricing structure but considered cargo types within the same tariff separately.

1.8.10 CARGO TYPE SPECIFIC CONSIDERATIONS

For some cargo types specific issues were investigated in more depth. For example, for containers we analysed call pattern in order to gather evidence on the intensity of competition between ports (see Section 7.4). For containers, we also considered categorising transshipment as a separate product market. However, we concluded against such a separation (see Section 7.12). A detailed discussion of these cargo type specific considerations can be found in the cargo type chapters.

1.8.11 SUGGESTED MARKET DEFINITIONS BY CARGO TYPE

For none of the markets we investigated could we fully exclude the possibility that the services provided by HbR constitute a separate relevant market. This conclusion results if significant weight is put on the following observations:

- With one exception, we obtained no evidence on past switching in response to an increase in harbour dues. HbR stated that there are no examples of explicit pricing related switching.²¹ This assessment was confirmed by the port users surveyed: With the exception of one port user (Agribulk) port users could not report evidence on switching in response to an increase in harbour dues.
- Not decisive, but consistent with the fact that almost no switching was observed, is that survey results suggest opportunities to raise prices. Using the switching volumes derived from the survey responses, price increases would be profitable for all cargo

²⁰ See also Masurel, E., Nijkamp, P. and B.W. Wiegman: “Tariefstructuur van het zeehavengeld en de daarmee samenhangende dienstverlening voor de oliesector in de Rotterdamse haven”, provided by the NMa.

²¹ Information provided by HbR 16 September 2004.

types even at existing levels of prices. This suggests that a profit maximising firm could increase prices further.

- These findings are also a reflection of the fact that harbour dues are only a very small part of the overall route costs that port users have to incur when using the port. As explained above, the smaller the share in total route cost the lower the responsiveness of demand for a given percentage increase of prices.

We have, however, also used various complementary methodologies that do not rely on switching evidence. By putting more weight on this evidence and less weight on the switching evidence we identify definitions that we consider as an upper bound or the widest possible market definitions considering the available evidence. The reason for this is that these are very conservative estimates, based on conservative assumptions and putting less weight on the fact that there is virtually no empirical evidence on switching in response to a change in harbour dues.

For most cargo types, we have been able to draw on a large variety of data to underpin our conclusions. However, for four cargo types, agribulk and “other dry bulk”, roro, and “other general” cargo, the nature of the freight is much more diverse than for most of the other cargo types, and we have less empirical evidence to build firm conclusions on. We have therefore been particularly conservative when drawing our conclusions on these markets – which are, however, not the prime markets in terms of throughput and together account for only about 12% of total throughput in Rotterdam.

Table 7: Market definitions general cargo

Cargo type	Market definition based on switching data	Most conservative market definition	Market share (upper bound)
Container	Rotterdam	Rotterdam	100%
RoRo	Rotterdam	Zeebrugge	37%
		Rotterdam	35%
		Antwerp	20%
		Vlissingen	7%
		Amsterdam	2%
Other general cargo	Rotterdam	Antwerp	43%
		Rotterdam	25%
		Amsterdam	17%
		Vlissingen	16%

Source: CRA analysis

Container

The container business of the port of Rotterdam is generally considered as the most competitive cargo type that goes through the port.²²

“The biggest competitive battle between the ports takes place in the container sector. Rotterdam’s most important competitors in this market segment are Hamburg and Antwerp.”²³

Containers are standardised, i.e., each container terminal operator can handle containers without further specialisation, and generally containers do not contain input for industry located at the port. It is generally considered as non-captured cargo that could, in principle, be dealt with at any port with a container terminal.²⁴ This is also confirmed by our survey, which shows that many operators consider a large part of their volume as non-captive volume.

In the current situation, we nevertheless conclude that with respect to containers HbR has pricing power relative to its rival ports and identify a very narrow relevant market. A number of factors led to this conclusion, in particular:

- There is clear evidence that Antwerp is the most relevant alternative port compared to Rotterdam. This is confirmed by an analysis of the call pattern, which suggests that the Antwerp-or-Rotterdam decision is much more relevant than the German-or-Benelux port decision (almost all lines call at a German *and* at a Benelux port). It is further underpinned by an analysis of the hinterland, which shows that the overlap between the ARA range ports is much greater than the overlap between German ports and Rotterdam or Le Havre and Rotterdam. Finally, this proposition is supported by the switching evidence. The survey responses of port users in the container segment suggest that almost half of any switched volume would be switched to Antwerp, 17% to Amsterdam and only 14% to Hamburg and 8% to Bremerhaven.
- However, although the above analysis suggests potential for intense rivalry between Antwerp and Rotterdam, there are a number of factors that indicate that Rotterdam is currently not effectively constrained by Antwerp. Based on evidence provided by HbR, harbour dues for typical deep-sea vessels on the Far East and the Transatlantic trade are 38 to 50% percent lower in Antwerp than they are in Rotterdam (and even lower in Hamburg and Bremerhaven). The differential compared to Antwerp is likely to reflect, among other factors, the better sea-side access of Rotterdam. This explanation was also suggested by HbR and is consistent with the fact that the price difference increases with ship size (the larger the ships, the more binding is the tidal constraint on the river Scheldt, to the disadvantage of Antwerp).
- Moreover, Antwerp is currently operating at full capacity. There is clear evidence that Rotterdam currently benefits from container flows that cannot go through Antwerp due to these constraints. This situation is expected to gradually change from the second half of the year 2005 onwards, but will be binding at least until then.

²² Interview with [confidential] on 8 July 2004. Interview with HbR.

²³ HbR Annual Report 2004, p. 13.

²⁴ With more and more cargo types being containerised, we may see more port bound containers in the future.

Note that these findings do not suggest that the statement in HbR's annual report, that the "biggest competitive battle" between the ports takes place in the container sector is necessarily generally wrong. Port related costs comprise many elements. Harbour dues are only a small part of the total port related cost and hinterland cost, whereas other elements, like container handling costs, are much more substantial part of total transport cost. It follows that competition between stevedores, on price and on quality, may indeed be intense but competition between port authorities in setting their harbour dues is not. Note, however, that in the short-run the capacity constraints at Antwerp also affect competition between stevedores.

Roll-on/roll-off

The roll-on/roll-off business is one of the least captive. This has been pointed out in our survey and it is confirmed by the fact that, at least for accompanied trucks on ferries, the terminal handling services are minimal. Over 90% of HbR's revenue in this sector is generated by ferry services between Rotterdam and the east coast of Great Britain the so-called North Sea ferry market. We have included all ports that operate in this market as relevant alternatives. The key points that lead to this definition were the following:

- The non-existence of routes and the geographical location of ports suggest that it is currently not economical to serve the east coast of Great Britain from other ports than those included in the North Sea ferry market. Close to 90% of the respondents to our survey said that they would switch to one of the markets included in our definition. HbR considers Zeebrugge, which accounts for the largest ro-ro throughput of ports that operate on the North Sea trade, as the most important competitor. There is also evidence that the hinterland on the continent is to a large extent local, or confined to the Benelux countries and locations in Germany along the Rhine.
- For the decision to move cargo from the North Sea to the French short sea market total generalised cost (including hinterland transportation in Great Britain) are to be considered. Given the low share of harbour dues in total generalised cost, an increase in harbour dues by five to ten percent is unlikely to lead to a significant shift from the North Sea ferry market to other ferry markets, like the market for the French short sea.
- Even across the ports serving the North Sea ferry market the port of Rotterdam can sustain higher price differences compared to Zeebrugge (46% less expensive), Amsterdam (-23%) and Vlissingen (-23%). The only exception to the rule that HbR's harbour dues over all its types of cargo are the largest of all ports is ro-ro harbour dues in Antwerp, which are double those of Rotterdam. According to HbR, however, this situation is likely to reflect the fact that the tariff benchmark in Antwerp captures the tariff for car cargo vessels rather than ferry services. Antwerp has traditionally focussed more on cars, whereas Rotterdam's main ro-ro business is ferry services. The markets are likely to be separate, and the differentiated but equally raised harbour dues are an indication of pricing power of both Antwerp (for cars) and Rotterdam (for ferry services), rather than a competitive discipline for HbR.

Comparing the ports that operate in the North Sea ferry market shows that the port of Rotterdam has a market share of 35%. In the Havenplan 2020, published by HbR and other bodies, competition with the most important rival in that market, Zeebrugge, was seen as limited. This conclusion was based on Hinterland considerations. This conclusion is confirmed by the benchmarking analysis. Note, however, that the finding that roro traffic is the least captive cargo type would suggest that competition within the North Sea ferry market should be more intense. Contrary to cargo types like bulk cargo, specific investments and the availability of industry at the port seems less relevant. The choice of port seems mainly driven by transport cost considerations for the origin and destination pairs of the cargo.

Other general cargo

Generally cargo is very diverse, ranging from paper to steel or bananas. Some ports, including Antwerp, distinguish various types of general cargo in their tariff scheme. It would therefore not be entirely impossible to analyse each sub-market separately. In our assessment we alternatively rely on our general findings regarding the hinterland and the captivity of business that generates significant value added at the port. In particular, the following arguments were critical:

- For a number of general cargo types, ports have specialised (like fruit juices in Rotterdam and bananas in Antwerp) and built up industrial clusters at the port, suggesting that some cargo is captive. This is confirmed by our survey, which ranks “other general cargo” in the mid-range with respect to share of captive volume.
- The survey respondents pointed to Antwerp as the most important substitute port. Interestingly, a number of respondents also pointed to Vlissingen as a less important but relevant alternative.
- The benchmarking confirms the general picture obtained for other cargo types as well. Rotterdam is the most expensive port, although harbour dues are very similar to those in Amsterdam. This evidence, the fact that switching is confined mostly to the ARA-range ports, and the overlap in hinterlands all points to the conclusion that the ARA-range forms an upper bound on the relevant market.

Liquid bulk

In contrast to roro and container cargo, which rank lowest in terms of the share of captive volume identified by our survey respondents, liquid bulk was generally classified as the most captive, in particular crude oil and mineral oil products.

Table 8: Market definitions liquid bulk

Cargo type	Market definition based on switching data	Most conservative market definition	Market share (upper bound)
Crude oil	Rotterdam	Rotterdam	100%
Mineral oil products	Rotterdam	Rotterdam	56%
		Antwerp	44%
Other liquid bulk	Rotterdam	Rotterdam	78%
		Antwerp	22%

Source: CRA analysis

Crude oil

Crude oil is only shipped into and not out of the port of Rotterdam and other ports in the Hamburg-Le Havre range. Shipments of crude oil are primarily determined by the location of the refineries. Four refineries are located at the port itself. They consume about half of the crude oil shipped into Rotterdam. The rest is pumped through pipelines to refineries located elsewhere. Some of these refineries also have access to a pipeline from Wilhelmshaven (they consume about 16% of Rotterdam's volume). The rest is mainly pumped through a pipeline to refineries in Antwerp. We conclude that Rotterdam is the relevant market, for the following reasons:

- The capacity of the pipeline from Wilhelmshaven is almost fully utilised.
- Crude oil is shipped by some of the largest vessels with significant depths. These cannot call at Antwerp for physical restraints.
- The price difference between harbour dues in Rotterdam and Wilhelmshaven and Rotterdam and Antwerp suggests that Rotterdam has significant market power.

Mineral oil products and other liquid bulk

The position of the port of Rotterdam with regards to mineral oil products and chemical products (about half of "other liquid bulk" is chemical products, the other half is oils and liquid fats) follows to some extent from the strong position in crude oil and the existence of major refineries at the port: A large number of shipments are induced by the petrochemical industry located at the port. Rotterdam has the largest petrochemical cluster in the HLH-range. We define Antwerp and Rotterdam as the relevant markets, mainly because:

- Some 50% of the hinterland traffic for mineral oil products is shipped through pipelines, thus giving Rotterdam a strong position. The remainder is shipped via inland waterways. For other liquid bulk the share of barge transport is 75%.

- The importance of barging gives the ARA range ports a strategic advantage, as they have superior access to the river Rhine corridor and the industry alongside.
- For many types of oils and fats, refineries and other processing at the port makes this business captive.
- Our survey results show that the only other port that was mentioned as a potential substitute to Rotterdam was Antwerp.

We have therefore concluded that the hinterlands served by the ports of Antwerp and Rotterdam constitute the widest possible relevant geographic market for mineral oil products and “other liquid bulk” type, that Rotterdam has consistently the largest market share in this market, as well as some power to set prices.

Dry bulk: Iron ore and scrap, coal, agribulk, and other dry bulk

Table 9: Market definitions dry bulk

Cargo type	Market definition based on switching data	Most conservative market definition	Market share
Iron ore and scrap	Rotterdam	Rotterdam	70%
		Amsterdam	18%
		Antwerp	12%
		Vlissingen	0%
Coal	Rotterdam	Rotterdam	50%
		Amsterdam	34%
		Antwerp	16%
Agribulk	Rotterdam	Rotterdam	44%
		Amsterdam	39%
		Gent	11%
		Antwerp	5%
Other dry bulk	Rotterdam	Rotterdam	29%
		Antwerp	27%
		Amsterdam	21%
		Gent	17%
		Zeebrugge	4%
		Vlissingen	2%

Source: CRA analysis.

Dry bulk cargo is mainly used as an input for industrial production. The most important cargo types in this segment are iron ore & scrap and coal, which together account for almost 80% of

total dry bulk throughput in Rotterdam. We base our suggested definition of the relevant markets on the following considerations.

- For iron ore & scrap and coal shipments, draught restrictions are the most important capacity constraint for competition between ports. Rotterdam is the only port that can accommodate large capesize vessels with more than 16.5 metres of draught. This means that at least between 62% (iron ore) and 11% (coal) of the current throughput volume in Rotterdam can be considered as captive business. Vertical integration of the main users also adds to the captivity of dry bulk cargo in Rotterdam. Both factors provide HbR with pricing power, which increases with the size of the respective vessel. The existence of price differentials is confirmed by our benchmarking analysis.
- Iron ore & scrap and coal are the most important dry bulk cargoes for the port of Rotterdam, both in terms of throughput and revenues generated for HbR. For both cargo types, German steel producers and power plants located in the hinterland in the Rhine/Moselle/Main area are the most important customers of the port of Rotterdam and all other ports in the ARA range. The overlap in hinterland with the German ports is marginal and not relevant for iron ore and coal. Moreover, our benchmarking analysis shows that harbour dues in Rotterdam are significantly higher than harbour dues in Hamburg. For agribulk and mineral dry bulk, the same hinterland and benchmarking considerations apply, which leads us to conclude that the German ports do not represent a competitive constraint on the pricing of HbR and are therefore not part of the relevant markets for any of the dry bulk cargo types.
- The importance of the other ARA ports, in particular Amsterdam and Antwerp, was confirmed by the responses to our survey.
- Due to relatively favourable maximum draught conditions (although still worse than in Rotterdam) and resulting fringe capacity, we included the port of Vlissingen in the relevant markets for iron ore and scrap and other dry bulk. This was confirmed by our survey results.
- Based on our hinterland analysis and our survey results, we also added Gent to the relevant markets for agribulk and other dry bulk. For other dry bulk, Zeebrugge was considered to be relevant too.
- The French port of Dunkerque shares some of the hinterland with the ARA ports, in particular in Belgium and Northern France. Still, although HbR indicated that volumes have been switched from Rotterdam to Dunkerque in the past, we have found no evidence for switches induced by harbour dues only. Also, the large majority of iron ore and coal shipped through Rotterdam is destined for German industry end users (83% and 63% respectively). Hence, the overlap in the hinterland is only very small. In addition, our survey responses indicate that Dunkerque is not considered as a suitable alternative to the port of Rotterdam for the various dry bulk goods. Even if it was mentioned as an alternative, respondents would not shift any volume there if prices in Rotterdam increased. Note that the latter argument also applied to Le Havre, which we excluded also due to hinterland considerations.

1.8.12 COUNTERVAILING POWER, ENTRY AND EFFICIENCIES

Most port users pay harbour dues as published in the tariff brochure. HbR consults its customers prior to changing the list prices, but, as discussed above, these rounds are considered as “ritual dances” by the port itself. The fact that no serious negotiations take place at these rounds has been confirmed by our survey.²⁵ Some port users, in particular container lines, but also some bulk users, negotiate discounts. With regard to container lines, the existence of price differentials between Rotterdam and Antwerp, as well as the current congestion at Antwerp, suggest that shipping lines have not been able to exercise countervailing power to the degree of eliminating HbR’s pricing power. The position of the lines is likely to be enhanced by the capacity expansion at Antwerp towards the end of 2005. Still, for the time being, although a number of port users are large companies, we conclude that they do not have countervailing power. Shortly before we finalised this project, HbR pointed to the apparent presence of discounts to some dry bulk cargo customers. Our survey also brought up some cases of ro-ro customers receiving discounts. Our analysis rests on the assumption that the price benchmarks provided by HbR reflect relative pricing between ports sufficiently well. As tariff differences are substantial, however, our conclusion would be robust to fairly large asymmetric discounts, so that this working assumption is not crucially influencing our findings. For containers, HbR has explicitly confirmed that the provided benchmarking data (which excludes discounts) is a good approximation of relative prices with discounts. The lack of evidence of actual switching in response to an increase in harbour dues is consistent with the absence of effective countervailing power.

Throughput of almost all cargo types in the HLH range is growing, reflecting increasing trade flows due to globalisation and the need of the European industry for raw materials. This growth offers opportunities for some of the smaller ports to attract investment in facilities and offer a more attractive network of hinterland connections. Clearly, this may change the competitive landscape in the future.

Vertical integration can lead to foreclosure effects, but also to efficiencies. As the port of Rotterdam is essentially a landlord port not engaged in significant complementary activities, and since we did not hear any complaints as a result of the survey on this issue, we did not pursue any in-depth analysis of foreclosure or potential efficiencies of vertical integration. At a number of occasions, however, interviewees and survey respondents pointed out that they felt that ECT, the container terminal previously partially owned by HbR, receives preferential treatment compared to other terminal operators. Some of the shipping lines also stated that the lack of competing terminals at the port was of concern and that stevedoring services had been of insufficient quality and too expensive. Although these signals, if robust, would further substantiate our findings on the dominance of HbR, we have not further investigated these issues, as they are outside the scope of the present study.

²⁵ However, one respondent pointed to a success of negotiations at these consultation rounds for feeder vessels and ferry operators in the past.

1.8.13 LIMITATIONS OF THE ANALYSIS

While our analysis provides convincing evidence that HbR has pricing power relative to rival ports and that the standard approach to market definition leads to relatively narrow markets among which HbR serves its own relevant market relatively unconstrained by competitors, a few remarks are important to put the findings into context. In particular, the finding of short-run pricing power does not automatically lead to a conclusion that this is welfare harming:

- While ports may have the power to exploit pricing power for a number of years, long-run considerations may induce lower pricing (in particular for expanding ports that want to attract more tenants).
- Dynamic considerations suggest that higher pricing of a port that has locational and geographic advantages can lead to higher investment at the – from a social perspective – right place.
- The competitive relationship between port authorities depends on the financing of the port authorities' investments. However, as explained above, analysing subsidies/state aid is beyond the scope of this report.

1.9 Structure of the report

The remainder of the report is structured as follows. Chapter 2 details the approach to market definition and market power. Chapter 3 summarises the survey results. Chapter 4 provides a more detailed account of HbR's activities, in particular the renting out of land and the provision of infrastructures. The ensuing chapters 5 to 10 present the detailed analysis of market definition and market power for these activities. Each of these chapters is introduced by an overview that summarises the key arguments and conclusions. The analysis with regard to the provision of infrastructure is conducted on the level of the ten identified cargo types. However, in order to avoid unnecessary repetitions we have grouped the analysis according to cargo categories: container, roll-on/roll-off and other general cargo, dry bulk and liquid bulk. In the last chapter we briefly discuss further considerations that put the analysis into the broader context of welfare considerations.

2 The approach to market definition and market power

2.1 Introduction

The definition of the relevant market is an intermediate step in order to assess market power. It is a tool for aiding the competitive analysis by identifying those substitute services that provide a significant constraint for the services offered by HbR. The European Commission Notice on the definition of the relevant market confirms this view:

“The main purpose of market definition is to identify in a systematic way the competitive constraints that the undertakings involved face. The objective of defining a market in both its product and geographic dimension is to identify those actual competitors of the undertakings involved that are capable of competitive pressure” (para 2).

While a proper definition of the market is a helpful step in the analysis of market power, it is not sufficient and also not always necessary for the purpose of analysing market power.

The insight that there are various intermediate methods to get an understanding of issue of pricing power in the present project has implications for the kind of data that is to be gathered as part of the empirical analysis in order to put the NMa in a position to assess market power. In this section we therefore describe an analytic framework that includes, but also goes beyond the definition of the relevant markets.

Six elements can be distinguished that are relevant for the analysis of market definition and market power:

- Identification of participants, services, cargo types and flows;
- Market definition;
- Barriers to entry;
- “Countervailing power” of port customers;
- Efficiencies; and
- Collusion.

2.2 Preliminary steps: Identifying participants, services, cargo types and flows

In its preliminary investigation of the economic activities of HbR, the NMa has concluded that the findings with regard to demand side substitution are likely to differ with regard to the type of ships that are used, the type of cargo, and the route. Moreover, the set of alternatives differs, depending on the positioning in the transport chain. For example, while ship-owners will consider using alternative ports in response to a price increase, shippers will, for some goods, also consider using alternative modes of transportation.

The analysis of, first, the types of services that are provided by HbR and, second, the alternatives to these services that are available to port users is the first important step of the market definition exercise. It involves identifying:

- **Services provided by HbR** – We describe the services provided by HbR in the next section. Market definition will concentrate on the two main activities of HbR, the distribution of parcels of land and the supply and operation of port infrastructure. Both markets are related. For example, competitive pressure on the market for the provision of infrastructure will constrain pricing for the leasing of land. This affects the sequencing of our analysis as we note below.
- **Identifying key participants** - The commercial activities conducted by the HbR involve the interaction of a number of principal parties, including coastal and international shipping operators, shippers, other providers of port services as well as land transport providers, regulators and tenants. For the market definition exercise the key participants are those that decide on the cargo flows (to assess relevant markets for the provision of infrastructure and the leasing and renting of land) and on the decision at which port to locate (to assess relevant markets for leasing and renting of land). We have identified the relevant participants by using the list of tenants provided by HbR, further information on port users that is available from HbR's website, CRA industry expertise and relevant public documents.
- **Types of cargo** - Ports handle a range of cargoes. One critical task in the market definition exercise is to determine which cargo types should be considered together in the same "product market". The appropriate definition critically depends on the ability of the port to differentiate between different cargo types and whether there are differences in the competitive constraints. To see that point, consider the following example. Suppose the port authority does not distinguish pricing between vessels that carry cargo type A and B, so that a price increase will always affect both cargo *types* (for ease of terminology we refer to cargo types in one pricing scheme as cargo *categories*, i.e. A and B are in one cargo category). Suppose further that there are two main competing ports (e.g. measured by available cargo handling capacity) for cargo type A, say Antwerp and Dunkerque, and two competing ports for cargo type B, say Antwerp and Amsterdam. Given the pricing structure, the pricing of the port authority will then be constrained by all three ports. Whether this constraint is sufficient to say that all three ports are in the same geographic market for the cargo category (A + B) depends on further analysis (such as the importance of cargo flow A, which may be

minor). Thus, when identifying the relevant types of cargo, two questions need to be answered. First, are the cargo flows affected by similar competitive constraints (if yes, they can be grouped together) and second, can the port differentiate between the cargo types? In practice, a further consideration is the level of detail at which information is available in order to consider differences in competitive constraints. Often, the categorisations used by industry reflect a level of disaggregation that is sufficient to take strategic pricing decisions. Below, we propose to distinguish ten different cargo types.

- **Origin and destination of cargo** – It is general industry knowledge – confirmed time and again in our interviews and questionnaires – that hinterland costs and seaside access are critical factors for the choice of port. In theory, it is possible to choose many different levels of aggregation. What is the correct level of aggregation? Here it is worth noting an important difference between the origin and destination and the type of cargo. While it is easy for the port to distinguish harbour dues by cargo type, it is usually not that easy to distinguish harbour dues by detailed origin or destination of the cargo. This is, first, because it would add significant complexity to the pricing scheme and, second, because a ship may carry cargo for many destinations and from many origins (this is especially relevant for the container business). Moreover, the port and those paying the harbour dues may simply not have that the necessary information about origins and destinations of the cargo (which incidentally also prevents them from price differentiating along this dimension when they would have the power to do so). Thus, in general, the proper approach is to analyse the origin and destination patterns at the level of cargo types (which could in principle be distinguished by the port). The level of detail that is applied in this analysis can vary significantly (see our proposal regarding module B).

2.3 The conceptual framework for market definition

The main practical purpose of market definition is to permit inferences about market power to be drawn from market shares. Thus, the relevant market needs to be defined so that it contains all those substitute products and regions that provide a significant competitive constraint to the services of HbR. The approach followed by most competition authorities is the “hypothetical monopolist test,” also called the “SSNIP test” (Small but Significant and Nontransitory Increase in Price). This test goes through the logic of a hypothetical monopolist to determine whether or not pricing on a particular candidate market is constrained by substitute products. The relevant market is the smallest collection of products (regions) such that the hypothetical profit-maximising monopolist would, if he were serving the market on its own, impose a small but significant nontransitory increase in price, assuming the terms of sale of the other products are held constant. The NMa itself explained the SSNIP test in a recent merger decision:

Het gaat er bij deze test om vast te stellen wat de reactie van consumenten is op een niet-tijdelijke verandering in prijzen van 5 à 10% door een bepaalde producent. In het geval dat zij zullen overstappen naar een andere producent, worden op grond van de SSNIP-test beide

producenten tot dezelfde relevante markt gerekend. (Besluit van 28 januari 2004, Nummer 3524 / 47, Juliana Kinderziekenhuis/ Rode Kruis Ziekenhuis - Leyenburg Ziekenhuis, p. 15).

The definition of the relevant market can have several dimensions. It is common to distinguish relevant product markets and relevant geographical markets. The main practical purpose of market definition is to permit inferences about market power to be drawn from market shares. Thus, the relevant market needs to be defined so that it contains all those substitute products and ports that provide a significant competitive constraint to the services of HbR. With regards to the services provided by HbR the following issues are of particular relevance:

- Relevant product markets - The main issues regarding the relevant product markets in the area of ports refer to the level of disaggregation regarding the types of cargo and the origin and destination of cargo. Other possible considerations include the size of the vessels, the types of customers or the modes of transport that are used for part of the transport chain. Products are grouped together if they face similar competitive restraints and if the port authority cannot differentiate between them. In practice, a further consideration is the level of detail at which information is available in order to consider differences in competitive constraints. Often, the categorisations used by industry reflect a level of disaggregation that is sufficient to take strategic pricing decisions.
- Relevant geographic markets - The relevant geographic market with regard to the provision of port infrastructure and with regard to the leasing of land to port bound customers is determined by analysing, which ports provide significant competitive restraints to the pricing of HbR. Tenants that are not bound to the port could also locate in regions outside the port. For them the relevant geographic market is much wider.

The approach followed by most competition authorities to determine the relevant markets is the “hypothetical monopolist test,” also called the “SSNIP test” (Small but Significant and Nontransitory Increase in Price). This test goes through the logic of a hypothetical monopolist to determine whether or not pricing on a particular candidate market is constrained by substitute products. The relevant market is the smallest collection of products (regions/ports) such that the hypothetical profit-maximising monopolist would, if he were serving the market on its own, impose a small but significant nontransitory increase in price, assuming the terms of sale of the other products are held constant.

There are a number of potential pitfalls that need to be avoided when applying the hypothetical monopolist test. We consider them under the headings:

- Wrong benchmark price;
- Reference to average instead of marginal consumers;
- Negligence of supply side substitution; and

- Wrong sequence of analysis.

Pitfall 1: Wrong benchmark price (“Cellophane fallacy”)

The hypothetical monopolist test will only produce reasonable results if the current price is a price reflecting effective competition. In the European Commission Notice on the definition of the relevant market this is emphasised:

“Generally, and in particular for the analysis of merger cases, the price to take into account will be the prevailing market price. This might not be the case where the prevailing price has been determined in the absence of sufficient competition. In particular for investigation of abuses of dominant positions, the fact that the prevailing price might already have been substantially increased will be taken into account” (para 19).

For the purpose of this investigation, this implies that one has to consider the possibility that some of the tariffs set by the port of Rotterdam under its previous organisational form do not reflect prices compatible with effective competition. That is, they may already include a considerable mark-up. Ignoring this possibility is known as the “Cellophane fallacy”. Note that ignoring a mark-up may lead to a market definition that is too wide. It cannot lead to a market definition that is too narrow.

One way to study whether existing prices already reflect market power is to compare the prices for similar services at different ports. We explain our approach to address this issue in Section 2.5.1.

An alternative approach to address the issue of the Cellophane fallacy is to study past incidences of capacity shortages. If prices went up significantly, this may reflect a lack of market power in the absence of these capacity shortages. We find that in the past the pricing of the port authority in Rotterdam was based on yearly adjustments and followed a long-run strategy, not adapted to short-run fluctuations in demand. Thus, past pricing data will not generate the information required for this analysis.

In any event, when there is indication that the prevailing price level reflects a considerable mark-up already, the relevant market tests will overestimate the substitution effects from a (further) price rise, as prices are already high to begin with. As a result, the relevant market is defined to include more products than are truly in the market, so that market power is likely to be underestimated due to this fallacy. Relevant markets are likely to be smaller when based on already monopolized prices.

Pitfall 2: Reference to average instead of marginal consumer

The profitability of a price rise depends on the sales volume that would be lost following such a price increase. Thus, one tool used in competition inquiries is the analysis of switching behaviour of customers. A common error in competition inquiries is the focus on the

behaviour of the average consumer. It is, however, not the behaviour of the average customer but that of the marginal customer that matters for market definition and therefore for the analysis of market power. The crucial question is whether the loss of sales that results from a price increase would be sufficient to offset the increased profits that stem from the higher margin on the remaining sales. It is not necessary for all customers to be willing to switch, only that enough would switch in response to a price increase for it not to be a profit maximising price increase.

In our survey, we asked whether users of the port of Rotterdam would switch in response to a lasting increase in port related prices by ten percent. In order to assess the economic importance of the switching statements we asked port users how much they would switch, and to which ports. This analysis was complemented by a cargo flow analysis described in more detail below. The cargo flow analysis looks directly at pricing power by analysing the differences in generalised cost of different cargo flows. If differences for a large number of these flows are large, a narrow relevant market follows.

Pitfall 3: Negligence of supply side substitution

Supply side substitution is given if companies that currently do not provide services that are substitutes for HbR could easily switch their production and offer these services. We agree with the initial assessment of the NMa that it is unlikely that on the level of inter-port competition other providers could easily switch from their current activity to providing the entire set of services that is provided by the port of Rotterdam. In fact, given the observed growth in almost all categories, switching is unlikely to occur. However, we do observe significant efforts by many ports to expand capacities and attract terminals for different cargo types. We analysed known expansion plans in the chapters discussing the cargo types. We also asked for known expansion plans in our survey.

Pitfall 4: Wrong sequence of the analysis

The results of the market definition analysis may depend on the sequence in which products or other ports are added. In order to identify the correct relevant market, it is necessary to add the services (ports, modes) to which the current customers of HbR would most likely switch first. If, for instance, the market for container shipping is analysed, and one would ask the question, would you switch to Gent in response to a hypothetical price rise, the answer could be no. This could lead to a wrong (too narrow) market definition as shippers may effectively consider Hamburg as the most relevant alternative container port.

This pitfall is addressed by asking port users where they would switch cargo volume in response to a price increase. Moreover, we ask a range of questions that address the issue of the quality of substitution of different ports. This allows us to determine the relevant sequence of the analysis by considering the best substitutes first.

2.4 Market power

In academic textbooks market power is sometimes referred to as pricing above marginal cost, i.e. the cost of producing the last unit of output (in practice average variable cost are often used as a substitute to marginal cost). In practice, this theoretical measure is often not very useful. If producing the goods involves low marginal cost but high fix costs that result, for example, from investments in infrastructure, market power in the academic sense would be necessary in order to provide sufficient investment incentives. Regulatory bodies therefore usually take into account the incentives for investment, e.g. when regulating prices. One way to achieve this is to use cost concepts that consider the cost of the investments into the infrastructure.

In the context of this study our focus is not on determining a set of optimal prices that a regulator would set. Moreover, we have not been tasks to study the financing of the port authorities and their investments.

In investigations that involve market definition and market power, competition authorities often rely on techniques that do not rely on a direct measure of costs of the firm investigated. We use these techniques and explain them further below. If pricing of the rival ports is competitive these techniques can be used to show that the analysed firm exploits market power. If rivals price below competitive levels (e.g. due to subsidies), the techniques provide evidence on the potential to exploit market power if rival firms were to price competitively. In other words, in a market where all rivals price artificially low, even a firm with market power may be constrained to price at costs. Since we did not look at the financing of HbR and rival port authorities, our results provide no direct evidence that the port is currently pricing excessively.

However, we do provide direct and convincing evidence addressing the question whether HbR can charge higher prices than the most important alternative ports. Such pricing power provides a strong indication that HbR can exploit its dominant position, at least if rival ports do not price below costs, i.e. it suggests that HbR has market power if rivals do not price artificially low.

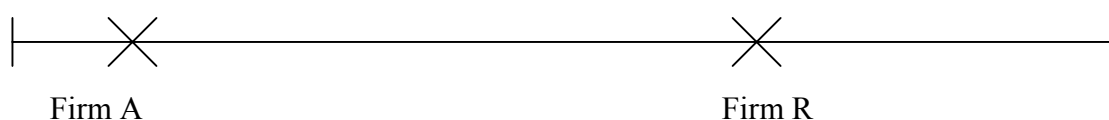
If firms exploit market power by setting high prices this will, at least in the short-run, harm customers of the port. The welfare implications for other groups in society depend on a variety of factors. For example, if ports operate at full capacity, high prices may have no effect on the number of calls, implying that there is, at least in the short-run, only a distributive effect to the benefit of the port authority. Since consumers are not direct customers of the port they are affected as higher transport costs lead to higher prices for consumer goods.

2.5 Methodologies to apply the framework

2.5.1 BENCHMARKING

In order to address the cellophane fallacy problems and to get a first indication of pricing power, we compare the harbour dues and lease-related prices per TEU (container) or per ton (other cargo).

The basic service of providing port infrastructure such as quay walls, jetties and roads does not differ significantly between ports, which means that higher pricing of the port of Rotterdam would then be an indication of pricing power relative to the relevant alternative ports.²⁶ The basic conceptual approach applied here is simple. To see the argument, consider two identical firms, R and A, that produce a homogenous good. In order to reach the customers, both firms have to incur transport cost (a given amount per kilometre). However, suppose that firm R has a more favourable position relative to the customers. The figure below illustrates this situation on a so-called Hotelling line for product differentiation – here along the dimension geography. Customers are distributed equally along the line and each cross represents the location of a firm. Given this market structure, the prediction is that firm R can set higher ex works prices (i.e. prices net of transport costs) than firm A, for it has a larger “catchment area”. The observed price difference is an indication for the market power that stems from the more favourable location of firm R.



When defining the relevant market we have to compare ex works prices. The observed price difference suggests that a market definition exercise that takes the existing prices of R as a basis would be subject to the cellophane fallacy. Transport cost advantages allow firms to price profitably above cost and this is a definition of market power. If ports are located differently, this may simply reflect some degree of product differentiation that may help port authorities recovering fix costs. If there is a significant asymmetry between ports (as indicated in the example above), the port with the advantage can profitably price above total costs if the competing (disadvantaged firm) prices at costs.

The benchmarking approach deduces the differences in (customer weighted) transport cost by comparing prices. An alternative approach is to analyse the differences in transport cost directly. This is what we do under the heading of “cargo flow” analysis (see next section).

²⁶ Higher prices at the port of Rotterdam may also reflect different policies regarding the financing of investments. Pricing power relative to competing ports does not have a direct implication for an assessment of welfare in a dynamic context.

Note that the reverse conclusion is not possible. That is, should prices do differ, this may reflect that current prices are competitive, but it is also consistent with ports operating in different relevant markets and having comparable pricing power, leading to fairly equal high price levels, or even with outright collusion among the ports.

The benchmarking approach is relatively simple for those cargo types for which comparative pricing data exists. Moreover, it is meaningful regarding the assessment of pricing power reflected in existing prices. However, it does not answer the question whether there is scope to increase prices (which we address in the following sections).

2.5.2 CARGO FLOW ANALYSIS

A complementary approach to the price benchmarking method is to analyse cargo flows. The conceptual approach is relatively simple. If at given prices²⁷ the routing of a relevant unit of cargo via Rotterdam (considering hinterland transport costs, sea transport cost, cargo handling costs, and call costs, including harbour dues) costs €1,000 and the routing via the next best alternative port costs €1,100, an increase in harbour dues of €50 per unit, i.e. an increase of total costs by 5%, is unlikely to lead to switching. If a €50 increase is higher than five to ten percent of the existing level of harbour dues, this would indicate that the next best alternative port is not to be considered being in the same relevant geographic market for the cargo flow considered. It follows that there are two important elements to this analysis. First, the importance of harbour dues and lease-related prices in the overall transport chain is of importance. Second, for each origin-destination pair the differences in generalised costs between alternative ports determine the likelihood of switching in response to an assumed price increase (captive business analysis).

Note that the fact that HbR can only control a small part of a bundle of complementary services also implies that its pricing power depends on the pricing of the terminal operator and other providers of complementary goods. By increasing competition between terminal providers, a port authority can induce lower prices and more room for its own pricing.

For technically inclined readers it is also worth pointing out that the combination of several providers of complementary goods leads to a double marginalisation effect in oligopoly markets. Several providers of complementary services add mark-ups to their services, which leads to higher overall prices than if firms were vertically integrated. The desire to reduce these multiple mark-ups and thereby become competitive is one rationale for the observed trend towards vertical integration in the transport industry.

²⁷ Note that this is subject to the Cellophane fallacy caveat described before.

2.5.3 SURVEY APPROACH

In order to complement the analysis above, we have designed survey questionnaires, which have been sent by the NMa to users and tenants of the port of Rotterdam (see Annex VII). Using survey techniques can be very helpful, in particular to complement other empirical evidence. However, one needs to be aware of the significant limitations of survey-based evidence for direct questions on competition. Strategic reporting of respondents may lead to biased answers. This can be exemplified by the SSNIP question, which asks whether respondents would switch volume away from Rotterdam in response to a lasting 10 percent increase in harbour dues charged by HbR (see enclosed questionnaires). Even ignoring the issues related to the cellophane fallacy discussed earlier, the bias of responses can go both ways:

- Strategic respondents may answer that they would not switch in order to indicate that price increases are possible and HbR has market power.
- Strategic respondents may also bias reporting to suggest that they would switch at the smallest price increase in order to indicate that they will not accept any price increase.

The fear of non-confidentiality may induce strategic responses. Further problems associated with survey techniques include a neglect of the pass-on dimension of price rises by suppliers in a vertical chain, straightforward forgetting of relevant issues, simple mistakes, and unintentional distortions. Respondents may also not fully understand their own preferences or – in particular since filling out questionnaires is not necessarily perceived as a principal activity – the person filling out the questionnaire may not have enough information to answer in detail. Moreover, prejudices may inform answers.

We conducted the survey despite these limitations, because we believe that it can still lead to valuable qualitative insights and input for the analyses pointed out above. In particular, we received more factual information on switching behaviour. In order to limit biased reporting, we have carefully chosen the order of questions and have asked for different types of evidence for similar issues.

2.5.4 REVEALED PREFERENCES

Neither HbR nor other port authorities have been able to provide us with examples of past pricing decisions that have induced port users to switch away from a particular port. The survey has, with one exception, confirmed this finding. According to our research there is no publicly available time-series data for harbour dues. Despite our acknowledgement of potentially important differences between actual behaviour and reported hypothetical reactions to changes in market conditions, we have therefore been forced to revert to the latter in the present study. Being well aware of the superiority of time-series data over questionnaires, however, we have taken considerable care in the drawing of our conclusions.

2.6 Further relevant steps to assess market power

There is significant overlap in the analysis of the relevant markets and the analysis of market power. All conclusions regarding pricing power have immediate relevance for conclusions regarding market power. In addition, we now look at the conceptual issues related to barriers to entry, countervailing power of port customers, efficiencies and collusion.

2.6.1 BARRIERS TO ENTRY AND EXPANSION

There will be no new major maritime ports in Europe in the near future. However, existing ports expand their capacities and change their focus by investing in specific facilities. Thus, with regard to inter-port competition, entry relates more to capacity expansions and the change in focus than to the development of completely new sites (see appendix). We covered major known plans to expand in the relevant sections on different cargo types.

2.6.2 COUNTERVAILING POWER OF PORT CUSTOMERS

The port of Rotterdam has very different types of customers. Some customers may have relevant countervailing power because they contribute significant business to the port and have the ability to switch to other ports. We have investigated this issue.

2.6.3 EFFICIENCIES

Vertical integration of HbR, i.e. the joint provision of land, infrastructure and a variety of services at the port of Rotterdam, could lead to the risk of foreclosure. As a consequence of bundling of services and the resulting behavioural barriers to entry, customers could lose some of their countervailing power and entrants could be deterred. Thus, vertical integration could increase market power.

However, vertical integration could also lead to efficiency gains that may offset any increase in market power. In the market for maritime port services, the efficiency gains could result from economies of scale and scope and the incentive of the port operator to maximise revenue on all complementary services - which leads to an incentive not to overprice a single service. Another reason for integration can be demand from customers for one-stop shopping and integrated services.

Given the lack of vertical integration of the port of Rotterdam and in line with the findings of the preliminary study conducted by the NMa (see Annex IV), we currently do not envision further investigation into issues of vertical integration and efficiencies.

2.6.4 COLLUSION

For the analysis of collusive oligopoly, three aspects are of particular significance:

- 1) Collusion represents a deviation from firms' short-term profit-maximising strategy. Hence, given the behaviour of its rivals, each firm has an incentive to undercut its competitors.
- 2) From (1) it follows that collusion can only be maintained if the long-term profits from collusion for each firm are higher than the profits from deviating from the collusive price level, which would be followed by 'punishment' by the other firms.
- 3) The incentive to cheat on the other firms is larger if market conditions do not allow firms to observe if their competitors deviate from the collusive behaviour. In such non-transparent markets, collusion usually cannot be maintained.

While some port users suggested that that Rotterdam usually "moves first", the analysis of collusion was not at the heart of this study.

2.6.5 SOURCES OF INFORMATION

In order to undertake the study we engaged in intensive communication with HbR (four meetings plus several telephone conversations). We furthermore conducted a number of interviews with port users (shipping lines, shipping agents for dry and liquid bulk), a competing port (Antwerp), the European Commission and academics at the University of Leuven (see Annex I for a list of interviews). We consulted various resources, including reports and data generated by our own research and those provided by HbR and the NMa (see Annex II for a list of articles, reports and studies used). A further important element of this study was the design and evaluation of a survey that was sent out to users and tenants of the port authority of Rotterdam (see next Chapter).

3 Summary of the survey results

3.1 Survey background and methodology

One important element of our study was the design and evaluation of surveys that were sent out to the tenants and users of the port of Rotterdam. The addressees for the questionnaires were based on a customer database that we received from HbR. We added various freight forwarders that HbR does not have contractual relations with and which therefore are not part of the port authority's database, but which nevertheless are users of the port and hence important for our study.

Questionnaires were sent out to 1,296 addresses in the Netherlands and 19 addresses abroad (mainly in Belgium and Germany). We left it up to the respondents to decide which of the surveys (or both) were relevant for them. Out of these 1,315 letters, 40 were returned to the sender (the NMa) by the Dutch mail because the address was no longer correct. In addition, 17 respondents sent blank questionnaires for both users and tenants back to the NMa, pointing out that the questions were not relevant for them or that the company addressed did no longer exist. Eight respondents did not fill out the tenants questionnaire, but sent it back in blank anyway. 16 respondents did the same with the user questionnaire. Note however that some respondents filled out one of the questionnaire – users or tenants respectively – but added the blank questionnaire which they did not see as relevant for themselves.

In our analysis of the survey responses, we considered 88 companies who filled out the tenants questionnaire and 58 companies who filled out the user questionnaire. Some user respondents answered the questions for several cargo types, which means that we could distinguish up to 67 different responses for some cargo-specific questions. Thus, we evaluated 146 questionnaires in total.

For the user survey, many of the major customers of HbR answered our questions, often in detail and providing valuable qualitative insights. We received answers from the majority of the large oil companies and refineries located in the port, from two of the largest dry bulk terminal operators, one large container terminal operator, various container liners (including the leading ones in the world) and some major forwarding companies and agents. In addition to these major customers, we also received responses from smaller companies, which improves the representativeness of our analysis. Our respondents covered all cargo types.

Generally, the responses to our tenant survey were also of high quality. Most of the large terminal operators in the port of Rotterdam participated in the survey and provided valuable insights. However, we also received answers from smaller tenants, which should make our survey more representative. In terms of leased land, the total area leased in the port of

Rotterdam by the respondents to the CRA tenant survey was 2,851 ha, which corresponds to about 60% of the total area leased out by the port of Rotterdam in 2003.²⁸

The survey is an important input for our analysis. Nevertheless, a number of qualifying remarks are due.

- Responses could be biased to the extent that especially those port users and tenants had an incentive to participate in the survey that have concerns or strong feelings regarding the market position of the port of Rotterdam.
- There is the risk of strategic reporting of respondents. One example is the SSNIP question, asking whether respondents would switch volume away from Rotterdam if HbR increased harbour dues permanently by 10%. On the one hand, strategic respondents could answer that they would not switch with the intention of indicating that price increases are possible and HbR has market power. On the other hand, strategic respondents could answer that they would switch at the smallest price increase with the intention of indicating that they will not accept any price increase.
- In general, all surveys are vulnerable to problems such as forgetting, simple mistakes, and unintentional distortions. Respondents may not fully understand their own preferences, the person filling out the questionnaire may not have enough information to answer in detail or rely on prejudices when giving his answers. For respondents who are not the end users but operate at some point in the vertical chain (e.g. terminal operators), one issue that might also arise is that respondents might not understand the actual consequences of symmetric price rises for all rivals alike in the setting of a vertical chain with pass-on possibilities.

When designing and evaluating the questionnaires, we addressed these issues in the following way:

- We carried out consistency checks. Where answers were inconsistent to the extent that they would risk the meaningfulness of our survey results, we followed up with the respondents to clarify their responses or excluded the answers from our evaluation.
- Besides asking hypothetical questions, e.g. regarding switching between ports, we also asked for evidence on actual switching between ports in the past.
- Finally, we do not rely too much on the quantitative results of our survey, but more on the qualitative results. For example, we put less emphasis on the survey results to estimate the total captive throughput volume in Rotterdam or how much volume would be lost in response to a price increase by HbR. However, we use the responses for ranking purposes (e.g. the relative captiveness of the different cargo types) and to gain insights into the ports that users of Rotterdam would switch to.

In the following sections, we describe our evaluation approach for the surveys and present the main results. Given the different target groups, we distinguish between the user and the tenant survey.

²⁸ 4,722 ha according to HbR Annual Report 2003, p. 20.

3.2 User survey – evaluation and main results

3.2.1 OVERVIEW

In total, we received 93 responses to our user survey. 33 responses were completely blank and therefore not considered in the evaluation. In addition, we excluded two of the remaining surveys from the evaluation due to gross inconsistencies and suspected misunderstandings (see the discussion of caveats in the previous section). These left out answers do not introduce a bias in the analysis, as the elimination on the grounds of unreliability was not asefect. In all, this left us with a total of 58 companies who filled out the user survey and where included in the analysis.

One aim of our survey analysis was to be able to distinguish between the different cargo types since alternative ports, captiveness etc. are likely to vary across the cargoes being shipped through the port of Rotterdam. In reality, many port users handle more than one cargo type, e.g. both iron ore and coal or both mineral oil and chemicals. Although we explicitly asked them to do so, none of the respondents filled out one survey per cargo type. However, we followed up with all respondents who answered the questions for more than one cargo type, clarifying whether their responses were valid for all cargo types they dealt with and whether they could provide information about their shipments through Rotterdam in 2003 per cargo type. In general, respondents confirmed that their responses applied to all cargo types represented by them. Where companies provided us with the split of throughput between the different cargo types, we counted the different company/cargo pairs (we called them “company ID”) as a separate survey. This means that although we received responses from 58 companies, our survey evaluation is based on a total of 67 company ID’s. Note that there were some companies for which we did not receive the exact split of throughput volume. We consider those respondents for the results of each cargo type they indicated in the survey. Hence, the sum of counted answers when adding all answers for all cargo types is larger than 67 for most questions.

In the following, we report the main results of the user survey. Note that, as explained above, we distinguish 67 company ID’s in our analysis, i.e. unique company/cargo type pairs. In the following, we will refer to these company ID’s as “respondents”. Note that this interpretation of “respondents” is not identical with the number of companies who actually answered the questionnaire (58). Out of the total number of 67 respondents, not all answered all questions. Hence, the number of respondents for a particular question varies (we report it in this section as “n”).

3.2.2 CHOICE OF PORT

About 37% of the respondents to the CRA questionnaire (n=65) are responsible for the decision which port to choose for a particular shipment. About 63% are not personally

responsible for port choice. We decided to still include the latter group in our analysis in order to benefit from their industry expertise and experience.

64 respondents provided information about the total volume of shipments through Rotterdam in 2003 that their company was involved in. In total, the throughput volume shipped or handled by the respondents to our survey amounted to almost 367 million tons. Note that total volume in tons reported by the respondents to our survey is higher than the actual throughput volume in the port of Rotterdam in 2003 (328 million tons). This can be explained by doublecounting due to the fact that our respondents included agents, shippers, cargo handlers, and even end users. Hence, some of them deal with the same cargo, but at different points in the transport chain.

On average, respondents estimated that about 39% of their shipments through Rotterdam in 2003 are captive business, i.e. the volume could not be moved to other ports even if e.g. harbour dues in Rotterdam were increased permanently by 10% while harbour dues in all other ports stayed at their current level. As could be expected, the share of captive volume reported varied significantly between cargo types, ranging from 7% for roll-on/roll-off to 78% for mineral oil products. For all cargo types, respondents indicated that specific investments in facilities at or near the port were an important reason for the captiveness of the volume. Dry bulk port users attributed even more importance to this factor than other cargo types such as containers. The respondents to this question who are active in the mineral oil segment (4) even mentioned infrastructure investments as the only reason for captive business. For container users, generalised route costs are a very important reason for captive volume in Rotterdam. They attributed more weight to this factor than any other cargo type. On average, long-term contracts were also seen as important for all cargo types except mineral oil products. Other reasons for captive business mentioned by our respondents included congestion and lack of free capacity in other ports, the strategic location of Rotterdam, proximity to inland destinations and demands of cargo owners to ship volume through Rotterdam instead of other ports.

The CRA survey asked respondents through which ports they shipped cargo in 2003. In general, all ports in the HLH range were used by some of the 54 respondents who answered this question. However, for all cargo types, Rotterdam was used by more respondents than any other port. 94% of all respondents to this question used Rotterdam in 2003. The next largest ports were Antwerp with 56% and Amsterdam with 37%. However, also more distant ports such as Hamburg were used by a significant share of respondents (35%).

After asking for the actual use of the different ports in 2003, we also asked respondents which ports they see as alternatives for the port of Rotterdam for the different cargo types and how they assess their quality compared to Rotterdam. A detailed analysis of the responses to this question will be presented in the chapters on the different cargo types later in this report. However, the general conclusion is that the three ports closest to Rotterdam – Antwerp, Amsterdam and Vlissingen – were mentioned most often as substitutes for the port of Rotterdam. 81%, 67% and 51% of all respondents said that they saw these ports as

alternatives for Rotterdam respectively. The quality of the ports as a substitute for Rotterdam was on average seen as relatively good, ranging from 0.4 (Amsterdam) to 0.9 (Antwerp) on a scale from -2 (very poor quality as a substitute) to +2 (very good quality as a substitute). Hamburg was seen by 44% as a possible substitute, with an average quality of 1.

Given that Antwerp is the largest port located close to Rotterdam, we asked respondents to evaluate the quality in Rotterdam compared to the quality in Antwerp. On average, our respondents believe that the quality (nautical, hinterland, terminal, dues, network effects) in Rotterdam is good compared to Antwerp (average of 0.1 to 0.8 for various quality factors on a scale from -2 (very poor) to +2 (very good)).²⁹ The two areas where Rotterdam achieved the lowest score were costs. For both the quality of harbour dues and stevedoring dues, Rotterdam achieved on average a negative score compared to Antwerp (-0.1).

Turning from port to hinterland considerations, we asked respondents which port they would use for a cargo shipment from or to a specific hinterland destination. In particular, we offered the origins/destinations of Paris, Strasbourg, Gent, Bochum, Frankfurt/Main, Stuttgart, Munich and Prague. Across all cargo types, Rotterdam was the port chosen most often for shipments to or from the destinations and origins. Exceptions were Paris, where Le Havre was chosen as the main port, reflecting its position as a truly French port and shipments to and from Gent, where the port of Gent was chosen most often. For those origins and destinations where respondents chose Rotterdam most often, Antwerp was generally chosen by the next highest number of respondents. Exceptions were shipments to Hannover and Prague, where the second highest number of respondents chose one of the German ports (Hamburg and Bremen/Bremerhaven). However, interestingly Rotterdam was chosen by more respondents for shipments to Hannover than Bremen/Bremerhaven and Hamburg respectively.

3.2.3 SWITCHING

As discussed in Section 2.5.3, revealed preferences are arguably more reliable than stated preferences when it comes to switching between port. Hence, we asked respondents whether they had ever reduced (or heard of a reduction of) volume at a port due to an increase in harbour dues, an increase in port costs, a capacity expansion at other ports or other reasons. Only 15% of all respondents to this question reported a reduction in volume at a port due to an increase in harbour dues in the past. However, following up on these cases, we could only confirm one situation in which volume had really been reduced in a response to an increase in harbour dues. In all other cases, changes in total port costs, logistical considerations or other

²⁹ Quality factors considered were “Proximity to origin and destination in terms of sailing time and nautical access”, “Cost and time of hinterland connection to origin or ultimate destination”, “Frequency of hinterland connections”, “Quality/ facilities of terminal operator”, “Quality of facilities for further processing or storage at or near the port”, “Draft restrictions”, “Harbour dues”, “Stevedoring dues”, “Benefits of bundling cargo at one port (network effects)”, “Benefits of splitting cargo between ports” and “Other”.

reasons were ultimately responsible for the decision to reduce volume at a port. The one case of a volume reduction due to an increase in harbour dues involved an agribulk agency moving volume from Rotterdam to Amsterdam in 2001. While a reduction in volume due to a change in harbour dues was mentioned only by a minority of respondents, 49% reported a reduction in volume in response to an increase on total call costs at a port and 30% a volume reduction due to a capacity expansion at another port. Other reasons for switching that respondents mentioned included terminal handling charges, generally better conditions, a decision made by cargo owners/end users, a capacity shortfall or congestion at a port, more storage facilities at another port, the general service level and the relation of service and price.

Despite the very limited amount of actual switching due to a change in harbour dues that respondents reported, 75% of them said that they would expect volume to be shifted away from Rotterdam if HbR increased harbour dues permanently by 10% and harbour dues at all other ports stayed the same. For a hypothetical 10% increase in total port related costs – defined as port call costs plus cargo handling costs – in Rotterdam assuming no price change in other port, 83% of all respondents expected that volume would move from Rotterdam to other ports. The average volume that respondents would expect to shift away from Rotterdam in response to such an increase in total port related costs was 46% for all cargo types. Note however that this share varied significantly across the different cargo types, ranging from 8% for crude oil to 73% for roll-on/roll-off. Table 10 shows that – based on our survey responses – Antwerp would benefit most from an increase in total port related costs in Rotterdam by 10%. Out of the volume that respondents would expect to shift away from Rotterdam, almost half (about 48%) is expected to be moved to Antwerp on average. Amsterdam would be the second port, with a share of 20%. All other ports would receive only small shares of volume.

Table 10: Share of volume shifted away from Rotterdam that is moved to other ports

	Simple average share of volume moved away from Rotterdam that would be re-routed to this port
Antwerp	48%
Amsterdam	20%
Hamburg	7%
Zeebrugge	5%
Vlissingen	5%
Wilhelmshaven	3%
Bremen/Bremerhaven	3%
Gent	2%
Felixstowe	2%
Le Havre	0%
Dunkerque	0%
Other	4%

Source: CRA questionnaire. Other ports included Moerdijk, Dordrecht, Terneuzen, North Killingholme, Thamesport, and Southampton.

3.2.4 IMPACT OF CAPACITY EXPANSION

There are plans to expand the general capacity of various ports in the HLH range in the future, e.g. the port of Wilhelmshaven, the port of Rotterdam (through Maasvlakte II) and the port of Antwerp (the first part of the new Deurganck dock will open in 2005). We asked respondents whether they believed that these expansions would lead to lower harbour dues in Rotterdam, lower terminal dues in Rotterdam or better service quality in Rotterdam. As Table 11 shows, the respondents to our questionnaire expect the strongest effect on harbour dues, terminal dues and service quality in Rotterdam to stem from the expansion in Antwerp. More than 40% of all respondents believed that this expansion would increase competition to the extent that prices in Rotterdam will fall and the level of service quality increase. Only around 20% of all respondents believe that the expansion in Wilhelmshaven will have this effect. With regard to the expansion of Rotterdam, one third of all respondents believed that Maasvlakte II will lead to lower harbour dues. 38% believed that it will lead to lower terminal dues. The strongest effect of Maasvlakte II is believed to be on the level of service quality in Rotterdam. 60% of our respondents believed that this will increase after the expansion.

Table 11: Expected effect of capacity expansions in various ports on pricing and quality in the port of Rotterdam

	Share of respondents answering “yes”
Will the expansion of Wilhelmshaven lead to...	
a. Lower harbour dues in Rotterdam?	18%
b. Lower terminal dues in Rotterdam?	18%
c. Better quality of services in Rotterdam?	23%
Will the expansion of Rotterdam lead to...	
a. Lower harbour dues in Rotterdam?	33%
b. Lower terminal dues in Rotterdam?	38%
c. Better quality of services in Rotterdam?	60%
Will the expansion of Antwerp lead to...	
a. Lower harbour dues in Rotterdam?	45%
b. Lower terminal dues in Rotterdam?	45%
c. Better quality of services in Rotterdam?	41%

Source: CRA questionnaire.

For containers, the recent expansion of terminal capacity at the port of Amsterdam provides an interesting case study for the effect of port expansion on competition and for the factors important for the choice of a port. The port of Amsterdam offers a new container terminal (Paragon terminal) where both harbour dues and stevedoring costs are about half of the level in Rotterdam. Still, the terminal has been unsuccessful in attracting significant container volume. We asked respondents what they believed are the reasons for this “failure” and to distribute 100 points between four factors: “Level of connections to the hinterland”, “Distance to hinterland locations”, “Seaside access” and “Other reason”. On average, respondents saw hinterland connections as the most important factor (33 points). Distance to hinterland locations received 14 points and seaside access 25. Other factors mentioned included a lack of connections with other main ports in the world, no infrastructure (hard and software) for containers, the fact that “the market” is in Rotterdam, and investments made in infrastructure in Rotterdam. One respondent said that his company was not willing to take the “risk of losing capacity in Rotterdam in case Amsterdam does not work and we want to return to Rotterdam”.

3.2.5 PRICING OF PORTS

According to our survey, 35% of the respondents negotiate harbour dues with HbR on average. Evaluating the answers per cargo type shows that there is a lot of variation. For liquid bulk, none of our respondents indicated that they negotiate harbour dues. For containers, the share was 69% and for roll-on/roll-off even 75%. For dry bulk, the share of

respondents negotiating harbour dues with the port authority ranged from 20% for iron ore & scrap and coal to 67% for agribulk.

With regard to the annual consultation rounds that HbR holds with port users before setting the new harbour dues, about 47% of all respondents do not think that these rounds have an effect on the ultimate pricing decision of the port authority. 53% believe the contrary. Reasons provided by those respondents indicating that the consultation rounds did not influence the pricing of HbR included “arrogance of HbR (and formerly ignorance of the municipality”, and the feeling that pricing decisions are usually already taken before the consultation rounds take place. On the other hand, one respondent who believes that the consultation rounds influences the decision of HbR reported that in the past, these rounds were successful for feeder vessels and ferry operators.

In the following question, we asked users – if they had knowledge about harbour dues in Rotterdam and at other ports – to specify at which ports in the Hamburg-Le Havre range harbour dues are generally lower than at the port of Rotterdam. However, after receiving the responses, we realised that the question was formulated in a misleading way. In particular, we asked respondents to specify at which ports harbour dues are generally lower **than** at the port of Rotterdam. However, the table in which respondents were asked to tick their answers said “higher **in** Rotterdam” and “equal or lower **in** Rotterdam”, i.e. the “than” was missing, which reversed the meaning of the question. Reviewing the responses and the information we received about the level of harbour dues in reality showed significant discrepancies. Also, the fact that many respondents who “harbour dues are equal or lower in Rotterdam” indicated reasons for a price premium in Rotterdam compared to other ports in the following question indicates that they actually meant “harbour dues are equal or lower **than** in Rotterdam”. Given these problems, we decided to exclude this question from our survey evaluation and not consider it in our analysis.

As already mentioned, the following question asked respondents – if they believed that harbour dues in Rotterdam were higher than in other ports – what they believed were the reasons for this premium. Possible answers included “better services at Rotterdam”, “better access to Rotterdam”, “better hinterland connections in Rotterdam” and “other reason(s)”. Respondents could indicate whether they believed the respective factor was important or not (i.e. yes or no). Out of all respondents who answered this question, 60% believed that better services in Rotterdam explained the price premium, 77% thought that better access to Rotterdam was important, and 73% answered that price premiums could be explained by better hinterland connections in Rotterdam. Other reasons mentioned included too high overhead costs at the port of Rotterdam, the fact that HbR does not compete on prices, and the fact that a substantial part of the proceeds of the port authority was given to the municipality in the past. It was also suggested that crude oil tankers were used as “cash cows”, that the port of Rotterdam was a monopoly and there was no transparent price calculation method and political conceit.

37% of all respondents who answered the respective question believed that there is a traditional sequencing in the price setting of harbour dues in the sense that one port starts and the others follow. Out of the 14 respondents who indicated who they saw as the port that would usually go first, 12 mentioned the port of Rotterdam. One said that it was either Antwerp or Rotterdam but in the past mainly Rotterdam. One respondent (other liquid bulk) mentioned the UK ports without any further specification.

Almost 90% of all respondents said that they perceived price differences between harbour dues at different ports to be relatively stable. Still, 37 respondents, representing 70% of all respondents for the respective question, indicated that they knew of examples of ports trying to lure customers and their cargo volume away from other ports. Rotterdam was mentioned by four respondents in this context, Amsterdam by 14 (mainly in the context of the new Ceres Paragon terminal mentioned earlier). Antwerp was mentioned eleven times as trying to lure customers away from other ports and Hamburg seven times.

3.2.6 PERFORMANCE AND COMPETITIVENESS

In order to gain information about how port users think about the performance and competitiveness of the port authority of Rotterdam, we asked them to indicate which changes, compared to the situation today, they would expect as a result of the corporatisation of the Rotterdam port authority and which changes they would expect if – hypothetically – the port authority was to be fully privatised, i.e. came under full private ownership. Table 12 shows the responses to this question.

Table 12: Performance and competitiveness – effect of corporatisation and privatisation (user survey)

	Corporatisation of the port authority			Full privatisation of the port authority		
Do you expect an effect on...	a. Pricing?	b. Investment?	c. Service quality?	a. Pricing?	b. Investment?	c. Service quality?
Share of “No, I do not expect an effect”	52%	43%	45%	13%	29%	29%
Share of “Yes, I expect an increase”	25%	54%	42%	42%	47%	55%
Share of “Yes, I expect a reduction”	23%	4%	13%	45%	24%	16%
Total answered	56	56	55	55	55	55

Source: CRA questionnaire.

For both corporatisation and full privatisation, expectations of port users – based on the survey responses – are relatively mixed. In particular, almost the same share of respondents believed that prices would increase after the change as the share of respondents believing that prices would fall. This is true for both corporatisation and privatisation, although the share of respondents who does not expect any effect on pricing is larger for the former than for the latter. With regard to investment, the majority of respondents believed that both corporatisation and privatisation would lead to higher investments. However, 24% of the respondents also expected that – after full privatisation – investment would drop. This compares to only 4% of the respondents who believed the same to occur after corporatisation. Finally, a significant share of respondents, 42% and 54%, expected that the quality of services would increase after corporatisation and privatisation respectively. Interestingly, more respondents believe that this will occur after full privatisation than after corporatisation. In summary, there seem to be mixed expectations regarding the development of prices after corporatisation and privatisation. The majority of respondents expects investment to increase in both cases and service quality is expected to increase too.

To conclude the block of questions on competitiveness and performance, we asked respondents whether they had ever had any negative experience with the port authority or one of its daughter companies (e.g. terminal operators) that they would consider as “anti-competitive”, i.e. not normal competitive practice and possibly an attempt of HbR to abuse potential market power? We received only a limited amount of information from this question. Although technically speaking 38 respondents answered it, the overwhelming majority did so by saying “no”. However, most of the oil companies answering our survey referred to the pending court case on allegedly discriminatory pricing by HbR vis-à-vis the oil sector.

3.2.7 QUALITATIVE QUESTIONS

Many respondents provided details on the following qualitative questions asked in the survey:

- Please describe the nature of specific investments in port infrastructure and suprastructure by your company. Describe your contractual relationships with the port (length of time etc.). Would you be able to move the facilities to another port?
- If available, please provide information on the total cost of calling at the port of Rotterdam (disbursement accounts, split into: Harbour dues, cargo handling, other) and at other ports in the Hamburg-Le Havre range.
- If you have detailed information on the hinterland transport of the cargo shipped by you (origin and destination, transport modes), please provide this information for the ports you call at.
- Please explain the decision-making process of at which ports to call, the sequencing of calls (if applicable, e.g. for liner business) and the key factors considered. How often do you revise these decisions?

- What do you see as the most important trends in your business that will affect the pricing and the service quality at the port of Rotterdam?
- Are there any concerns regarding the competitiveness between ports or of service providers within ports that you wish to bring to our attention?

The information we received from answers to these questions is used throughout the report and the different chapters.

3.3 Tenants survey – evaluation and main results

3.3.1 OVERVIEW

In total, we received 114 responses to our tenant survey. 25 responses were completely blank and therefore not considered in the evaluation. In addition, we excluded one of the remaining surveys from the evaluation due to inconsistencies and lack of substantial information contained in the answers (see the discussion of caveats in the previous section). This left us with a total of 88 companies who filled out the tenant survey and were included in the analysis.

Like for the user survey, we tried to distinguish between tenants involved in the shipping and handling of different cargo types since alternative ports, captiveness etc. are likely to vary across the cargoes tenants deal with. In reality, port tenants often handle more than one cargo type, e.g. both iron ore and coal or both mineral oil and chemicals. Although we explicitly asked them to do so, none of the respondents filled out one survey per cargo type. However, this problem is less severe for the tenants than for the port users, where we followed up with all respondents who answered the questions for more than one cargo type, clarifying whether their responses were valid for all cargo types they dealt with. This means that for the tenant survey, the number of “company ID’s”, i.e. company/cargo type pairs is equal to the number of companies answering the survey, 88. Note however that where we distinguished between different cargo types, we considered all respondents for the results of each cargo type they indicated in the survey. Hence, the sum of counted answers when adding all answers for all cargo types is larger than 88 for most questions.

In the following, we report the main results of the tenant survey. Note that out of the 88 respondents, not all answered all questions. Hence, the number of respondents for a particular question varies (we report it in this section as “n”).

3.3.2 CHOICE OF LOCATION

The survey asked tenants which port or non-port locations would represent a possible substitute for their location at the port of Rotterdam. Interestingly, only very few respondents

indicated that a non-port location would be suitable to them, which means that most of the respondents to our survey can be considered as port bound. Antwerp (55%) and Vlissingen (40%) received the highest share of respondents who said that those ports are possible substitutes for the location of their company. In terms of quality as a substitute compared to Rotterdam, Antwerp was rated on average with 1 (on a scale from –2 (very poor) to +2 (very good)) and Vlissingen with 0. Amsterdam represents an alternative for one third of all respondents who answered that question and received an average quality score of 0. However, other more distant ports were also seen as alternatives: the German ports received between 15% (Wilhelmshaven, average quality 0) and 24% (Hamburg, average quality 0). Dunkerque and Felixstowe seem to represent an alternative location only for a very small share of respondents, 4% and 6% respectively.

Based on our survey, Rotterdam does not have a significant quality advantage compared to the quality of respondents' second best location alternative. For most quality factors tested in the survey (in particular for lease conditions, provision of suitable infrastructure, proximity to customers, synergies with other companies, quality of labour and other factors such as hinterland connections and quay dues), Rotterdam achieved on average a quality score of 0 compared to the quality at the next best location (on a scale from –2 (very poor) to +2 (very good)). The only factor where Rotterdam stood out was sea access (average score of 1), which confirms our general findings in this study.

57% of all respondents to the tenant survey feel that their company is locked in in the port of Rotterdam, i.e. it could not easily relocate even after termination of the lease contract. The by far most important reason for being locked in according to the survey results are specific investments made in facilities at or near the port. This factor received on average 49 points out of 100 points that respondents were asked to distributed between five different factors: "specific investments made in facilities at or near the port", "long-term contracts with port-bound customers, e.g. ship owners" (received 10 points), "long-term contracts with other port tenants, e.g. terminal operators or storage companies" (6 points), "no other location offers the infrastructure necessary for our business" (16 points) and "other reason(s)" (19 points). Other reasons mentioned by respondents included, besides mentioning infrastructure investments and long-term contracts again, the strategic advantage of being located at a port, lease conditions and staff considerations.

While 57% of all respondents indicated to feel locked in in the port of Rotterdam, 32% of all respondents to that specific question said that they would re-locate if HbR increased its lease prices permanently by 10% and prices at all other locations stayed the same.

3.3.3 INFORMATION ABOUT THE LEASE RELATIONSHIP WITH THE PORT

The total area in the port of Rotterdam leased in 2003 by the respondents to the CRA survey who indicated the size of their sites amounted to 2,859 ha, representing about 60% of the total

area leased out to. On average, respondents signed their first lease contract in 1966 and their lease will expire in 2027.

Total throughput volume handled by the respondents to our tenant survey was 489 million tons in 2003. This is higher than total throughput in Rotterdam in 2003 (328 million tons) due to doublecounting of the same volume handled by shippers, terminal operators and end users. On average, tenant respondents estimated that 57% of the cargo volume handled by them is captive volume for the port of Rotterdam, i.e. volume that could not be switched to other ports within a year even if e.g. harbour dues (zeehavengeld) in Rotterdam were increased permanently by 10%. The most important reason for captivity according to our survey results are specific investments made in facilities at or near the port. This reasoning is in line with the results from our user survey, where respondents also gave specific investments as the most important reason for captive volume. However, on average respondents to the user survey gave a lower share of captive volume than the tenants, only 39%.

Total cargo handling capacity of the respondents to our tenants survey was about 232 million tons in 2003. This question only related to transport, cargo handling and forwarding and shipping companies.

3.3.4 LEASE PRICES

As explained in the section on lease price setting by HbR (Section 5.5), HbR published recommended lease tariffs, but the final lease price depends on negotiations between the port and tenants. 15% of all respondents for this question indicated that they received a discount on the official lease prices published by HbR when they signed their contracts. Only four respondents provided information on the discounts they received, which ranged from 20 to 32%. One respondent received a one-time discount phased from 100 to 0%. Only 5% of all respondents to that question had received costless services from HbR when signing their lease contracts. These services are described in more detail in Section 1.7.

When being asked about the level of lease prices in the port of Rotterdam compared to lease prices at their next best alternative location, 17% of all respondents to that question indicated that they believed that lease prices were higher in the port of Rotterdam. 73% answered that they did not have any knowledge about lease prices at other locations. In general, this result confirms our finding that lease prices in the port of Rotterdam are at the upper end of the spectrum compared to other ports (see Section 5.8). Most respondents (83%) reported that they believed better sea access in Rotterdam was one reason for the price differential between the port of Rotterdam and other ports. Other important reasons were better infrastructure at Rotterdam (58%) and better hinterland connections (50%, multiple answers were possible). Better service level at the port of Rotterdam was seen by only 25% of all respondents to this question as an explanation for the price differential, which supports our previous findings that the pricing power of HbR stems mainly from the port's locational advantage and not from better quality offered by the port authority compared to other port authorities.

Only 10% of all respondents to the respective question indicated that they were aware of examples of landlords trying to lure tenants away from their current location. One of the tools employed for this are the offer of help with investments according to one survey respondent. Some ports mentioned in this regard were Vlissingen and Antwerp. Some non-port locations such as Tilburg and Venlo were also mentioned.

3.3.5 IMPACT OF CAPACITY EXPANSION

21% of all respondents to the respective question did in the past express an interest in leasing more land in the port of Rotterdam but were rejected by the port authority. The most important reason for rejection was that there was no suitable land available (57%, multiple answers possible) which supports our finding of current scarcity of land in the port area and hence restrictions on HbR with regard to price negotiations. 43% of the respondents indicated that in their case, there was suitable land available, but it was given to another applicant.

The planned expansion of the port through Maasvlakte II can be expected to alleviate some of the current capacity constraints of the port of Rotterdam with regard to land. Table 13 shows the expected effect of Maasvlakte II on lease prices, investment by HbR and investment by third parties in the port according to our survey. The overwhelming majority of respondents believed that Maasvlakte II will lead to lower lease prices and higher investments both by HbR and third parties. Other changes mentioned were increased traffic congestion due to more traffic by road, additional fuel oil demand leading to profitability and growth for refineries, expansion opportunities for businesses already located at the port and more economic activity in port-related services.

Table 13: Expected effects of Maasvlakte II

Do you think the development of Maasvlakte II will lead to...	a. Lower lease prices in Rotterdam?	b. Higher investments in infrastructure in Rotterdam by HbR?	c. Higher investments in infrastructure in Rotterdam by third parties?	d. Other changes (please specify):
Share of respondents saying "yes" "	96%	99%	88%	9%

Source: CRA questionnaire.

Only very few respondents provided information about capacity expansion plans at other ports. Ports mentioned included Amsterdam, Antwerp, Hamburg, Vlissingen, Wilhelmshaven and Le Havre. However, no details – especially not with regard to tenant aspects – were given.

3.3.6 PERFORMANCE AND COMPETITIVENESS

Like the user survey, the tenant questionnaire asked respondents to indicate which changes, compared to the situation today, they would expect as a result of the corporatisation of the Rotterdam port authority and which changes they would expect if – hypothetically – the port authority was to be fully privatised, i.e. came under full private ownership. Table 14 shows the responses to this question.

Table 14: Performance and competitiveness – effect of corporatisation and privatisation (tenant survey)

	Corporatisation of the port authority				Full privatization of the port authority			
Do you expect an effect on...	a. Pricing of land?	b. Pricing of harbour dues?	c. Investment?	d. Service quality?	a. Pricing of land?	b. Pricing of harbour dues?	c. Investment?	d. Service quality?
Share of “No, I do not expect an effect”	49%	43%	40%	54%	14%	24%	33%	41%
Share of “Yes, I expect an increase”	32%	30%	52%	37%	64%	47%	43%	48%
Share of “Yes, I expect a reduction”	19%	28%	8%	9%	22%	29%	23%	11%

*Totals may not add up to 100 due to rounding.
Source: CRA questionnaire.*

Compared to the user survey, the respondents to our tenants survey seem to be more pessimistic with regard to the effect of corporatisation and privatisation on the pricing of HbR (compare Section 3). In particular, 32% of the respondents expect lease prices to increase after corporatisation and 64% after privatisation. For the pricing of harbour dues, the shares are 30% and 47% respectively. These results indicate that tenants seem to expect HbR to have some pricing power, which it currently does not exercise fully given that they believe there is still room for price increases. However, the majority of respondents also believed that investments would increase after corporatisation and privatisation (52% and 43% respectively). With regard to the level of service quality, 54% believed that this would not change after corporatisation while 48% expect it to increase after a hypothetical full privatisation.

3.3.7 QUALITATIVE SURVEY

Like in the user survey, we included a list of qualitative questions in the tenants survey. Many respondents provided details on the following qualitative questions:

- Please describe the nature of specific investments in port infrastructure and suprastructure that you have made. Describe the contractual relationships with the port (length of time etc.). Would you be able to move the facilities to another port?
- What do you see as the main strengths and weaknesses of the port of Rotterdam as a landlord?
- Are there any concerns regarding the competitiveness between ports or between service providers within ports that you wish to bring to our attention?
- Suppose you would start your company tomorrow. In which port would you locate your company? Which port-characteristics are essential for this choice? Do other ports constitute real alternatives for the port of first choice? If they do: which ports are these? If they do not: why are other ports not suitable?

The information we received from answers to these questions is used throughout the report and the different chapters. We did not analyse them separately.

3.4 Survey-based evidence on switching – the SSNIP test

As explained above, our user survey included questions concerning the effect of an increase in harbour dues or an increase in total port related costs (i.e. all port call costs plus cargo handling costs) on the cargo volume shipped through the port. The estimates of respondents regarding the volume that the port of Rotterdam would lose after such a price increase can be used demarkate the relevant market following the SSNIP test methodology. Note that due to the relatively small number of respondents per cargo type and due to the uncertainties related with survey data (strategic responses and other biases, see Section 3.1), the result of our SSNIP test is only indicative. Hence, we do not rely on it to define the relevant markets and to assess whether HbR has pricing power or not.

3.4.1 THE SSNIP TEST

The SSNIP test (“Small but Significant and Nontransitory Increase in Price”), also referred to as the “5% test” or the “hypothetical monopolist test,” is followed by most competition authorities in the definition of relevant markets in the antitrust context. The test seeks to demarkate the relevant market of a particular product by following the logic and behaviour of a hypothetical monopolist. The relevant market is the smallest collection of products (regions) such that the hypothetical monopolist could increase its profits by imposing a small but significant nontransitory increase in price of all the goods in the thus defined market, assuming the terms of sale of all other products are held constant.

In practice, one considers the products or services of the firm under consideration asking whether a hypothetical profit-maximising monopolist with control over all of these products would be able to profitably raise the price permanently by 5 to 10 percent. If the answer is

yes, then this is the relevant market. If the answer is no, other products (regions) also provide significant competitive constraints. Thus, in a next step further products (and/or regions) are added and it is again asked whether the hypothetical monopolist would be able to raise prices by 5 to 10 percent. If yes, this is the relevant market. As a guiding principle, the relevant market can be thought of as the smallest market that is “worth monopolising.”

3.4.2 APPLYING THE SSNIP TEST METHODOLOGY TO THE SURVEY DATA

In our survey, we asked respondents which share of the volume that they currently ship through Rotterdam they would expect to re-route to other ports in case of a permanent increase in total port related costs (i.e. all port call costs and cargo handling costs) in Rotterdam while cost in all other ports remained the same.³⁰ Clearly, these data indicate how much cargo volume would be shifted from Rotterdam to other ports in the case of an increase in harbour dues. Note however that harbour dues only account for a (usually small share) of total port related costs. This needs to be taken into account in the analysis..

As already mentioned, when applying the SSNIP test in practice, one considers the products or services of the firm under consideration asking whether a price increase of 5 to 10% would be profitable for a hypothetical profit-maximising monopolist with control over all of these products. If the answer is yes, then this is the relevant market. Based on our survey data, we can estimate the change in cargo volume induced by a 10% increase in harbour dues by HbR.

It should be noted that when testing the profitability of a change in price and thereby quantity, one also needs to consider potential changes in costs for the hypothetical monopolist. An increase in costs if volume decreases could partly offset the increase in price for the remaining quantity that is sold. In the course of our study, we have not received any evidence that the cost structure of HbR is directly linked to the volume being shipped through the port. Hence, in our indicative SSNIP analysis, we assume that there are no variable costs and that therefore HbR’s costs are bound not to change with quantity (note that this is a conservative assumption as it makes price increases less profitable). Note that this assumption is conservative as it means that a reduction in volume will only reduce revenues for HbR, but that there will be no additional cost savings due to lower quantity, which would make a price increase even more profitable. Our conservative assumption of no variable costs means that an increase in harbour dues will be profitable for HbR if the percentage loss in volume induced by this increase is lower than the percentage increase in harbour dues, i.e. if the elasticity of demand is less than one.

³⁰ Port users often have a clearer view on total port related costs than on minor parts of it. Moreover, HbR could not provide switching evidence regarding harbour dues. Thus, asking for the response to changes to total port related costs is likely to yield more informed answers than questions referring to responses to changes in harbour dues.

Table 15 shows the different steps of our SSNIP test. Note that we could only conduct the test for those cargo types where we had information about the share of harbour dues in total port related costs, i.e. for containers and all dry bulk cargo.

Based on the data from our survey, we arrive at the conclusion that it would be profitable for HbR to raise harbour dues by 10% for all cargo types analysed here. The percentage loss in volume would always be smaller than the percentage increase in price, which means that total profits would be higher than before the price increase – given that average costs are assumed to remain constant.

There are two important things to note regarding this result. First, the fact that our analysis suggests that there is room for HbR to increase prices for containers and all dry bulk cargo suggests that HbR is currently not profit maximising. Hence, HbR does not seem to exploit the pricing power that it has according to our analysis.

On the other hand, it is important to note that – due to the caveats discussed above (see Section 3.1) – our results are only indicative and do not necessarily reflect the true demand elasticity of port users. Whenever possible, we prefer data on revealed preferences over data on preferences stated in an interview or in the questionnaire. Given these restrictions, although the SSNIP test results suggest that the relevant market for containers and all dry bulk cargo types consists only of the port of Rotterdam, we do not base our definition of the relevant markets on the survey-based SSNIP test analysis only. In the course of our study, we have learned about only one example of revealed preferences with regard to switching induced by an increase in harbour dues. An agribulk agency moved volume from Rotterdam to Antwerp in 2001 after harbour dues had increased in Rotterdam. Our survey revealed no other switching related to a change in harbour dues.

In the following, we explain the steps of the profitability analysis in detail.

Table 15: Test for profitability of an increase in harbour dues in the port of Rotterdam (SSNIP test)

		Containers Asia trade	Containers Atlantic trade	Iron ore & scrap	Coal	Agribulk	Other dry bulk
Input	1) Assumed change in harbour dues	10%	10%	10%	10%	10%	10%
	2) Share of harbour dues in total port related costs ³¹ in 2003	10.1%	9.8%	22.2%	21.1%	13.7%	14.4%
	3) Resulting change in total port related costs	1.0%	1.0%	2.2%	2.1%	1.4%	1.4%
	4) Change in volume for a 10% increase in total port related costs according to our survey	-44%	-44%	-23%	-42%	-29%	-34%
Output	5) Change in volume for change in harbour dues assuming constant elasticity (%)	-4.4%	-4.3%	-5.1%	-8.8%	-4.0%	-4.9%
	6) Profitable assuming constant elasticity demand?	yes	yes	yes	yes	yes	yes

Source: CRA calculations based on information provided by HbR and the CRA questionnaire.

- 1) The hypothetical increase in harbour dues is assumed to be 10%. The usual price increase considered in a SSNIP test analysis is between 5 and 10%. Choosing the larger increase makes our test conservative.
- 2) As already mentioned, the CRA survey asked respondents which share of the volume they currently ship through Rotterdam they would move to different ports, assuming that total port related costs, i.e. the sum of harbour dues, other port call costs and cargo handling costs, increased by 10%. Therefore, in order to estimate the effect on throughput volume of an increase in harbour dues, one first needs to determine that share of harbour dues in total port related costs.
 - For containers, we calculated the share of harbour dues in total port related costs based on data contained in the IBM study “Concurrentiepositie van de haven van Rotterdam in de containeroverslag” that HbR provided us with.³² Table 16 in Section 3.4 shows the split of port related costs per container for representative shipment on the Asia and Atlantic trades respectively.

³¹ We define total port related costs as total port call costs (harbour dues and other port call costs) plus total cargo handling costs.

³² See pp. 15 and 17 of the study for the relevant data.

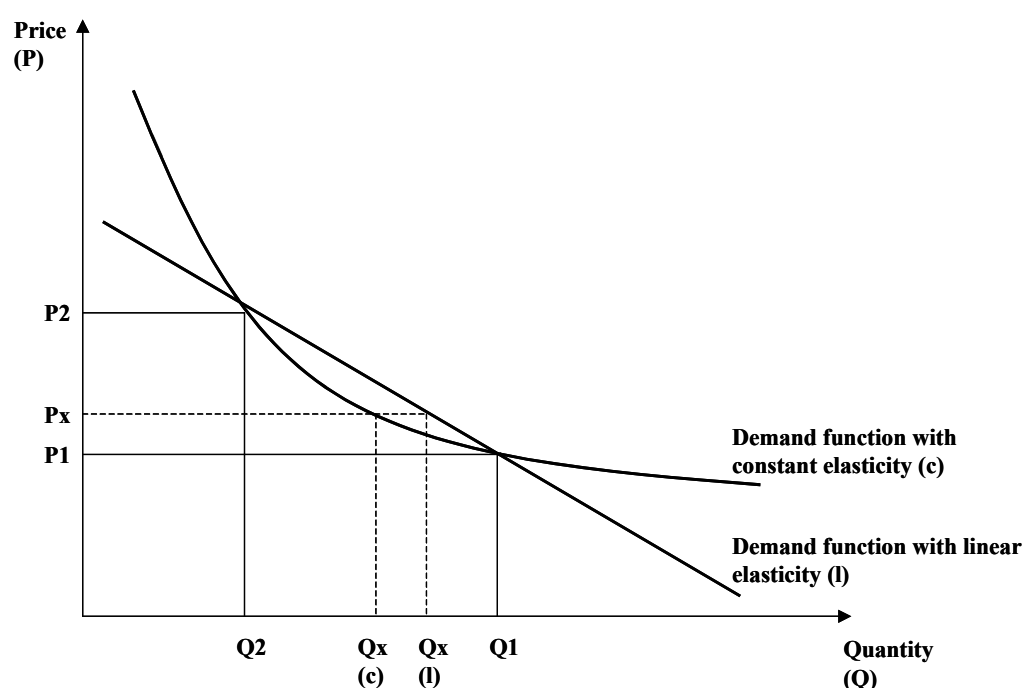
- For dry bulk, we calculated the share of harbour dues in total port related costs based on information provided by HbR on 16 July 2004. This information did not include cargo handling costs, which are, therefore, taken from the study “Benchmark Droge Bulk”, provided by HbR on 16 July 2004. We assume that cargo is not stored, but transhipped (“overslag” but no “opslag” costs). We also assume that the cargo handling costs given for coal are also applicable to iron ore & scrap and that the cargo handling costs given for agribulk are the same as the cost charged for other dry bulk. Given the similarities between the two cargo type pairs, this assumption is reasonable. Note that HbR information related to 2003 while cargo handling costs are based on information for 2001.³³ Table 17 and Table 18 in Section 3.4 show total port related costs for representative dry bulk carriers and costs per ton of cargo shipped as well as the share of harbour dues.
- 3) The percentage change in volume for an increase in total port related costs by 10%, i.e. the demand elasticity of cargo throughput with regard to total port related costs, has been taken from the CRA survey results. Note that for each cargo type we took the unweighted average volume that respondents indicated they would expect to shift to other ports if port related costs increased in Rotterdam. Since our survey questions did not distinguish between Atlantic and Asia trade for containers, we assume that the two trades have the same demand elasticity.
 - 4) The percentage increase in total port related costs subsequently depends on the percentage in harbour dues and on the share of harbour dues in total port related costs. The higher the share of harbour dues in total port related costs, the higher the change in those cost if harbour dues increase. For the cargo types analysed here, an increase in harbour dues by 10% would lead to an increase in total port related costs between 1% and 2.2%. The effect of higher harbour dues is stronger for dry bulk than for containers, where harbour dues account for a lower share of total port related costs due to lower cargo handling costs.
 - 5) The percentage change in volume induced by an increase in harbour dues of 10% is calculated by multiplying the increase in total port related costs for the respective cargo with the demand elasticity described under (4) divided by 10 (i.e. the change in volume for an increase in total port related costs by 1%). Note that this implies the assumption of a constant elasticity of demand, i.e. that the demand elasticity is the same at all points along the demand curve. This assumption is conservative. A linear demand curve with non-constant elasticity would lead to a lower decrease in volume induced by a small price increase, which would mean even less lost volume and hence higher profitability of a price increase (see Figure 1).

³³ HbR attached strong disclaimers to the study “Benchmark Droge Bulk” when providing us with it and recommended not to rely too heavily on the number contained in the study. We still decided to use the estimates of cargo handling costs of €1.7 and €3.4 per ton in our SSNIP test. HbR’s own estimate of dry bulk cargo handling costs were €1 to €3 per ton. The results of our test are the same for all cargo types when the average cargo handling cost estimate of HbR (€2 per ton) is assumed.

- 6) Finally, we checked whether the increase in harbour dues would be profitable. Assuming no changes in variable cost, an increase in harbour dues by 10% will be profitable if the quantity falls by less than 10%, i.e. if the elasticity of demand is less than one. Our results show that this is the case for all cargo types analysed here.

One assumption for our SSNIP test approach is that the elasticity of demand of port users is constant for all price/quantity pairs. Note that this assumption is conservative, in the sense that it leads to a lower estimated loss in volume than a linear demand curve would yield. Figure 1 shows this.

Figure 1: Quantity change due to an increase in price with constant and linear demand elasticity



Source: CRA. For a small price increase from P_1 to P_x , a demand function with constant elasticity leads to a higher loss in quantity ($Q_x(c) < Q_x(l)$) and hence a lower profitability than under a linear demand function.

We have used the two points P_1/Q_1 and P_2/Q_2 to determine the position of the demand curve. Assuming a linear demand function (l) and a small price increase to P_x leads to a reduction in quantity to $Q_x(l)$. Assuming a constant elasticity demand function leads to a larger reduction in quantity (to $Q_x(c)$) for the same small increase in price and – assuming no variable costs – a lower increase in revenues and profits. Thus, assuming a demand function with constant elasticity is conservative, as stated.

3.4.3 SHARE OF HARBOUR DUES IN PORT RELATED COSTS FOR CONTAINERS AND DRY BULK CARGO

Table 16 presents the split of total port related costs for containers in 2003.

Table 16: Split of total port related costs for containers in 2003

	Asia trade	Atlantic trade
	Rotterdam	Rotterdam
Harbour dues	29,720	19,613
Towage cost	8,310	7,800
Mooring/unmooring	3,901	3,093
Pilotage	10,974	10,898
Others	1,601	1,546
Total	54,506	42,950
Share of harbour dues	0.55	0.46
Total call costs per container (p. 16)	25	30
Cost of land move per container	110	110
Port related costs per container	135	140
Harbour dues per container	13.63	13.70
Share of harbour dues in port related costs	10.1%	9.8%

Source: CRA calculations based on "Concurrentiepositie van de haven van Rotterdam in de containeroverslag", pp. 15 and 17, provided by HbR on 8 July 2004.

Table 17 presents the split of the total costs of a representative dry bulk shipment in the port of Rotterdam in 2003 (cargo handling costs for 2001).

Table 17: Cost of cargo shipment through Rotterdam in 2003 (cargo handling cost for 2001)

	Tons of cargo shipped	Total sea transport cost in €	Total harbour dues in €	Total other port call cost in €	Total hinterland costs in €	Cargo handling costs per ton in €	Total cargo handling cost in €	Total port related costs in €
Iron ore	145,000	4,101,180	77,850	26,593	1,812,500	1.7	246,500	350,943
Coal	55,000	1,054,800	29,170	15,830	687,500	1.7	93,500	138,500
Agribulk	55,000	2,343,000	32,495	17,505	687,500	3.4	187,000	237,000
Other dry bulk	30,000	359,964	18,986	11,014	375,000	3.4	102,000	132,000

Source: Information provided by HbR on 16 July 2004. Cargo handling costs are taken from "Benchmark Droge Bulk", provided by HbR on 16 July 2004. All shipments are assumed to be shipped to Mannheim/Germany. Origins are assumed to be Brazil for iron ore, South Africa for coal and other dry bulk and the US gulf for agribulk. Note that cargo handling costs assume no storage, but only transshipment of the cargo to the hinterland transport mode. Cargo handling costs are at 2001 level.

Table 19 presents the total port related costs per ton for representative dry bulk shipments in the port of Rotterdam and the share of harbour dues.

Table 18: Total port related costs per ton and share of harbour dues

	Iron ore	Coal	Agribulk	Other dry bulk
Total port related costs per ton	2.42	2.52	4.31	4.40
Harbour dues per ton	0.54	0.53	0.59	0.63
Share of harbour dues	22.2%	21.1%	13.7%	14.4%

Source: : Information provided by HbR on 16 July 2004. Cargo handling costs are taken from "Benchmark Droge Bulk", provided by HbR on 16 July 2004.

4 Activities of HbR

4.1 Introduction

As the port authority of the port of Rotterdam, HbR is involved in four main activities:

- The supply of nautical-maritime services.
- The supply of land to tenants of the port.
- The supply of port infrastructure to tenants and port users.
- (Minority) shareholdings in other companies.

Out of these four activities, only the second and third, i.e. the supply of land and the supply of port infrastructure, will be analysed in this study. This is in accordance with the brief we received from the NMa. CRA has not been tasked to further investigate issues related to vertical integration.

4.2 HbR services covered in this report

As explained in the previous section, this study covers two economic activities undertaken by HbR: the renting out of land and the provision of port infrastructure. This section provides more details on what the provision of these two services includes.

With regard to the renting out of land, HbR is responsible for the long-term spatial planning of the port, as well as the actual allocation of sites to and negotiation of lease prices with (prospective) tenants. For parcels that include quay walls, HbR does not only charge lease prices, but also quay dues. In many cases, the rented out land includes additional infrastructure set up by HbR, such as stronger quay walls, jetties, roads, or rail tracks. Such investments will be considered in the lease price charged by HbR. The process of price setting by HbR is discussed in more detail in the following sections of this report.

In addition to spatial management, HbR is responsible for the planning, construction and maintenance of the wet and dry infrastructure in the port, which includes for example waterways, port basins, quay walls and roads. HbR charges harbour dues to port customers for the use of this infrastructure. HbR also invests in the dredging of the channel in order to ensure the sea-side access for very large vessels like the ultra large oil tankers or the Berge Stahl, the largest dry bulk vessel that calls at a European port.

Additional suprastructure such as storage facilities, back-up areas, and cranes are not the direct responsibility of HbR, but are usually set up and maintained by port tenants and users.

However, HbR is to a limited extent involved through its Infra+ strategy. Under this strategy, HbR provides some parts of suprastructure to terminal operators.

The yearly expenditure related to investment and maintenance of the port territory and infrastructure is around €150m, which is generally financed out of HbR's total revenues. The port authority is also engaged in the planning of major expansions of the port (Botlek in the late 1940s and early 1950s; Europoort starting in 1958; Maasvlakte I between 1968 and 1974; Maasvlakte II, for which planning is ongoing). These projects are typically financed through loans from the municipality of Rotterdam and co-financed by the Dutch government with specific repayment arrangements.

Table 19 below shows a split of total revenues of HbR in 2002 and 2003. Clearly, the port authority's two main sources of revenue are lease related income (quay dues and leases) and harbour dues charged for the use of port infrastructure. The latter account for about 50% of the port's revenues while the share of lease-related income in total revenues was close to 40% in the last two years. The following sections will explain the price setting of HbR in more detail.

Table 19: Revenues of the port of Rotterdam in 2002 and 2003

	Revenues in 2002 in million €	Revenues of total income in 2002	Revenues in 2003 in million €	Revenues of total income in 2003
Harbour dues sea-going vessels	200	50%	201	50%
Harbour dues inland vessels	10	3%	10	2%
Rent, ground rent, quay fees	150	38%	152	38%
Other income	37	9%	38	9%
Total	397	100%	401	100%

Source: Port of Rotterdam, Annual Report 2003, p. 41. Note that the categorisation of revenues for 2003 presented in this table differs from other categorisations used later in the report. This is due to a new cost accounting approach that HbR introduced in 2003.

4.2.1 LEASE-RELATED PRICES

HbR uses a price list for lease-related prices. However, base lease prices are negotiated between the tenants and HbR and can differ from the list prices by up to 30%. The standard length of a lease is 25 years with the option for renewal. For the time of the lease, the price is determined by the base price adjusted by the Dutch consumer price index. All contracts contain a clause that limits the scope of price increases at the time of renegotiation: HbR needs to take the prices for similar parcels of land on the port territory into account.

List prices for leases are adjusted every 5 years. These adjustments affect new and renegotiated lease contracts only.

When negotiating lease prices with prospective tenants, HbR takes into account their competitive position, the expected revenue generated by the tenant through harbour dues and any investments that might be required to prepare the parcel for the tenant by installing certain infrastructure. HbR has in the past used a cost-based pricing method, with which it is generally looking for an internal rate of return of 8.55%. This is not a regulated target, but internal HbR policy.

4.2.2 HARBOUR DUES FOR THE USE OF PORT INFRASTRUCTURE

Every year, HbR publishes a list of port tariffs that includes the harbour dues payable to the port authority. For most cargo types, harbour dues are charged according to the list prices. For example, vessels carrying wet and dry bulk cargo are charged per GT (gross tons) of the vessel. There are some (official and published) rebates available, but no additional discounts are given. The exception is the container business, where rebates of up to 30% on list prices are negotiated with the liners. According to HbR, harbour dues in Rotterdam are among the most transparent worldwide.

In general, harbour dues can vary by a broad range of characteristics. Possible factors for price discrimination include the type of cargo, ship characteristics (e.g. gross tonnage, length, draft, level of loading), the cargo loaded and/or discharged per call, the origin and destination of the cargo, or whether the vessel operates in liner service or as a tramp vessel. In addition, frequency and other rebates can be offered.

In Rotterdam, harbour dues vary by cargo category and by ship characteristics.³⁴ There is no differentiation by origin or destination of the cargo carried, but a special tariff applies to shortsea/feeder and hinterland vessels. There are special tariffs or rebates for some cargo/vessel types. These include:

- Tariff for crude oil tankers;
- Frequency reductions for agribulk vessels (based on calls per year);
- Tariff for container vessels operating in liner service;
- Tariff for vessels carrying other general cargo and operating in liner service (non-shortsea/feeder);
- Tariff for shortsea/feeder vessels (which, by definition, can only carry general cargo and must operate in liner service); and
- Tariff for roll-on/roll-off vessels (whether or not in liner service).

For all other cargo types, HbR does not price discriminate, but charges a general tramp vessel tariff. This means that, for example, coal and mineral oil vessels pay the same harbour dues

per GT. This lack of price discrimination by cargo type is not a technical necessity, but represents the traditional pricing approach of the port authority of Rotterdam.³⁵

With regard to container vessels, HbR does not apply different harbour dues for cargo destined for transshipment and cargo destined for onward transportation to the hinterland. All incoming container vessels pay the same tariff. However, there is an indirect possibility to apply a targeted pricing policy for transshipment due to the fact that HbR charges different tariffs for incoming (overseas) container vessels, shortsea/feeder vessels and hinterland vessels. By setting the price for shortsea/feeder vessels, the port can, in fact, price discriminate between hinterland cargo and transshipment cargo (excluding relay).

The level and structure of harbour dues are reviewed annually. Until corporatisation, the port authority would consult port customers and then make a proposal to the municipality, taking into account the views of the port customers and especially the financial situation and objectives of the port³⁶. A number of features of this process are noteworthy:³⁷

- The consultation of port customers was described as “ritual dancing” by HbR as the arguments of the customer representatives are predictable and these rounds are not seen as decisive for the actual outcome of the pricing decision. Our survey broadly confirmed this perception although some port users felt the consultation rounds did have an effect on the pricing decision.
- During the consultation rounds with customers, HbR is usually not approached regarding the level of harbour dues, but customers are more interested in better infrastructure, port facilities and/or land. Capacity limits and congestion are more important issues for customers than harbour dues.
- Occasionally the municipality would not agree with the port’s recommendations regarding the new level and/or structure of harbour dues. In such cases, the municipality would usually demand higher harbour dues in order to improve its own financial situation.
- It was pointed out by HbR that they do not follow a short-run profit maximising strategy, but seek to maintain a stable long-run pricing policy and establish the port as a “reliable partner” for its customers.
- According to HbR other ports generally wait and see how prices in Rotterdam change before they make their pricing decisions. This was confirmed by some but not by all survey respondents that commented on the sequencing of pricing decisions.

³⁴ There are also special harbour dues for inland vessels, e.g. fishermen and pleasure yachts. However, those are not the focus of this study.

³⁵ Price discrimination can be welfare and consumer welfare enhancing. The use of this term should not induce a negative connotation.

³⁶ According to a study undertaken by researchers of the University of Amsterdam, the port considers investment, maintenance and development costs of port infrastructure in setting prices (Masurel, E., Nijkamp, P. and B.W. Wiegman: “Tariefstructuur van het zeehavengeld en de daarmee samenhangende dienstverlening voor de oliesector in de Rotterdamse haven”, provided by the NMa).

³⁷ Interview with HbR on 22 July 2004.

HbR has repeatedly told us that it intends to maintain its traditional price decision-making process after corporatisation. The only difference will be that the municipality will no longer have to approve prices, which HbR welcomes for it eliminates a level of bureaucracy the port experienced as a professional hinder. We understand that there will remain some indirect influence of the municipality on the pricing of the port: according to the corporatisation agreement, HbR must pay 4% of the invested capital to the municipality every year.³⁸ If anything, this requirement does certainly not cap the prices set by HbR. There is, moreover, at this time no legal obligation foreseen for HbR to maintain any of the pricing policies applied in the past.³⁹

4.3 Implications for the study

The analysis of the activities of HbR and its price setting procedure leads to some relevant implications for this study:

- The actual lease prices depend on the bargaining position of the tenant. For port-related services⁴⁰ this bargaining position will depend on specific investments to be made by the port and the tenant respectively and on the ease by which cargo can be switched to other ports. Thus, inter-port competition on the cargo side will not only constrain harbour dues, but also lease-related prices. Similarly, a lack of competition on the cargo side will increase pricing power for leases. The definition of relevant markets for the lease of land will therefore be informed by the market definition for the provision of infrastructure for the relevant cargo type.
- When negotiating lease-related prices for a parcel, the expected level of harbour dues generated by the tenant is taken into account. We would expect (and do see) lower lease prices for parcels used for port-related services (e.g. terminals) than for other services (e.g. accountants). HbR sees harbour dues and lease-related prices as a bundle and, therefore, the chosen level of harbour dues and lease-related prices interact. Thus, the setting of lease related prices needs to be analysed in conjunction with the expected revenue generated by harbour dues.
- Harbour dues are not directly related to variable (or marginal) cost of providing services to the port user.⁴¹ They are set to generate cash for past and ongoing investments and to generate a return for the owner of the port. Thus, the level of investment activity and the conditions of financing these activities are of key importance for pricing at the port of Rotterdam (and for port pricing in general).

Given the current pricing structure, there are limits to the possibilities to price discriminate between different cargo types and destinations. While it is possible to price discriminate

³⁸ Interview with HbR on 22 July 2004.

³⁹ Information provided by the NMa.

⁴⁰ Services that are derived from the cargo throughput of the port.

⁴¹ See also Masurel, E., Nijkamp, P. and B.W. Wiegman: "Tariefstructuur van het zeehavengeld en de daarmee samenhangende dienstverlening voor de oliesector in de Rotterdamse haven", provided by the NMa.

between hinterland traffic and transshipment, it is in the current price structure otherwise not possible to discriminate between different origin destination pairs as origin and destination are not part of the price schedule. One potential exception is the container business. If particular liners have traditional strongholds in regions or for certain cargo types, rebates can be used to price discriminate. The possibility to price discriminate influences the definition of the relevant market as it affects the profitability of a price increase. HbR is free to change the pricing structure and to differentiate prices by cargo type. We have been told by HbR that they have discussed possibilities to change the pricing structure, but that no formal plans exist. We have, therefore, not restricted our analysis to the given pricing structure but considered cargo types within the same tariff separately.

5 Renting out of land

5.1 Overview

The port of Rotterdam is a large industrial complex, which includes some five thousand hectares of land suitable for business and industrial tenants. The port has a total territory of about 11,000 ha, one third of which is covered by water. Of the remaining land area, only about two thirds are suitable to be rented out to businesses and industry.⁴² In 2003, the area of land suitable for business and industrial tenants was 5,036 ha.⁴³

Currently, HbR has about 2,000 lease and ground rent contracts, generating revenues of about €179 million per year. The top five contracts – three in the oil segment, one in the container segment and one not cargo-related – account for about 9% of total lease revenues. There are 33 contracts with revenues of more than €1 million per year, which in total generate revenues of about €58 million, i.e. almost one third of all lease revenues.⁴⁴

HbR rents out a variety of items. Clearly sites, berths and quays are the most important ones, but in some cases the port authority also leases infrastructure facilities to its tenants. These infrastructure facilities are covered by the port authority's Infra+ strategy. The majority of the facilities is provided to tenants in the container segment. Infra+ contracts account for about 9% of HbR's lease-related revenues as of October 2004.⁴⁵

One important skill required by HbR with regard to renting out land is spatial planning, i.e. to develop and follow a long-term strategy for the port, which includes locating the right tenants at the right location on the port territory so that industry clusters can work efficiently. New tenants may add value to the port not only by paying rent, but also by attracting cargo or improving the network of services offered to other tenants.

In order to be able to define the relevant markets for the renting of land, one needs to distinguish the different tenant types. Tenants may be potential tenants or firms already established on the port territory. Secondly, they may be port-bound, i.e. access to land at the port is crucial in order to provide their services to the port's customers. Also, tenants may have invested heavily in infrastructure and other facilities in the port, or may be easily able to re-locate once their contract expires.

⁴² On 1 January 2003, the port of Rotterdam had a total territory of 10,845 ha, of which 7,181 ha were land and 3,664 ha were water (Ruimtebalans 2003, p. 2).

⁴³ HbR Annual Report 2003, p. 20.

⁴⁴ CRA calculations based on data received from HbR on 14 October 2004.

⁴⁵ CRA calculations based on data received from HbR on 14 October 2004. Detailed numbers are presented later in this chapter.

For port-bound tenants, potential market power for lease prices is derived from the port authority's potential market power with respect to the relevant cargo flows. Given that most lease contracts of HbR are (very) long-term, it is important for the assessment of market power to determine to what extent the port authority is free to set and negotiate lease prices.

Benchmarking studies have shown that lease prices in the port of Rotterdam are higher than in other ports. Based on the CRA questionnaire, the most important reason for a price premium in Rotterdam is the better and unconstrained sea access that is offered compared to other ports. Our analysis of the HbR tenants database and other information on the status of the land on the port area indicates that scarcity of land, which reflects the high demand for land at the port of Rotterdam, could be another reason for the price differential found by all studies we considered.

In this chapter, it will become clear that over the next three years – due to space restrictions, extension options for existing contracts, and a price review process that requires benchmarking between existing tenants and prevents arbitrarily high price increases – HbR will only be free with regard to the pricing of a very small share of its total area, about 8%. This percentage of rental area that can be reallocated in the coming years is split into 6% of the total surface suitable for business and industrial tenants that is immediately available for allocation at the moment, and about 2% that will become available due to expiring contracts until the end of 2007. While 6% of currently available land may seem a considerable share, it is important to note that the majority of the sites available for immediate allocation to tenants consist mainly of very small patches of land. There is one site of 58 ha and a few smaller sites of 10 to 20 hectares. All other plots are smaller. This greatly reduces the sites' attractiveness for some potential tenants and consequently decreases the pricing power of the port authority. The conclusion of large new lease contracts, e.g. for the construction of a new terminal or industrial plant, is at present not possible simply for lack of available space.

With regard to those land lease contracts that will expire over the next few years, in many cases existing tenants may wish to extend these lease contracts, especially if they have invested in on-site facilities. Such "captivity" would reduce the bargaining power of the tenants and allow HbR to exercise some pricing power in the renegotiation of the lease prices. However, this could affect at most 2.1% of the total surface area suitable for business and industry over the next three years, i.e. those sites for which contracts will expire without any extension option. This percentage is this low mainly due to the fact that many lease contracts specify conditions on extension prices that greatly curb HbR's power to raise them. Overall, space limits, contract extensions, and required price benchmarking clearly constrain any potential market power that the port authority possesses for the renting of land.

For those sites where HbR can negotiate prices freely, the level of potential market power will – as already mentioned – depend to a significant extent on the port's position in the respective cargo segment, which will influence its attractiveness as a business location not only for tenants that are directly bound to cargo flows, but also – through the effect on trade flows and economic activity in the port – its attractiveness for other tenants active in support

industries that are only indirectly related to a specific cargo flow. An assessment of market definitions and market power of HbR for the provision of infrastructure for port users in the different cargo flow segments will be analysed in later chapters.

5.2 Tenant types

There is a wide range of tenant groups located in the port of Rotterdam. The following groups are based on a port directory published by HbR:

- “Cargo handling companies”, e.g. stevedores, terminal operators, warehousing and distribution companies, container depots, cargo superintendents, cargo classification companies and cargo surveyors.
- “Transport companies”, representing all transport modes (air, rail, barge, road).
- “Forwarding and shipping companies,” e.g. freight forwarders, shipping lines, shipbrokers, liner agents, inland shipping, and shortsea/feeder shipping companies.
- “Supplies-associated industries” (including nautical service providers), e.g. general industry, container-related companies (sale, rental, lease and repair), bunkering, towage and salvage companies companies dealing with equipment and materials, ship stores, and shipbuilding and repair companies.
- “Finance and consultancy companies”, e.g. banks, insurances, accountants, notaries, lawyers, consulting engineers and IT companies.⁴⁶

In order to define relevant markets for the leasing of land, it is helpful to distinguish those tenants that are bound to the port and those that could lease or rent land at other sites. With regard to port-bound tenants, one should consider not only tenants that are bound to a port in general, i.e. tenants for whom location at some port as a provider of sea access is crucial to carry out their business, but also tenants that are bound to the port of Rotterdam because they have to be located at the port in order to get access to the users of the port of Rotterdam, e.g. to provide services to cargo flows, passenger flows or companies located on the Rotterdam port territory (providing services to cargo flows may include processing goods coming into the port). Out of the list of company types listed above, the majority can be classified as being port-bound.⁴⁷

Cargo handling companies are generally port-bound since they require direct physical contact with the cargo they are dealing with and hence need sea access or at least access to sea-going vessels for their business. Clearly, a stevedoring company requires access to an area that is accessible for sea-going vessels. In principle, some cargo handling operations can locate at a

⁴⁶ HbR “Rotterdam Port Information 2004”, p. 289.

⁴⁷ Note that the analysis in the following paragraphs is of a general nature. In all tenant groups, there are likely to be exceptions to the general classification. For example, while most cargo-handling companies are likely to be port-bound, some may not be. A comprehensive analysis of the degree to which tenants are bound to the port would require a case-by-case assessment.

distance from the port, like e.g. hinterland terminals, warehousing companies and container depots. However, these are usually complementary to facilities at the port. Thus, while some hinterland terminals and warehouses do indeed exist, a scenario where most or even all cargo-handling companies locate outside the port is highly unlikely. In general, cargo-handling companies can, therefore, be classified as being port-bound and – given that specialisation is common – in addition usually bound to specific (groups of) cargo types.

Transport companies provide transport services from and to the port by a variety of transport modes. They are bound to the port in the sense that they need access to cargo loaded and/or unloaded in the port, but their administrative offices etc. could in theory be located outside the port. However, it seems reasonable to assume that, since their customers are located at the port, many transport companies have a strong incentive to be present in the port area in order to facilitate transactions and to have direct access to the cargo flows going through the port. Hence, we classify transport companies as generally bound to the port.

Forwarding and shipping companies are similar to transport companies in the sense that they do not need port infrastructure or sea access in order to conduct their business. However, they differ from transport companies to the extent that their relationship with cargo flows is mainly administrative and not physical, i.e. they may deal with cargo flows but usually do not touch the cargo itself. This explains why in fact various large forwarding companies and agents doing business in the port of Rotterdam are not tenants of the port authority.⁴⁸ Hence, we do not classify forwarding and shipping companies as port-bound. Geographic proximity to the port, i.e. locations in the area directly around the port, may be an advantage for these companies in order to enable the necessary communication with port customers and the port authority. Yet, it does not appear that it is crucial for them to get access to the port users.⁴⁹

The majority of supplies-associated industries require geographic proximity to the port and its customers. While some general industry may not be bound to the port in any shape or form, some may be port-bound if they depend on the cargo flows going through the port and require direct access in order to be able to provide their services to these flows. Nautical service providers like bunkering and towage companies are also clearly port-bound because, in order to do their business, they need access to sea-going vessels, which are in turn bound to the port by physical constraints. The same holds true for shipbuilding and repair companies, container-related companies etc. We therefore classify supplies-associated industries as generally bound to the port. Note that the decisive factor for being bound to the port is not necessarily the need for sea access or physical contact with cargo flows. Consider the case of a car rental company, which can be seen as a supplies-associated industry. While one could

⁴⁸ Examples include [confidential] and [confidential], two of HbR's key accounts in the dry bulk segment. Note however that other agencies, e.g. Vopak for liquid bulk, are still located directly in the port of Rotterdam.

⁴⁹ In fact, Eurokor for example provide ship agency services for the ports of IJmuiden, Velsen, Amsterdam, Rotterdam, Vlaardingen, Schiedam, Dordrecht, Moerdijk and Vlissingen from their office in Ridderkerk close to Rotterdam. This clearly shows the fact that forwarding and shipping companies generally are not port-bound, but can provide their services also to more distant customers.

argue that such a company could provide its services outside the port as well as inside the port territory, one could still classify it as port bound in the sense that – in order to have access to the passenger flows in the port – it needs to be established on the port territory. Otherwise, whenever a car was rented to someone on the port territory, a driver would have to bring this car from the off-site location to the port. Clearly, this would impose significant extra cost on the business. Hence, one could classify such a car rental company as being bound to the port as an economic entity and as a hub where passenger flows are bundled.

Finally, finance and consultancy companies are unlikely to be bound to the port territory. In principle, such companies could locate outside the port territory just as well as locating in the direct port area. While it may be more practical for e.g. accountants to be on-site, there is nothing that prevents them from locating in an office in the city centre and drive to the port area as necessary.

Table 20 summarises our classification of tenant types. Note that all our findings are indicative. A full analysis would require a case-by-case assessment of each individual tenant of the port authority.

Table 20: Categorisation of tenant types

Tenant group	Categorisation (bound to the port or not)
Cargo handling companies	Port-bound
Transport companies	To some extent port-bound
Forwarding and shipping companies	Generally not port-bound
Supplies-associated industries (incl. nautical service providers)	Mainly port-bound
Finance and consultancy companies	Generally not port-bound

Source: CRA. Note that this categorisation is indicative.

HbR distinguishes between port-bound and non-port bound tenants in its list prices and defines them generally in accordance with our definition:

“A non port-bound company is a company with such a range of products and/or services that it could also be settled outside the port area. In general such a company does not need water access for its raw materials and products and has no relationship with a port-bound company for which it is essential to be established on a short distance.”⁵⁰

On 1 January 2003, at least 87% of the port area suitable for business and industry was leased by port-bound tenants as defined by HbR. In particular, tenants active in the dry bulk, wet bulk and break bulk (incl. containers) segments held 87% of the total area leased out by the port. The remaining 13% were leased by “other tenants”, which included construction companies, trading companies, industry, and transport. It is very likely that at least some of

⁵⁰ Email of Pieter van Essen (HbR), received on 12 October 2004.

these other tenants are also bound to the port under HbR's definition, which means that 87% is a lower bound for the share of land leased out to port-bound tenants.⁵¹

Many of the port's tenants have made significant specific investments on their sites. Examples of such tenants are the oil refineries and storage companies, who have – according to our survey – invested up to € [confidential] in hardware and infrastructure.⁵² Clearly, at the time of re-negotiation for these tenants the relevant geographic market is the port of Rotterdam, as switching would be prohibitively expensive.⁵³

The CRA questionnaire asked tenants if they felt that their company was locked in in the port of Rotterdam, i.e. if they thought that their company could not easily relocate even after termination of the lease contract. Out of a total of 86 respondents, 57% reported that they felt locked in. Specific investments made in facilities at or near the port were the most important reason given for the lock-in. Next, respondents were asked whether they believed that their company would re-locate if the port of Rotterdam were to increase its lease prices for existing contracts permanently by 10%, while lease prices for all other locations stayed at their current levels, assuming that the lease contract could be terminated easily and without penalty payments. Out of a total of 82 respondents, 68% said that they would not re-locate. Only 32% said that they believed their company would move. Table 21 below presents more details on the respondents who indicated that they would re-locate.⁵⁴

⁵¹ HbR Ruimtebalans 2003, p. 8.

⁵² CRA questionnaire.

⁵³ Note that we take the specific investment made in the past as an indicator for the investments they would have to undertake (again) if they were to move to a different location today. It is the latter that matters for the switching decision.

⁵⁴ CRA questionnaire.

Table 21: Number of tenants of the port of Rotterdam indicating they would re-locate following a permanent increase in lease prices for existing contracts by 10% in the port of Rotterdam

Cargo type	Type of company	Number of respondents indicating they would re-locate
Agribulk	Cargo handling	1
Containers	Cargo handling	2
	Supplies-associated industries	1
Other dry bulk	Cargo handling	1
	Supplies-associated industries	1
Other general cargo	Other	1
	Transport company	1
Other liquid bulk	Cargo handling	2
	Other	1
Roll-on/roll-off	Cargo handling	2

Source: CRA questionnaire. Number of respondents answering “yes” to the following question: “Suppose that the port of Rotterdam were to increase its lease prices for existing contracts permanently by 10% while the lease prices for all other locations stayed at their current levels. Do you think that your company would re-locate if the lease contract could be terminated easily and without penalty payments?” Note that the total in the table above adds up to more than 26, the total number of companies saying “yes”, due to the fact that some companies are involved in more than one cargo type and/or classified themselves as more than one type of company.

Interestingly, the majority of the companies indicating that they would re-locate are cargo handlers. In particular, the group includes two terminal operators (one for juice and one for roll-on/roll-off) and one storage company (other liquid bulk/chemicals). However, none of the large dry bulk and container terminals said that their company would move away from Rotterdam if lease prices increased.

Despite the evidence reported above, overall our survey results seem to confirm the view that for a large number of port tenants and in particular the most important tenants in terms of lease revenues (oil terminals/storage facilities and container terminals) switching would not be an option and hence the relevant geographic market for lease contracts would be the port of Rotterdam.⁵⁵

We have not analysed the market for non-port bound tenants, assuming that competition between the port of Rotterdam, other ports and especially non-port locations nearer or further away from the Rotterdam port area is intact. The responses to our survey did not indicate that there are particular competition problems with regard to tenants who are not port bound. Hence, we use the term “tenants” as a shorthand for tenants that are port-bound in the remainder of this report.

⁵⁵ Note that the total area leased in the port of Rotterdam by the respondents to the CRA survey was 2,859 ha, which corresponds to about 60% of the total area leased out by the port of Rotterdam in 2003 (4,722 ha according to HbR Annual Report 2003, p. 20).

5.3 Relationship between renting of land and provision of infrastructure

For tenants specialising in specific (groups of) cargo types, the market definition for new tenants, existing tenants that wish to expand to new locations at the port, and tenants that have not made significant specific investments is derived to a significant extent from the market definition for the related cargo types. For example, a new terminal operator for crude oil may only consider the port of Rotterdam as a suitable location if Rotterdam is the only port that can accommodate large oil tankers. Likewise, a new terminal operator for dry bulk cargo may consider mainly those ports as alternative locations that are strong in dry bulk, such as Antwerp and Amsterdam. The more throughput of a specific cargo type a particular port attracts, the more attractive the port becomes for terminal operators dealing with this type of cargo. Hence, a strong market position in dry bulk could increase the pricing power of the port authority vis-à-vis prospective tenants active in the dry bulk industry. This situation is only reversed if, for example, a large terminal operator promises to develop new facilities that may divert the existing cargo flows to the benefit of Rotterdam. While these considerations may not apply to all tenants, they are likely to be relevant for many, in particular those that are port bound.

As will be discussed in more detail below, HbR is well aware of the link between the provision of infrastructure and the renting out of land. The port authority sees revenues generated by harbour dues and lease prices as a bundle. Tenants that are expected to generate higher income for the port through harbour dues (e.g. terminal operators) are likely to be offered lower lease prices than tenants who are unlikely to generate significant income through harbour dues.

In addition to the link between cargo flows and tenants, there is a more direct link between the renting out of land and the provision of infrastructure by HbR. As already mentioned, HbR does not only rent out sites, berths and quays, but in some cases also infrastructure facilities. These infrastructure facilities are covered by the port authority's Infra+ strategy. The majority of infrastructure facilities are provided to tenants in the container segment, as shown in the table below.

Table 22: Lease contracts of HbR in the context of Infra+ by tenant type

Segment	Number of contracts	Sum of ha (sites)	Sum of metres (berths)	Sum of other items
Containers and Distribution	19	56.0	0	120,058
Food	1	0	0	1
Neobulk and other general cargo	2	0	0	5
Other (not linked to cargo)	1	0	0	1
Total	23	56.0	0	120,065

Source: CRA calculations based on data received from HbR on 14 October 2004. Other leased items include pieces of infrastructure, special rights etc.

In terms of turnover, Infra+ contracts account for €15.8 million of revenues in 2004, which corresponds to almost 9% of total lease-related revenues of HbR as of October 2004.⁵⁶

5.4 Lease contracts

The port authority of Rotterdam uses standard lease and ground rent contracts (in the following both referred to as “lease contracts”) that are linked to “General Terms for Rights of Use” specifying the contract partners’ rights and obligations as well as the details of use-related payments.⁵⁷ The most common contract term is 25 years, but in principle any lease term is possible. Contracts can include an option for the tenant to extend the lease, typically by a multiple of twenty-five years. Extended contracts are subject to a conditional review of the lease price.⁵⁸

The total lease price consists of – if relevant – a price for the site, a price for the slope, a price for the water and for the facilities covered by the lease contract. All lease prices are adjusted annually based on the Dutch Consumer Price Index.⁵⁹ In case of long-term contracts and those that include an extension option, the basic price is usually fixed for twenty-five years and revisited thereafter. However, changes to the lease prices are generally conditional, in particular on the development of the prices for similar parcels of land rented out in the port. The details of the price review are set out in the port authority’s “General Terms for Rights of Use”:

“Both HbR NV and the User may demand that the Use-related payment is reviewed as of the date of expiry of twenty-five Years after commencement of the Right of Use, and subsequently

⁵⁶ The contracts in force in October 2004 generate revenues of about €179 million (CRA calculation based on data received from HbR on 14 October 2004).

⁵⁷ Port of Rotterdam, “General Terms for Rights of Use – Havenbedrijf Rotterdam N.V. 2004”.

⁵⁸ Standard lease and ground rent agreements, articles 5.3 and 5.4 (provided by HbR on 14 October 2004).

⁵⁹ Standard lease and ground rent agreements, articles 6.1-6.2 and “General Terms for Rights of Use – Havenbedrijf Rotterdam N.V. 2004”, article 8.

each time after expiry of a twenty-five Year period, provided the User or HbR NV was notified of such demand by no later than one hundred and twenty days prior to the date the review is demanded by registered letter. The provisions set forth in the previous sentence shall apply only if HbR NV or the User believes that the Use-related payment is not in agreement with similar use-related payments that have been agreed by HbR NV with third parties for the period of one Year prior to the Year in which the required review must be applied to the Use of Sites, Water, Slopes, Quaywalls, Jetties or Facilities, comparable to the Real Property, whilst taking into consideration:

- a. The location, nature and condition of Real Property and comparable real property, whereby no account is taken of use or availability or nature of Buildings, if any;*
- b. The provisions subject to which the relevant similar rights of use were granted; and*
- c. The conditions subject to which the relevant similar rights of use were granted.*

Where either HbR NV or the User should request a review, HbR NV shall submit a proposal for such review to the User by no later than fourteen days prior to the date of review. [...] the new Use-related payment shall be fixed on the basis of the proposal to be submitted by HbR NV that will be based for this purpose on the provisions set forth in this Article 9.1.”

If HbR and the tenant cannot agree on a new lease price, a binding decision will be taken by a group of three experts, of which each party will appoint one and these two experts will appoint a third one. Like HbR, the appointed experts are bound to take into account the provisions set forth in article 9.1 as well as any changes in the property's value due to external circumstances or currency movements.⁶⁰

The requirement to take into account the price of similar sites rented out in the port limits the possibility of the port authority to demand a much higher price when tenants are locked in. Moreover, it creates a link between the pricing for new tenants and the re-negotiated prices for existing tenants. This limits the freedom for the port of Rotterdam to extract rents from its tenants. However, it may not reduce the space for doing so completely, in particular if prices for new tenants can be set high due to a strong position in the cargo market.

5.5 Lease-related prices

Lease contracts in the port of Rotterdam are not determined through an open tender. Instead, the port of Rotterdam has list prices (“recommended tariffs”) for lease and ground rent contracts, which are adjusted for inflation each year. A fundamental review of the list lease prices takes place every five years. The current list was determined in 1999 and is valid until the end of 2004. It distinguishes prices according to whether tenants are bound to the port or not according to HbR's definition. Prices for dry land leased to tenants that are not port bound are higher than for port-bound companies (€9.51 versus €7.58 in 2004), since the former do not generate any additional income for the port through harbour dues and because the port

⁶⁰ Port of Rotterdam, “General Terms for Rights of Use – Havenbedrijf Rotterdam N.V. 2004”, articles 9, 10 and 45.

favours port-bound companies in its area.⁶¹ For port-bound tenants, prices vary depending on the type of land. HbR list prices distinguish four basic site types for port-bound companies:

- Dry sites without water access;
- Pitching parcels, i.e. sites with a slope that in most cases will be furnished with a jetty;
- Quay sites, i.e. sites behind a quay wall; and
- Incline and water.

While there is only one tariff per square metre applicable to pitching sites (€7.58 in 2004) and incline and water sites (€0.62), the price of pitching and quay sites depends on additional characteristics of the land.

- Pitching sites with a water depth of less than 4 metres: €6.77;
- Pitching sites with a water depth of more than 4 metres: €3.80 per square metre for the first 5 ha of, €3.16 for the second 5 hectares and €2.52 for each subsequent square metre;
- Quay sites: €5.54 for land up to 200 metres behind the quay wall, €3.15 for land more than 200 metres behind the quay wall, but a minimum average of €4.74 per square metre.⁶²

Lease contracts usually include quay dues.⁶³ Extra quay dues are only payable to the port authority for the use of public quays. Most quay walls, however, are rented by terminal owners.⁶⁴

Although lease prices are listed according to the above categorisations, in practice, according to HbR, lease contracts are almost always concluded on an individual basis. In these negotiations, the final lease price agreed in the contract depends on the bargaining power of the potential tenant, which in turn is influenced by competition from other possible sites of location. HbR applies a maximum negotiation margin of -30% on the list prices. This means that there are sometimes significant differences between the prices tenants pay per square metre. We have been informed by HbR that the average reduction on list prices is about 10%.⁶⁵

The CRA survey asked HbR's tenants whether they received discounts on the official lease prices of the port of Rotterdam. Out of a total 55 respondents who answered that particular question, only eight, i.e. about 15%, indicated that they had received discounts from HbR. The discounts reported ranged from 13% up to 50%, with one respondent reporting a one-time discount phased from 100% to 0%. The survey also asked respondents whether they had

⁶¹ Email from Pieter van Essen, received 12 October 2004.

⁶² See "Aanpassing richtprijzen 2004", 4 November 2003, document provided by HbR on 22 July 2004.

⁶³ Interview with HbR on 5 July 2004.

⁶⁴ HbR Port Tariffs 2004, p. 5.

⁶⁵ Interview with HbR on 22 July 2004 and email from Pieter van Essen (HbR), 12 October 2004.

received any costless services from HbR when signing the lease contract. Only 2 out of the 39 companies answering this question indicated that they did receive such services, but a total of seven companies provided details on services received from HbR. The extra services described by HbR include “promotion and commercial support”, “security and facility management”, co-operation on some site refurbishment, “pipeline installation (underground), fire brigade and other rescue services”, “co-investment in the improvement of the infrastructure on the terminal”, and “help in developing harbour infrastructure”.⁶⁶ While some of the reported services seem to relate to public functions (e.g. fire brigade and rescue services), others clearly represent commercial services, e.g. promotion and commercial support.

In general, HbR does not use auctions for renting out land. It sometimes tries to find a new tenant for a particular site through an auction when a site is given back to the port authority for reallocation with existing installations and infrastructure that might be interesting for other tenants. Rather than unnecessarily destroying such an Infra+ site, HbR then seeks to find a suitable new tenant that wants to take over the existing sunk investments.⁶⁷

Lease price differentials of existing tenants can arise due to different negotiated lease prices, but also due to different starting times of the contracts of different tenants and the level of recommended tariffs at that time. For example, during the 1970s and the 1980s, the recommended tariffs increased more than the rate of inflation during the same period. Because the lease prices of old tenants follow the rate of inflation, new tenants often pay more than old tenants for the same type of land.⁶⁸ In particular, clients with lease contracts that date back to the 1950s and 1960s pay less than tenants with more recent contracts.⁶⁹ To a large extent this is due to the historical development of the harbour in which the attraction of big tenants of certain cargo types was the prime objective of the port. It gave out favourable lease contracts to attract such desired customers.

Price differentials may also arise from extra investments made by the port of Rotterdam. Leases are cost-driven, i.e. HbR charges higher prices for sites where investment costs are higher. For example, because the quay wall is always an investment by the port of Rotterdam, quay sites are more expensive than pitching sites, where in most cases the tenant himself invested in a jetty. According to HbR, quay dues are not sufficient to cover the costs of constructing quay walls. The fact that lease prices are cost-driven is linked to HbR’s IRR objective of 8.55%.⁷⁰ For containers, lease contracts usually follow the list prices plus a surcharge for specific site investments.⁷¹

⁶⁶ CRA questionnaire.

⁶⁷ Interview with HbR on 5 July 2004.

⁶⁸ Email from Pieter van Essen (HbR), 12 October 2004.

⁶⁹ Information provided by HbR on 22 July 2004.

⁷⁰ Interview with HbR on 22 July 2004 and email from Pieter van Essen (HbR), 12 October 2004.

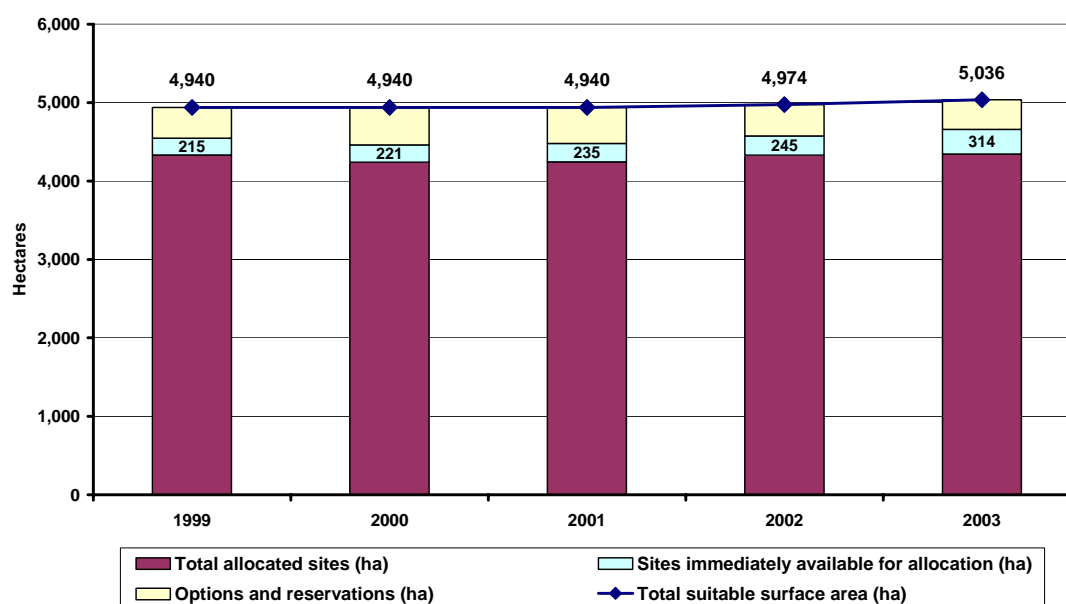
⁷¹ Interview with HbR on 22 July 2004.

The fact that HbR's potential to set lease prices and harbour dues, which together are its two main sources of revenue, are related is well understood by the port. HbR clearly sees harbour dues and lease prices as a bundle. In particular, it tends to charge higher lease prices for sites that do not generate harbour dues. In particular, dry sites are more expensive than wet sites: They generate no harbour dues that can be attributed directly to the tenant. Another variant of this is that some land lease contracts include a surcharge to be paid by the tenant if a specified level of cargo throughput is not met. Likewise, distribution and warehousing companies, who generate no harbour dues but pay higher leases to compensate for this, account for about the same revenue for HbR as sites linked to the dry and wet bulk segments (distribution companies occupy about 200h of the port area).⁷² Clearly, HbR sees that the variable fees it can charge on cargo limit the rent extraction via the lease contracts, and vice versa.

5.6 Tenant turnover and capacity constraints

As already mentioned, there are currently 5,036 ha of land at the port of Rotterdam that are suitable to be rented out to business and industry.⁷³ The graph below shows the development of the total area surface suitable for business and industrial tenants over the last five years, split into whether the land was rented out, reserved or free for immediate allocation.

Figure 2: Total surface area of business and industrial premises in the port, split by status



Source: HbR Annual Report 2003, p. 20.

⁷² Interview with HbR on 22 July 2004.

⁷³ On 1 January 2003, the port of Rotterdam had a total territory of 10,845 ha, of which 7,181 ha were land and 3,664 ha were water (Ruimtebalans 2003, p. 2).

The total surface area suitable for business and industrial tenants increased both in 2002 and 2003. In 2002, the increase was due to the purchase by HbR of 30 ha of land in the Waalhaven. In 2003, the total area earmarked to be rented out increased again, basically for two reasons. One was the purchase of a site on the north bank of the Nieuwe Waterweg. Another reason was accounting adjustments. In 2002, 155 ha of land had been left out of the total area indicated as suitable due to uncertainties regarding Maasvlakte II. These sites had been reserved for infrastructure of Maasvlakte II, in particular the access to Maasvlakte II for shipping. In 2003, a decision was made that the sites would not be needed and therefore HbR could include them in the total of suitable area for business and industry again.⁷⁴ Although there may be small changes in the total surface area of land suitable for business and industrial tenants, in our further analysis we assume them to be negligible. That is, we assume the total area remained constant at the level of 2003, which seems reasonable, given that total rental space was relatively constant between 1999 and 2001.⁷⁵ The expansion of Maasvlakte II will not come into effect before the end of 2007, that is, the end date of our analysis.⁷⁶

Returning to the question of land available for immediate allocation to future tenants, the chart above shows that the share is low, around 6% in 2003. In addition, there are restrictions on the use of the free sites, given that most of them are relatively small. For example, the 314 ha of land available for immediate allocation at the end of 2003 included one site of 58 ha and a few smaller parcels of 10-20 ha, but all other sites were smaller. None of the sites could accommodate a new container terminal or a large industrial cluster.⁷⁷ In January 2003, HbR reported sites immediately available for allocation of tenants with a total area of 245 ha. This area was split into 70 sites, 25 of which were smaller than 0.5 ha. 16 sites had a size of about 1 ha, 18 had 2 to 5 ha, nine plots were between 5 and 13 ha and only two sites were larger than 30 ha (33 and 59 ha respectively).⁷⁸ Hence, any pricing power of HbR with regard to the currently available land is severely restricted by the limited size of the available plots and hence their attractiveness for potential tenants.

In the coming years, a new container terminal will be built on the northwest corner of the Maasvlakte in Rotterdam, the so-called Euromax terminal. HbR will be responsible for carrying out the basic construction and dredging, while the terminal itself, which will have a quay length of 1,800 metres, a draught of 19.65 metres and a surface of 100 ha (with possible extensions in a second phase), will be developed, built and operated by a 50/50 joint venture between P&O Nedlloyd and ECT. Construction work is expected to begin in the first half of

⁷⁴ HbR Ruimtebalans 2003, p. 2 and HbR Annual Report 2003, p. 20.

⁷⁵ Note that contrary to the information in the Annual Report 2003, the HbR publication "Ruimtebalans 2003" indicates that the total surface area available for business and industrial tenants was not constant between 1999 and 2001, but fluctuated slightly. However, fluctuations occurred both upwards and downwards and usually below 1% (compare Ruimtebalans 2003, p. 6).

⁷⁶ Construction work on Maasvlakte II is expected to commence in 2006 and the building of the first container terminal or chemical plant will not start before 2010 (<http://www.maasvlakte2.com>).

⁷⁷ HbR Annual Report 2003, p. 20.

⁷⁸ Ruimtebalans 2003, pp. 19-20.

2005 and is expected to be completed by the end of 2008. The land for the new terminal comes out of reserved sites or sites for which tenants had options.⁷⁹

The table below shows that the turnover of land on the port territory was very small in the last two years. Only 2-4% of the total surface area suitable for business and industry was given out per year by HbR, and only 2% was received back from tenants.

Table 23: Turnover of land in the port of Rotterdam in 2002 and 2003

	2002	2003
Land given out (ha)	207	109
Land received back (ha)	121	95
Total surface suitable for business and industry(ha)	4,974	5,036
Share of land given out	4%	2%
Share of land received back	2%	2%

Source: Ruimtebalans 2003, p. 2, HbR Annual Report 2003, p. 20.

Clearly, there is only a small share of land available for immediate allocation at this moment. In theory, HbR could set lease prices for these sites freely. In addition to the land already available today, more land is likely to become available for allocation in the future when current lease contracts expire. However, HbR will only be able to negotiate prices freely for those contracts that do not include a conditional extension option specifying that the price review procedure must be based on lease prices paid by other tenants of HbR (as explained above). Hence, one should only consider contracts that expire without an extension option. The table below shows the area for which lease prices will become “freely negotiable” before the end of 2007. Given the short-run analysis of this report, we only take the next three years into account, i.e. we consider 2005-2007.

The results presented were arrived at as follows:

- From the tenant database we received from HbR, we filtered out those contracts that have a general end date between the 16th of October and the end of 2004, in 2005, in 2006 and in 2007. We excluded all contracts that have an extension option.
- For the remaining contracts, we calculated the total sum of metres (berths) and square metres (sites) becoming available in each year respectively.
- Secondly, we filtered out all contracts whose extensions expire between the 16th of October and the end of 2004, in 2005, in 2006 and in 2007, i.e. those contracts whose general contract term had already ended in the past but who were extended.
- For the set of contracts isolated in this way, we calculated the total sum of metres (berths) and square metres (sites) becoming available in each year respectively.

⁷⁹ Information provided by HbR 28 October 2004.

- Thirdly, we summed the total area and metres from “general end date” and “extension end date” contracts to receive the area and metres becoming freely negotiable per year.
- These numbers were put in relation to the total area suitable for business and industry in 2003 (5,036 ha) and to the total berth length currently leased out (all contracts from the HbR database that end after the 16th of October 2004, 58,583 metres).

Our analysis is furthermore based on the following assumptions:

- If no extension is indicated for a contract, the contract ends at the “general end date” specified in the database. Prices can be negotiated freely for that site/berth.
- If there is an extension indicated for a contract, this was/will be exercised by the tenant.
- Prices for a contract extension are not freely negotiable, but based on benchmarking with other similar contracts that HbR holds (re-negotiation points).
- After the total extension end date specified in the database, prices become freely negotiable for that site/berth.
- There will be no additional sites/berths returned to HbR in the next three years that are not indicated in the database.

Table 24: Lease contracts expiring until the end of 2007 for which prices will become freely negotiable – total and as share of total surface for business and industry

	2004	2005	2006	2007	Total
Area from contracts expiring without extension (m ²)	509,258	184,062	214,511	143,835	1,051,666
Area from contracts expiring after one or more extensions (m ²)	0	0	15,175	3,462	18,637
Total area becoming “negotiable” (m ²)	509,258	184,062	229,686	147,297	1,070,303
Total area becoming “negotiable” (ha)	51	18	23	15	107
Share of total area suitable for business and industry today (5,036 ha)	1.0%	0.4%	0.5%	0.3%	2.1%
Berths from contracts expiring without extension (m)	350	612	218	531	1,710
Berths from contracts expiring after one or more extensions (m)	0	0	230	0	230
Total berths becoming “negotiable” (m)	350	612	448	531	1,940
Share of total berth length rented out today (58,583 m)	0.6%	1.0%	0.8%	0.9%	3.3%

Source: CRA calculations based on data received from HbR on 14 October 2004, total of area suitable for business and industry taken from HbR Annual Report 2003, p. 20).

Based on the above described methodology and assumptions, our findings show that prices will become freely negotiable only for a very small share of the total surface suitable for business and industry. That is, before the end of 2007, only about 2.1% of the area will become freely negotiable. In addition, similar to the land that is already available today, it is important to note that it is not only the total rental area that matters, but also its constitution. The following table shows the number of the expiring lease contracts per cargo type, as well as the largest site/berth for which a contract expires from 2005 until 2007.

Table 25: Lease contracts expiring until the end of 2007 for which prices will become freely negotiable – number of contracts and largest site/berth by cargo type

Segment	Year	Number of contracts	Largest site (ha)	Largest berth (m)	Other leased items
Oil and Refinery	2005	3	8.0	345	0
	2006	2	0.3	0	1
Other wet bulk	2005	1	1.9	0	0
	2007	2	0.3	90	0
(Petro) Chemical industry	2006	2	2.0	0	0
Agribulk	2005	6	0.2	42	0
Other dry bulk	2007	4	0.5	75	0
Containers and Distribution	2005	2	2.2	0	0
	2006	1	0.2	0	0
	2007	6	2.1	125	85
Food	2006	7	1.0	180	7
	2007	4	5.7	150	1
Other (not linked to cargo)	2005	20	2.7	63	4
	2006	21	7.0	130	2
	2007	12	0.5	21	0

Source: CRA calculations based on data received from HbR on 14 October 2004. Other leased items include pieces of infrastructure (under HbR's infra+ strategy), various rights etc.

From the table above, it is clear that sites and berths that come available are relatively small and hence will not provide major opportunities for larger scale projects, such as the building of a new container terminal, or large industrial facilities. The largest site overall that will be released for allocation is about 8 ha and is currently leased by Esso Nederland. However, this site is one of the smallest sites amongst all sites that Esso leases from HbR, which sum up to almost 228 ha in total,. Of these, 218 ha are covered by contracts that allow for extension until 2039 and 2046 respectively.⁸⁰

⁸⁰ CRA calculations based on data received from HbR on 14 October 2004.

Overall, the short-run pricing power of HbR with respect to lease prices is therefore very much restricted by existing contracts, the majority of which on top of that includes extension options and hence only allows price changes based on prices of similar sites leased out by the port authority. Until the end of 2007, a maximum of only 2.1% of the current port area suitable for business and industry will become available for “free” price negotiations, i.e. price negotiations without the need for benchmarking with comparable sites on the port territory. HbR could exercise its bargaining power in price negotiations for these sites, especially if tenants who have invested in facilities on the site wish to extend their contract. However, as already mentioned, this would only apply to a very small share of the port’s total land suitable for renting out. In addition, the average size of the sites that will become available is relatively small, which reduces their attractiveness for many potential new tenants and hence the degree of pricing power HbR could exercise.

The scant availability of free sites in the port of Rotterdam was also confirmed by our questionnaire results. Out of a total of 65 respondents to a question specifically asking whether scarcity of rental space was perceived, 15 companies answered that their company had – in the recent past – expressed an interest in leasing more land in the port of Rotterdam, but was rejected by the port authority. In eight cases, this had been for reasons of unavailability of suitable land, while in six cases suitable land was given to another applicant. Various respondents also reported a lack of proper spaces in the port of Rotterdam in the qualitative sections of our survey.⁸¹

5.7 Investments

Each year, HbR establishes average “normal” investments in the construction and maintenance of infrastructure of about €150 million per year (€112 in 2003).⁸² Following proper business methods, before investing in new projects to expand the port territory and hence the area that can be leased out, HbR seeks to estimate the expected revenue stream, including the additional land lease payments, quay dues and harbour dues generated by the investment. These revenues are assessed against the investment costs and expected maintenance cost (NPV valuation). By internal rules, investment projects must have an IRR of 8.55% in order to be approved. For large investments, if so required, it has been common for the municipality of Rotterdam, or even the Dutch government, to step in with a loan.⁸³

HbR has stated that it is difficult to rank the importance of the different cargo types for the port, because the port authority does not have a purely commercial perspective, but also takes socio-economic considerations into account (“The port is not a normal company.”). Still, if a

⁸¹ CRA questionnaire.

⁸² HbR Annual Report 2003, p. 20).

⁸³ Interview with HbR on 22 July 2004.

new trend has been identified (e.g. the start of the container business), then the port does not shy away from starting to think like a true investor.⁸⁴

In general, however, the tool to promote or discourage certain sectors in the port area is not pricing, but land reservations instead.⁸⁵

“Profit maximisation has never been the philosophy of the port management. The guiding factor is to ensure continuity and to serve the market well. All decisions have a long-term focus.”⁸⁶

Furthermore, all major investment projects are decided upon in the context of also the world economy developments, such as the competitiveness of Europe vs. Asia.

5.7.1 PAST AND FUTURE PORT EXPANSION INVESTMENTS

In general, HbR is of the opinion that the huge investments related to port expansions cannot be financed in a traditional way, because they are too long-term focused. No bank would finance investments like these, according to the port. In the past public financing of infrastructure was an important basis for a number of major port expansions:

- The Botlek expansion in the late 1940s and early 1950s was financed by the port itself, out of revenues generated by the existing port facilities.
- The Europoort expansion in 1958 was a huge investment, the financing of which was shared between the Dutch government and the port. The port authority allocated port revenues and took out a loan from the municipality, which was paid back over about 20 years.
- The Maasvlakte I expansion established between 1968 and 1974 followed an approach similar to the Europoort expansion. It was financed by the port through a loan from the municipality of Rotterdam (with a longer term than for the Europoort project, but presently fully paid off) and co-financed by the Dutch government.
- Maasvlakte II is planned to be a €2.6 billion investment project and the financing approach will be similar to the ones used for the Maasvlakte I and Europoort projects. The dyke around the area will be subsidised and taken care of by the Dutch government, which participates in the company set up to develop Maasvlakte II. The port is expected to pay for the rest.⁸⁷

⁸⁴ Interview with HbR on 5 July 2004.

⁸⁵ Interview with HbR on 22 July 2004.

⁸⁶ Interview with HbR on 22 July 2004.

⁸⁷ Interview with HbR on 22 July 2004.

5.7.2 INVESTMENTS IN OTHER PORTS

According to some industry experts, while in Antwerp the Belgian government has always been heavily involved in the financing of port investments, demanding that the port authority set attractively low rental (and other) prices in return, the port of Rotterdam had to finance its expansions mainly internally, which forced it to charge higher rents in order to repay its investments. This is widely considered to be an important reason for why, in the 1970s, Rotterdam was very interested in getting the large oil tankers: it needed the harbour dues to pay for its investments.⁸⁸

Port financing systems are generally the same for all ports within one and the same country. According to industry experts, while the internal investment situation of German ports is similar to that of Rotterdam, Le Havre works under the French central system in which the larger part of finances is likely to come from the state. Moreover, there is a fundamental difference between continental ports and ports in the UK, which were privatised very early and have subsequently lobbied in Brussels for the start of a general debate about port privatisation. Industry experts have pointed out that any discussion about harbour dues should take the traditional differences in port financing into account.⁸⁹

5.8 Lease-related prices in Rotterdam compared to other ports

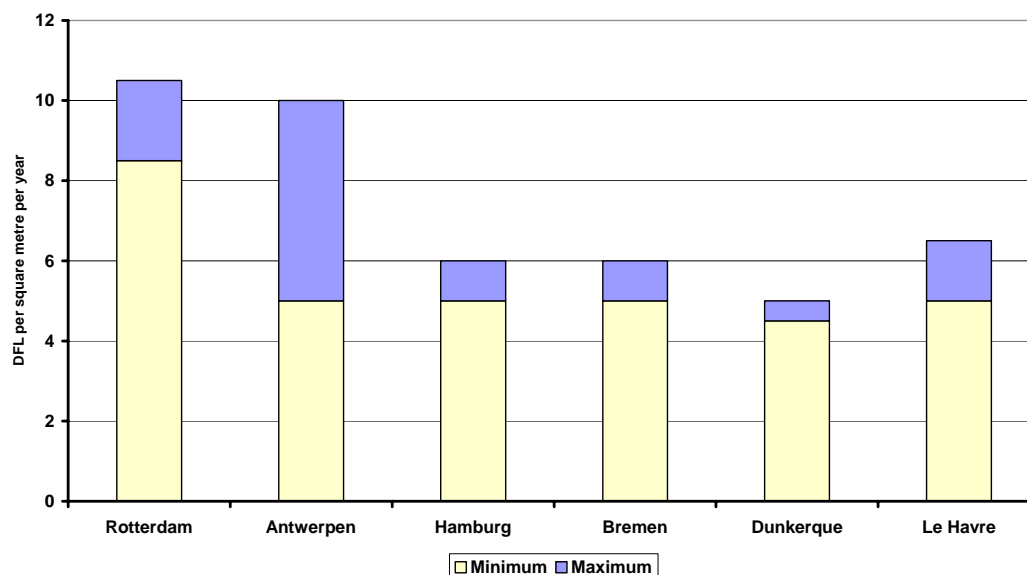
We considered several studies in order to compare lease-related prices at Rotterdam with prices at other ports. All of the studies we analysed found that Rotterdam charges more than is asked for comparable sites at other ports in the HLH range.

In a study conducted by PriceWaterhouseCoopers on behalf of HbR in 2000, the port of Rotterdam was found to have significantly higher lease prices for both wet and dry sites than other ports. The results of the study are presented in the graphs below.

⁸⁸ Interview with [confidential] on 12 July 2004.

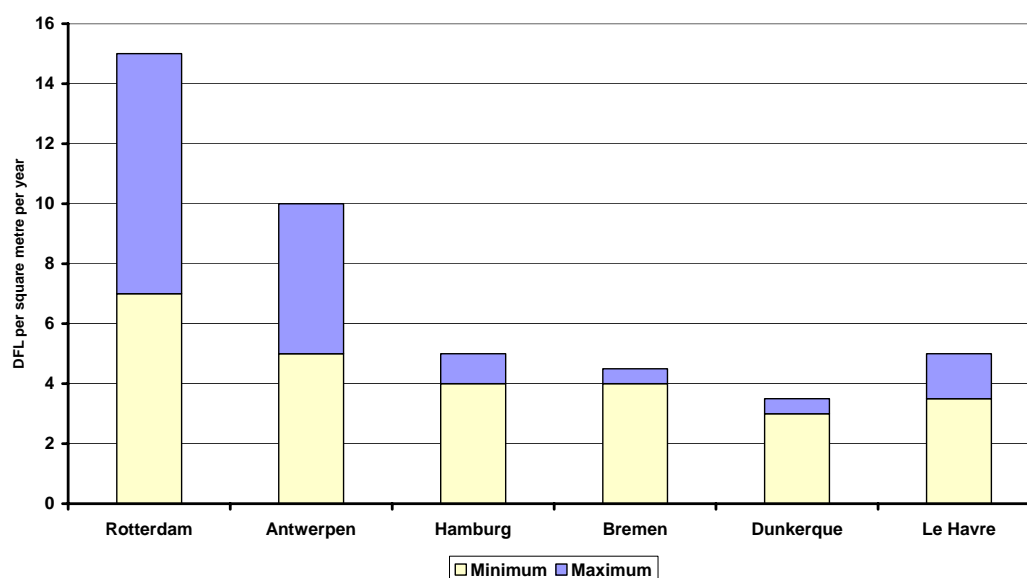
⁸⁹ Interview with [confidential] on 12 July 2004.

Figure 3: Lease prices of wet parcels with quay in various ports in 1998 (DFL/m²/year)



Source: PriceWaterhouseCoopers, "Case Reebok – Financial considerations including profitability of Distri-park Maasvlakte and the cash compensation", provided by HbR on 26 July 2004.

Figure 4: Lease prices of dry parcels with quay in various ports in 1998 (DFL/m²/year)



Source: PriceWaterhouseCoopers, "Case Reebok – Financial considerations including profitability of Distri-park Maasvlakte and the cash compensation", provided by HbR on 26 July 2004.

Interestingly, Antwerp was found to be the second most expensive port per m² for both dry and wet parcels. The difference between prices in Rotterdam and Antwerp ranged from 5% to 41% for wet parcels and from 29% to 33% for dry parcels.⁹⁰

A more recent study, undertaken by DTZ on behalf of HbR, compared the ports of Le Havre, Antwerp and Rotterdam for the setting up of a new logistics warehouse (10,000 square metres, 30 employees). The study found that Rotterdam is generally the most expensive location, with regard to rent, labour costs as well as container handling and hinterland transport.⁹¹ According to the study, lease prices for land in the port per square metre and year were €3-5 in Rotterdam, €2.83 in Antwerp and €1.8-3.4 in Le Havre. Applying these findings to the hypothetical setting up of a new logistics warehouse, the state of affairs translates into total rental cost (rent plus charges) per square metre and year of €50.53 in Le Havre, €51.65 in Antwerp and €60.77 in Rotterdam.⁹²

Like the PWC study, DTZ found that again Antwerp was the port with the second highest lease-related price per m². The price premium of Rotterdam ranged between 6% and 43%.

The third study on lease-related prices that we considered was a study by IBM on the position of the port of Rotterdam in the container segment. The study simulated lease-related prices per container (including lease and quay dues) and found that lease-related prices were highest in Rotterdam, followed by Le Havre. The price premium at the port of Rotterdam compared to the Le Havre was found to be 26%.⁹³

To sum up, all studies on lease-related prices that we considered found that the port of Rotterdam prices higher than other ports. These findings were generally confirmed by the results of the CRA questionnaire. We asked respondents if – in case they had knowledge about the level of lease prices at other locations – lease prices were higher in Rotterdam than elsewhere. A total of 83 respondents answered this question and 14 of them (17%) of them indicated that they thought lease prices were higher in Rotterdam than at other locations. Only 8 companies (10%) thought that lease prices were not higher in Rotterdam. The remaining 73% did not have any knowledge about lease prices at other locations. Of the 14 respondents that perceived prices to be higher at the port of Rotterdam, seven attributed the price differential to better infrastructure in Rotterdam, three to better services in Rotterdam (incl. labour supply), ten to better sea access, six to better hinterland connections and five to

⁹⁰ We compared the minimum and maximum prices in Rotterdam with the minimum and maximum prices in Antwerp.

⁹¹ DTZ “Benchmark Study Le Havre – Antwerp – Rotterdam“, July 2003, provided by HbR on 26 July 2004 (internet link).

⁹² Note that the lease fees charged by the port of Antwerp are published and open for public inspection. There are six different tariffs for the various types of land in the port and all fees are linked to an index (which makes large increases impossible). Any change in fees must be applied to all contracts, not only new ones (Interview with [confidential] on 8 July 2004). This last characteristic is in contrast to lease prices in the port of Rotterdam, which can only be adjusted for inflation but remain unchanged until a review and/or the contract expires.

⁹³ For a detailed description of the IBM study, see Section 7.6.

better synergies with other companies than in other locations. Note that the questionnaire allowed for multiple answers.⁹⁴

According to HbR, the port authority is well aware of the difference between lease prices in Rotterdam and other ports, as well as non-port locations. However, HbR believes that potential tenants would not decide against being established or establishing themselves within the port of Rotterdam as location on the basis of a price difference of €1-2 per m².⁹⁵

5.9 Market power with regard to the renting out of land

Our analyses set out in the previous sections allow us to draw several conclusions regarding the pricing of HbR with regard to leases. As already mentioned, it is important to distinguish port-bound and non-port bound tenants as well as existing tenants and new tenants.

With regard to tenants that are not port-bound, we have seen no evidence that competition between port and non-port locations is not working properly and that there might be a potential risk of HbR having or abusing market power. Following our indicative categorisation of tenants in Table 20, this finding is relevant for forwarding and shipping companies as well as finance and consultancy companies. In general, non-port bound tenants are companies that could provide exactly the same service to exactly the same customers from a non-port location elsewhere.

With regard to tenants that are bound to the port (in particular to the customers and cargo flows in the port), the assessment of potential market power is likely to vary between new tenants and existing tenants.

For new port-bound tenants that are tied to a specific cargo type or group of cargo types (e.g. containers or iron ore and coal), market power can in the short run be derived from today's market power analysis with regard to the provision of infrastructure for the respective cargo type. As explained in Section 5.3, there is a close interaction between harbour dues and lease prices. HbR tends to see them as a bundle and our benchmarking results suggest that HbR uses both pricing instruments to extract any potential rents from port tenants and users. Based on our results of the cargo type analysis (see Sections 7 to 10), there is evidence that HbR has market power with regard to all cargo types, with market power being more limited for roll-on/roll-off. This means that conceptually, HbR is also likely to have market power with regard to lease prices for new tenants that are port-bound.

Note that in exceptional cases, there may only be one provider of a specific service interested in locating at the port of Rotterdam. In such a case, the rent that is likely to follow from HbR's market power would be shared between the port authority and the new tenant,

⁹⁴ CRA questionnaire.

⁹⁵ Interview with HbR on 22 July 2004.

distributed according to the outcome of the bargaining on the respective lease price. Yet, the overall welfare effects would not be changed.

In cases of new port-bound tenants that are not directly linked to a specific cargo type, generally the same logic applies. However, instead of deriving the potential level of market power of HbR directly from the port's position in the respective cargo type segment, one would need to take into account the mix of cargo types that the tenant serves. The link to cargo types can be either direct or indirect, e.g. via customers of the tenants that are in turn tied to (a mix of) specific cargo types. Given our general finding of market power for all cargo types, HbR can be expected to have market power also vis-à-vis port-bound tenants that are not directly linked to a single cargo type.⁹⁶

Conceptually, based on our findings in the cargo type analyses, the derived demand for land parcels of port bound tenants should provide HbR with market power for lease prices. However, in reality there are limits to the port authority's ability to exercise pricing power for lease prices. This stems from the fact that – as explained in detail in Section 5.6 – there is currently only very limited availability of new land. Also, only a small fraction of the total area suitable for renting out will become freely available for price negotiations with new tenants until the end of 2007. Hence, while pricing power with regard to new port-bound tenants is conceptually likely, it is unlikely to be an issue in practice.

Finally, we turn to existing port-bound tenants. From the price review process set out in HbR's standard lease contracts (see Section 5.4 for a detailed discussion), it follows that reviewed lease prices for existing tenants depend on the pricing of recent new tenants when it comes to the re-negotiation point.⁹⁷ Hence, to the extent that HbR may possess market power vis-à-vis new port-bound tenants, there is the possibility that this market power could have an effect on the review of lease prices of existing tenants. However – as explained above – while this is conceptually possible, it is highly unlikely that HbR would be able to exercise any pricing power with regard to new port-bound tenants. This implies that the port authority would also not be able to exercise any market power derived from the demand for specific cargo types vis-à-vis existing port-bound tenants.

⁹⁶ By definition, the only chance for the port-bound tenant to get access to its potential customers and/or the cargo flows at the port is to locate at the port. Hence, tenants should be willing to pay a rent premium to the port authority in order to be able to be active in that market. The port authority could extract part of that rent for given prices by auctioning the services.

⁹⁷ Note that the recent new tenants used in this benchmarking process must be comparable to the tenant whose lease price is under review. Hence, one could for example not derive higher prices for a coal terminal operator from higher lease prices charged to a small coal trader that recently settled on the port territory.

6 Provision of infrastructure: Overview

It is common practice of ports to distinguish three cargo categories and a number of cargo types per category:

- General cargo: container, roll-on/roll-off, other general cargo;
- Dry bulk: iron ore and scrap, coal, agribulk, other dry bulk; and
- Liquid bulk (sometimes referred to as “wet bulk”): crude oil, mineral oil products, other liquid bulk (mainly chemicals, oils and fats).

Table 26 shows the importance of dry bulk, wet bulk, container and general cargo excluding containers by the weight of cargo throughput and the type of revenue generated.

Table 26: Throughput and revenue by cargo category (revenue in million €)

	Container	General cargo ⁹⁸	Wet bulk	Dry bulk	Other	Total
Throughput (in m tons)	71	8	153	86	11	328
Lease related revenue	50	19	52	19	35	175
Harbour dues (sea going vessels)	46	16	101	38	0	201
Harbour dues (non sea going vessels)	1	0	3	6	0	10
Other	5	3	4	2	2	18
Total revenue	103	38	160	65	37	403

Source: Rentabiliteitsberichtgeving – jaargang 2003. We received the document from the HbR on 14 October 2004. The totals may not add up to the totals indicated on the document because of rounding as our totals are based on the percentage share of revenue indicated in the Rentabiliteitsberichtgeving. Other sources of revenue include revenue from customs, development costs (“exploitatie VBS”) and other revenue.

Wet bulk is the most important source of revenue, followed by containers and dry bulk. Wet bulk also accounts for the highest throughput.

Although the port authority uses tariffs that apply to several cargo types (like the general tramp vessel tariff, which is relevant for all bulk cargo except crude oil), its own tariff structure (special tariffs for crude oil, discounts for agribulk), as well as tariff structures at other ports (e.g. special tariff for general cargo types at Antwerp) show that a differentiation by cargo type and other dimensions is possible. We have therefore not aggregated the cargo types according to shared tariffs. We have instead described the most relevant tariffs for each cargo type. HbR is currently engaged in internal discussions, as well as talks with port users, regarding the potential to further differentiate the tariff structure.

⁹⁸ Other than container.

In the following we discuss general cargo, with a focus on containers, the roll-on/roll-off and “other general cargo”. We then move on to discuss dry bulk (iron ore and scrap, coal, agribulk, other dry bulk) and liquid bulk (crude oil, mineral oil products, and “other liquid bulk”).

7 Containers

7.1 Overview

The container business of the port of Rotterdam is generally considered as the most competitive cargo type that goes through the port.⁹⁹

“The biggest competitive battle between the ports takes place in the container sector. Rotterdam’s most important competitors in this market segment are Hamburg and Antwerp.”¹⁰⁰

Containers are standardised, i.e. each container terminal operator can handle containers without further specialisation, and generally containers do not contain input for industry located at the port. It is generally considered as non-captured cargo that could, in principle, be dealt with at any port with a container terminal.¹⁰¹ This is also confirmed by our survey, which shows that many operators consider a large part of their volume as non-captive volume. In the current situation, we nevertheless conclude that HbR has pricing power relative to its rival ports.

There is clear evidence and general agreement that, of all ports in the HLH range, the port of Antwerp is the most relevant alternative port for the port of Rotterdam. Both share similar catchment areas and offer a good network in hinterland connections. An analysis of the call pattern of container lines shows that most lines call at either of the two ports, some at both. There are only very few lines that call at a German port and not also at either Rotterdam or Antwerp. This suggests that there is a qualitative difference between the competition between the two Benelux ports on the one hand and between Rotterdam and the German ports (in particular Hamburg) on the other. This is also confirmed by the analysis of the cargo flows, which shows that the overlap of the catchment areas of Antwerp and Rotterdam is far bigger than the overlap of the catchment areas of Hamburg and the two Benelux ports.

Yet, despite the relevance of Antwerp as an alternative port we find significant price differences. According to data provided by HbR the harbour dues for deep-sea container vessels at the port of Rotterdam are significantly higher than at the port of Antwerp - the larger the vessels, the higher the difference in the harbour dues. For typical vessels employed on the transatlantic and the Far-East trade, harbour dues in Antwerp are 38, respectively 50 percent lower than in Rotterdam.

The general impression that HbR has pricing power relative to its rival ports is confirmed by further analysis. Other ports in the HLH charge even lower fees for the typical vessels

⁹⁹ Interview with [confidential] on 8 July 2004. Interview with HbR.

¹⁰⁰ HbR Annual Report 2004, p. 13.

¹⁰¹ With more and more cargo types being containerised, we may see more port bound containers in the future.

analysed. Simulations of lease related revenue per container shows that again Antwerp is significantly less expensive than Rotterdam (39 percent).

There is no evidence that the price difference can be explained, for example, by a better quality of the services provided by HbR.¹⁰² The main reason for the price difference provided by HbR is that Rotterdam offers better sea-side access than Antwerp, deep-sea vessels do not have to travel four to five extra hours on the river Schelde to get to the terminals in Antwerp and the same amount of time back to the sea. Moreover, larger vessels, for which the price differences is also the largest, face additional tidal constraints at Antwerp, which can lead to additional waiting hours, as these do not trouble the access to Rotterdam.

A study that has been provided by HbR shows that harbour dues at Rotterdam are about €14 per container, which is only a small part of the generalised cost of routing a shipment through a port. The same study provided by HbR shows, for example, that other port related costs are €130 per container in Rotterdam and that hinterland transport cost from Rotterdam to Genk are €191, to Frankfurt/Main €359 and to Prague €735. Using Genk as a lower bound on hinterland cost, the data suggest that harbour dues are at most four percent of the relevant route cost of €335.¹⁰³ Indeed, when including the full cost of the sea-transport this share would be much lower. Thus, an increase of harbour dues by 10% increases the costs of routing the cargo through the port by at most 0.4 percent.

This relationship between harbour dues and generalised costs of a particular route is relevant for the assessment of the profitability of a price increase by HbR. Generally, if costs do not vary with quantity, a small price increase is profitable if the elasticity of demand for the service provided is below one. However, if customers have to buy a bundle of goods and services, like in the port example, the calculation is different. Using the container example mentioned above, suppose costs of HbR that are related to the provision of infrastructure do not vary with the container throughput. Based on the €14 harbour dues and the total route cost (excluding additional sea transport compared to Le Havre) of €335, one can compute a critical demand elasticity with respect to total route cost. These calculations show that an increase in harbour dues by 10% would be profitable if the firm elasticity of demand with respect to total route cost was below 24. That is, only if less than 24% of the volume were lost in response to a 1% increase of the total route cost of €335, the increase in harbour dues would be profitable. If part of the volume is bound to the port, for instance because the cargo is used at or close to the port, or because of specific investments of the carrier, the critical elasticity on the remaining volume is higher. Moreover, the exemplary calculation is based on the observed level of harbour dues. If these reflect pricing power, the required elasticity would be even higher, which is less likely at lower prices. More generally the point of the

¹⁰² If comments about services that can be influenced by HbR were made, they related to public services (like customs or scanning) provided by HbR. Other comments were made relative to services provided by ECT, the largest container terminal in the port. The comments invariably pointed to lower quality in Rotterdam than in Antwerp.

¹⁰³ The analysis underestimates the potential to increase prices as the current prices are likely to reflect some pricing power as argued above.

calculations is that the fact that HbR controls only a small part of the total route costs, it is more likely to have an incentive to implement a small percentage increase in prices than otherwise.

We have found no convincing evidence of switching between services in response to changes in harbour dues. According to HbR, “[t]here are no examples of explicit pricing related switching. It is always a combination of service, time, price, quality, etc. Coming closest to this kind of switching are the withdrawals of some container services from Maersk (AE2 2001 to Antwerp) and P&ONL (loop D 2001 to Antwerp)”. [confidential] However, subsequent research did not confirm that these switches were motivated by changes in the relative level of harbour dues, but rather by other considerations. In another document, HbR also pointed to the merger of Maersk and Sealand and subsequent restructuring of networks as a reason for the switching of cargo from Rotterdam to Antwerp.

We did, however, receive evidence on switching in response to changes in total call costs. Shippers and carriers are also concerned about competition between stevedores, which account for the bulk of port related costs. Thus, there can be competition between ports without harbour dues necessarily being a critical factor. More generally, the pricing power of the port authority also depends on the intra-port competition of stevedores. If they skim off a large part of the locational rent at Rotterdam (e.g. the competitive advantage of better deep-sea access) through the rents, there is less pricing power for the port authority in harbour dues. If the stevedores face strong intra-port competition, there is more pricing power for the port authority as the joint possibilities for rent extraction are limited.

Our results suggest a ranking of rival ports in terms of their relevance. Antwerp is by far the most important alternative port. This result is confirmed by the analysis of call pattern, hinterland, our survey results and general perception of industry experts. The survey evidence suggests that the next most important alternative ports are the two German ports, with Hamburg coming first, followed by Bremerhaven. The ARA range ports then follow, with Amsterdam being in a clear waiting position.

There is clear evidence of capacity constraints for container handling at Antwerp. Thus, in the short-run the potential competitive threat of Antwerp does not significantly constrain the pricing of the port authority of Rotterdam as switching to Antwerp is limited by the short-run absorption possibilities of the latter. More generally, market power of port authorities (and stevedores) increases with capacity utilisation.

The evidence currently available indicates that the port of Rotterdam has pricing power in the container business. Based on the price differences compared to Antwerp and other ports in the HLH range and the current capacity constraints at Antwerp, and having taken regards of the differences in quality between the services offered elsewhere, HbR’s provision of infrastructure for container vessels would currently constitute a relevant market as harbour dues set by HbR are more than 5 to 10 percent higher than those at the other ports, where port authorities provide essentially the same services with regard to the provision of infrastructure.

A number of qualifying and explanatory comments are due in order to put this conclusion into context.

Our argumentation needs to be followed with care. It relates, for example, to pricing decisions taken on harbour dues only. Inter-port competition can still be perceived as vigorous. The point is that for the routing decisions of port users the pricing and the quality of other port-related services and hinterland transportation matter much more.

One focus of our analysis is on existing price differentials between ports.¹⁰⁴

HbR provides discounts to some container lines. According to HbR almost all shipping lines benefit from these discounts, reflecting reductions in the order of 20 to 30 percent. In 2004 discounts will be equivalent to about €16 million. Some discounts are lump sum, others partly dependent on the amount of cargo. We have not received more detailed information on these discounts. However, HbR explicitly confirmed that in their view the benchmarking data that we used provides a good picture of relative pricing of the different ports.

Pricing power within the container segment varies depending on a number of factors. Pricing power of the port of Rotterdam increases with the size of the vessels. Since the largest vessels are deployed on the Far East trade, this is also the trade where the port has the most substantial pricing power (and, indeed, the highest prices and the highest market share). For some hinterland destinations (origins) cargo is bound to the port. For transshipment cargo is less bound. While this situation is more likely to affect the pricing of feeder traffic than that related to deep-sea vessels, it provides a further argument that pricing power increases with vessel size.

We have not been tasked to explore any issues related to the financing of the ports. Evidence of pricing power relative to rival ports is therefore not necessarily indication of excessive returns by the port authority relative to costs. HbR has recently moved to a new cost accounting system. Based on this system the current return is 4.3 percent for the containers and distribution market segment. These results depend critically on the depreciation and valuation techniques used for the asset base.

In our analysis we have taken the capacities as given and focussed on short-run pricing power. In the long-run ports are engaged in capacity competition as well. Pricing power at preferential locations can be beneficial for consumers if it attracts more investments at these locations than at less suitable locations.

There are a number of critical developments that are likely to change the competitive situation in the long run. Antwerp is planning to significantly increase container-handling capacity in the second half of next year. After a phasing in period, this will release the

capacity constraint it presently faces. Also, if container growth rates continue as they were in the last few years, and Amsterdam keeps offering much lower harbour dues and terminal handling dues, it may eventually attract business. This may induce other port users to follow thus tipping the market. This, in turn, would ease capacity constraints at existing locations. Other smaller ports in the region have furthermore gained importance and are planning to expand. APM recently signed a letter of intent to operate a container terminal in Zeebrugge. Other ports, like Wilhelmshaven are expected to significantly increase capacity. ECT and P&ONL are potentially building and operating a new terminal at Rotterdam. At the same time vessel size increases and draught restrictions for ports like Antwerp and Hamburg become more binding.

7.2 Port users

The port of Rotterdam hosts a number of large container terminals that provide stevedoring services for deep-sea container ships.

Figure 5 shows the six container related tenants in the port that generate the most revenues for HbR. By far the largest operator of container handling services is ECT (European Container Terminals, formerly European Combined Terminals), owned by one of the largest terminal operating companies, Hutchison Whampoa Limited (HWL). The next largest is APM Terminals Rotterdam (formerly Maersk Delta), which belongs to the A.P. Møller – Mærsk Group which also operates liner shipping services. The two largest container terminals, the Delta terminal of ECT and the APM terminal, are each situated at the Maasvlakte, close to the sea. ECT also operates a second terminal, the Home Terminal, in the Waalhaven/Eemhaven, where other smaller terminals are situated too.

ECT's Home Terminal can handle ships with a capacity of up to 5,500 TEU. The Maasvlakte terminals have no capacity restrictions. ECT, for example, states that its Delta Terminal is capable of handling the latest and future generations of container vessels with a capacity of 8,000 to 12,000 TEU. ECT has also stakes in some of the smaller container terminals. Waalveem, for example, is a fully owned subsidiary. It furthermore has a 50% share in Rotterdam Short Sea Terminals. All large container terminals at the port of Rotterdam are open to all shipping lines.

Figure 5: Harbour dues and lease-related revenues generated for HbR by the largest container and distribution customers (2003)

[confidential]

Source: Based on information received from HbR on 14 Oct 2004

¹⁰⁴ The consultants that undertook the benchmarking study for HbR that yielded the simulation results reported above concluded that there was no room for HbR to increase either lease related fees or harbour dues. This does, of course, have no implications regarding the pricing power reflected in existing prices.

In the coming years, a new container terminal is to be built on the northwest corner of the Maasvlakte in Rotterdam. The so-called Euromax terminal is scheduled to have a quay length of 1,800 metres, a draught of 19.65 metres and a surface of 100 ha (which can all be extended in a second phase). The port of Rotterdam will carry out the construction and dredging, while Euromax, a 50/50 joint venture between P&O Nedlloyd (PONL) and ECT will develop, build and operate the terminal. The works is expected to begin in the first half of 2005 and should be completed by the end of 2008. The new terminal will be progressively operational after 2007. Over the next fifteen years, container traffic is expected to grow at about 8% per year and, according to HbR, the capacity added by Euromax is expected to be sufficient to accommodate traffic growth until 2011.¹⁰⁵

Contracts between stevedores and liners are usually short-term (1-2 years). According to HbR the bargaining power of stevedoring companies is growing.¹⁰⁶ In the HLH range, there are 1-2 terminal operators in each port. Liners would like to see more “hub ports” like Rotterdam, with one provider of infrastructure, but 5-6 terminal operators.¹⁰⁷

Table 27 provides the throughput in TEUs of the ten largest shipping lines at each terminal in Rotterdam, as well as the percentage relative to total port container throughput. Apart from providing an additional indication of the size of the terminals, these data show the importance to HbR of several of the larger customers for the terminals. Altogether the ten largest customers account for [confidential] percent of the total container throughput of the port of Rotterdam.

¹⁰⁵ [confidential] and
http://www.portofrotterdam.com/news/UK/Pressreleases/Pressreleases/HBR_28062004_01.asp?ComponentID=57244&SourcePageID=0.

¹⁰⁶ Interview with HbR on 5 July 2004.

¹⁰⁷ Interview with [confidential] on 6 July 2004.

Table 27: Terminal operators in the port of Rotterdam – cargo throughput of top 10 customers at each terminal (TEU)

	2003		2002	
	Cargo throughput of terminal (TEU)	Share of total port container throughput	Cargo throughput of terminal (TEU)	Share of total port container throughput
ECT DELTA	[confidential]	[confidential]	[confidential]	[confidential]
ECT HOME	[confidential]	[confidential]	[confidential]	[confidential]
APM	[confidential]	[confidential]	[confidential]	[confidential]
RST	[confidential]	[confidential]	[confidential]	[confidential]
HANNO	[confidential]	[confidential]	[confidential]	[confidential]
UNIPORT	[confidential]	[confidential]	[confidential]	[confidential]
<i>Total throughput top 10 customers</i>	[confidential]	[confidential]	[confidential]	[confidential]
<i>Total port throughput</i>	7,107,000	100%	6,506,000	100%

Source: CRA calculations based on Port Statistics 2003 and data provided by HbR on 26 July 2004.

Table 28 shows the most important container customers of the port of Rotterdam in terms of income generated through harbour dues.

Table 28: Top four container clients at the port of Rotterdam in 2003 in terms of harbour dues

Name of liner company	Harbour dues paid in 2003	Share of total income out of seagoing vessels harbour dues in 2003
[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]

Source: Information provided by HbR on 16 September 2004.

The shipping lines determine the network, decisions such as which ports a line calls at, the sequence in which it does so, the terminals, etc. For a large number of shipments, the customers of the shipping lines make the final choice for a specific port within that network.

For the analysis that follows it is important to note that, as described above, there are two large and a number of smaller container terminals at the port of Rotterdam that provide container handling services. The largest capacities are situated at Maasvlakte, which has no restrictions on the size of the container vessels that can be handled.

7.3 Throughput and capacity of container ports in North Europe

Table 29 shows the container throughput in the Hamburg-Le Havre range between 1996 and 2003. Table 30 lists the corresponding market shares. Note that container throughput in Vlissingen and Terneuzen is not included in the table. The market shares of total container throughput for each of these ports for the years 2000-2003 remained below 1%.¹⁰⁸

Table 29: Container throughput in million tons

	1996	1997	1998	1999	2000	2001	2002	2003
Hamburg	31	35.2	36.1	40	45.3	49.8	57.2	64.3
Bremen/Bremerhaven	15.7	17.4	18.3	21.7	27.5	29.3	30	31.8
Amsterdam	1.7	0.8	0.5	0.6	0.8	0.7	0.7	0.7
Rotterdam	52.9	58.6	61.6	66.3	65.1	62.2	65.8	70.6
Antwerp	29.5	33.4	35.4	39.4	44.5	46.4	53	61.4
Gent	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Zeebrugge	6.2	7.6	9.1	10	11.6	10.6	11.9	12.3
Dunkerque	0.7	0.8	1	1.1	1.3	1.4	1.5	1.5
Le Havre	9.5	11.2	12.2	12.8	13.8	14.6	16.8	19
Total	147.3	165.2	174.4	192.1	210	215.2	237.1	261.8

Source: Information provided by HbR on 16 September 2004. Vlissingen and Terneuzen are not included as the market shares of total container throughput for each of the ports for the years 2000-2003 was below 1%.

Table 30: Market shares based on container throughput in million tons

	1996	1997	1998	1999	2000	2001	2002	2003
Hamburg	21	21	21	21	22	23	24	25
Bremen/Bremerhaven	11	11	10	11	13	14	13	12
Amsterdam	1	0	0	0	0	0	0	0
Rotterdam	36	35	35	35	31	29	28	27
Antwerp	20	20	20	21	21	22	22	23
Gent	0	0	0	0	0	0	0	0
Zeebrugge	4	5	5	5	6	5	5	5
Dunkerque	0	0	1	1	1	1	1	1
Le Havre	6	7	7	7	7	7	7	7
Total	100	100	100	100	100	100	100	100

Totals may not add up to 100 due to rounding.

Source: Information provided by HbR on 16 September 2004. Vlissingen and Terneuzen are not included as the market shares of total container throughput for each of the ports for the years 2000-2003 was below 1%.

¹⁰⁸ Based on statistics obtained from the website of the Ports of Zeeland (<http://www.zeeland-seaports.com>).

Table 31 shows the estimated throughput capacity for most ports in the HLH range and that the port of Antwerp is currently facing tight capacity constraints.

Table 31: Container terminal capacity and utilisation in 2003

	Capacity (in m TEUs)	Utilisation (%)
Rotterdam	7.5	95
Hamburg	7.2	86
Antwerp	5.4	100
Bremerhaven	3.5	92
Le Havre	2.0	103
Zeebrugge	1.6	62
Amsterdam	1	0
Total capacity (in m TEU)	28.2	

Source: Information provided by the HbR on 25 October 2004. The information source for Amsterdam is the Ceres website, see www.ceresglobal.com/pages/pressre.html, accessed on 21 Oct. 2004.

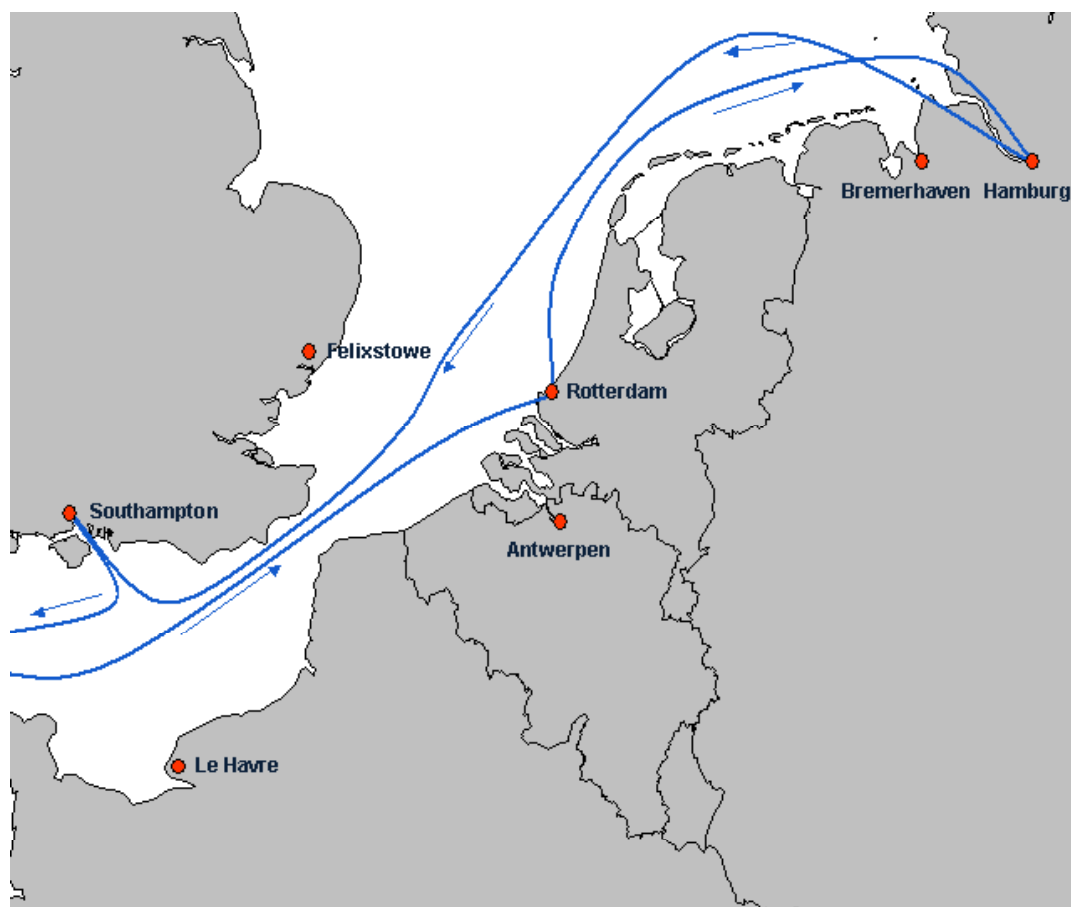
A leading container liner [name confidential] intended to add further calls to Antwerp, but could not due to these constraints. Barge companies have moreover added surcharges due to increased waiting times in the ports as a result of the delays caused by terminals trying to handle deep-sea vessels.¹⁰⁹ Rotterdam has also been affected by the capacity constraints, but appears to have resolved some of the issues also by transferring cargo to Amsterdam, which was shipped back to Rotterdam on the road.

7.4 Call pattern

In one loop, liners usually have three to four, and a maximum of five calls in Northern Europe. This finding is confirmed by the typical call patterns of deep-sea vessels.

¹⁰⁹ Financial Times 17th of August 2004 p. 14. Interview with [confidential].

Figure 6: Example for a call pattern of a container line



Source: HbR

Figure 6 shows the call pattern of a route where Rotterdam is the first port of call, Hamburg is the second and Southampton the last. Two observations are noteworthy here. First, only the seven main container ports are listed. Second, the chart clearly shows that for optimal geographical coverage with three to four calls in Northern Europe liners would call at one of the two UK ports, one of the three Benelux ports, one of the two German ports and Le Havre.

Table 32: Europe Far-East trade: ports of call in North Europe and capacity of trade lines

Carrier	String	RTM	ANR	HAM	BRV	SOU	FXT	LEH	Other EU ports	Average capacity ¹¹⁰	Annualised capacity ¹¹¹
Grand Alliance	Loop A	✓		✓		✓		✓		6405	580820
	Loop B	✓	✓		✓			✓		5776	523778
	Loop C	✓		✓		✓				5709	517748
	Loop D	✓		✓		✓			(GIT)	7455	644985
	Loop E	✓		✓		✓				3642	88713
	Loop G	✓		✓		✓			(GIT)	3533	232758
Maerks Sealand	AE1	✓			✓		✓		(CAG)	7850	641479
	AE2		✓		✓		✓	✓	(GIT)	6357	435968
	AE5	✓					✓		(GOT)	7815	566112
New World Alliance (APL, HMM, MOL)	Japan Exp. JEX (MOL)	✓		✓		✓		✓		6211	563248
	Asia Exp. AEX (HMM)	✓		✓		✓		✓		5570	481852
	China Exp. CEX (APL)		✓		✓	✓				5343	436614
Cosco/K Line/Yangmin/Hanjin/Senator (CKYH)	CES (Cosco)	✓	✓	✓			✓			5446	493874
	AES 1 (K Line)	✓	✓	✓			✓			5596	457277
	AES 2 (Yangming)	✓		✓			✓	✓		5554	477035
	PDS (Hanjin)	✓		✓			✓			4458	372214
	NEX (Hanjin/Yangmin)	✓		✓			✓	✓		5591	472071
	CEX (Hanjin/Cosco)	✓		✓			✓			5469	495949
United Arab (UASC)	AEC	✓	✓	✓					(THP)	3802	54950
Evergreen/Lloyd Triestino	WAE (Evergreen)	✓		✓				✓	(THP) (ZEE)	5172	422628
	CEM (Lloyd Triestino/Evergreen)	✓		✓					(THP)	5364	390223
MSC	Silk Express		✓	✓	✓		✓	✓		6716	436751
CMA CGM/Norasia	FAL (CAM CGM)	✓		✓		✓		✓	(ZEE)	6659	295541

¹¹⁰ Capacity is measured in TEU.¹¹¹ Total annualised capacity is the sum of Westbound and Eastbound annualised capacity.

	NCX (CMA CGM/Norasia/ APL)	✓		✓		✓	✓		(ZEE)	4212	92070
	Sunda Express (CMA CGM/Norasia/A PL)			✓					(ZEE) (PIR)	2739	162420
China Shipping	China Shipping	✓	✓	✓			✓			5620	423483
	CMA CGM/Contship/P&O Nedloyd/Marfret	✓		✓						550	44835
Total annualised capacity in TEU										10,805,396	

Source: Drewry Shipping Consulting Ltd, Drewry Container Quarterly, December 2003. Trade routes where information on ports called at or on total annualised capacity was missing were omitted from the above analysis.

A first observation from Table 32 and Table 33 is that for the majority of carriers and strings German ports are not a substitute for Benelux ports. Table 32 reveals that only one out of 27 strings on the Far East trade, representing 1.5% percent of the total annualised capacity on the routes analysed, does not cover both a German port and a Benelux port. However, an exception is the Sunda Express of the CMA CGM Norasia alliance, which calls at Zeebrugge (not shown in the table). For the case of transatlantic trade, Table 33 shows that five out of 23 strings do not call at both a German and a Benelux port, representing 5% of the total capacity analysed.

A second observation is that the majority of lines for a specific trade route chooses either Antwerp or Rotterdam: 21 lines representing 82% of the analysed capacity of the Far East trade call either in Rotterdam or in Antwerp and 18 lines representing 72% of the analysed capacity for transatlantic trade. However, the number of strings calling at either Antwerp or Rotterdam and Hamburg or Bremerhaven is slightly smaller: 19 out of 27 lines (representing 72% of the total analysed capacity) call at both a German port and a Benelux port. In the case of transatlantic trade, 12 out of 23 trade lines call at one of the German ports and one of the Benelux ports, covering 55% of total capacity analysed.

Table 33: Europe transatlantic trade: ports of call in North Europe and capacity of trade lines

Carrier	String	RTM	ANR	HAM	BRV	SOU	FXT	LEH	Other EU ports	Average Capacity	Annualised capacity
Grand Alliance/CP Ships	Grand Alliance PAX	✓	✓		✓			✓	(THP)	4751	401298
	Grand Alliance ATX/NAX	✓	✓	✓		✓				2931	275050
	Grand Alliance SGX/GAX		✓	✓		✓		✓		2931	275050
	Lykes (Gulf loop 1)		✓		✓				(THP)	3000	281608
	TMM (Hapag-Lloyd/Lykes (Gulf Loop 2))		✓		✓			✓	(THP)	3028	284218
Maersk Sealnd Sealand/New World Alliance	Maersk Sealnd TA2	✓			✓		✓			3477	326322
	Maersk Sealnd TA3/Andean	✓			✓		✓	✓		2682	125876
	New World Alliance APX (TA1)	✓			✓		✓	✓		4218	336514
MSC/Cosco o/Hanjin/K Line/Yang ming	Atlantic	✓	✓		✓		✓	✓		3818	358300
	MSC		✓		✓			✓		3432	322094
	MSC		✓	✓	✓		✓	✓		3665	292416
CMA CGM/P&O Nedlloyd/C ontship/Mar fret	Eastabout	✓		✓					(ZEE) (TIL)	4113	38603
	Westabout	✓		✓				✓	(TIL) (DKK)	2308	27077
Others	ACL		✓		✓				(GOT)	1850	183282
	Atlanticcargo	✓	✓		✓				(TIL)		32850
	Evergreen NUE	✓	✓		✓			✓	(THT)	4085	325876
	Italia/Lykes/TMM	✓							(THP)	2439	20606
	Star Shipping		✓							400	17280
	Melbridge Container Line	✓								1015	3334
Canmar/OCCL 1			✓					✓	(THP)	3500	328500
Canmar/OCCL 2			✓	✓					(MTR)	2633	247158
Cast			✓						(LPL)	2174	204046
Maersk Sealnd/PONL/MESC		✓			✓			✓		2936	275596
Total annualised capacity in TEU										4,982,954	

Source: Drewry Shipping Consulting Ltd, Drewry Container Quarterly, December 2003. Trade routes where information on ports called at and information on capacity was missing were omitted from the analysis.

Although the general pattern therefore is that typically one of the Benelux ports is chosen for a call, some liners call at both Antwerp and Rotterdam in one string. In the case of Far East and transatlantic trade, five strings include both Antwerp and Rotterdam. On the level of alliances, the majority (10 out of 16 alliances) of the Far East and transatlantic alliances call at both ports. One argument for having relationships with both ports is to keep up competition between the two. Also, multi-port calling is done to ensure that there is a potential substitute destination if something goes wrong in one of the ports (e.g. vessel collision or explosion of an oil tanker that blocks a port for some time).¹¹²

Zeebrugge is served by the CMA CGM/Contship/P&O Nedlloyd/Marfret alliance on both trade routes and once by the Evergreen/Lloyd Triestino alliance on the Far East/Europe trade route. Other than Zeebrugge, no alternative port in the Benelux and northern France, neither the ports of Vlissingen, Amsterdam, or Wilhelmshaven are called at by the shipping lines analysed. Dunkirk is called at once by the CMA CGM/P&O Nedlloyd/Contship/Marfret alliance. We discuss potential entry by alternative ports in Section 7.13.

Comparing the frequency and capacity of strings calling at Antwerp and Rotterdam also shows the relative strengths of these two ports with regard to different trades. The annualised capacity share of the analysed lines on the Far East route calling at Antwerp is low, representing only 30% of the total capacity analysed. Antwerp's role is much more significant with regard to transatlantic trade, with 15 strings calling at Antwerp, covering 77% of the total capacity analysed. Conversely, Rotterdam is significant with regard to Far East trade, with strings covering 88% of the annualised capacity analysed calling at Rotterdam and less significant with regard to transatlantic trade, with strings covering 51% of the annualised analysed capacity calling at Rotterdam.

The ports regard some carriers as their “home carriers”. For example, for the Benelux call on the transatlantic trade, Maersk calls only at Rotterdam and never at Antwerp. On the Far-East trade, only one of the three Maersk lines call at Antwerp. However, Maersk, which also operates a container terminal at Rotterdam, has recently moved strings to Antwerp.

The sequence of ports called at depends to a large extent on the trade route. As shown in Table 34 below, Antwerp is never the port of first call for lines on the Far East trade. This is likely to reflect the fact that the largest vessels are usually employed on that trade, which is also a traditional strength of the port of Rotterdam. For this particular trade route, ports of first call include Rotterdam, followed by Southampton and Hamburg. However, as Table 35 shows, Antwerp is port of first call on the transatlantic trade route for nine out of 27 trade routes, compared to Rotterdam who is port of first call for only three trade routes.

¹¹² Interview with [confidential].

Table 34: Sequence of calls on the Far-East/Europe trade (27 trade routes)

	Rotterdam	Antwerp	Hamburg	Bremerhaven	Southampton	Felixtowe	Le Havre
1 st port of call	8	0	4	0	5	4	4
2 nd port of call	11	2	9	1	0	1	0
3 rd port of call	3	1	7	2	3	4	0
4 th port of call	1	4	0	1	1	1	3

Source: Drewry Shipping Consulting Ltd, Drewry Container Quarterly, December 2003

Table 35: Sequence of call for Transatlantic/Europe trade (23 trade routes)

	Rotterdam	Antwerp	Hamburg	Bremerhaven	Southampton	Felixtowe	Le Havre
1 st port of call	3	9	1	2	1	0	1
2 nd port of call	2	2	1	6	0	2	1
3 rd port of call	1	3	2	3	0	3	3
4 th port of call	5	0	0	1	0	0	2

Source: Drewry Shipping Consulting Ltd, Drewry Container Quarterly, December 2003

In the Europe/Mid-East/South Asia trade a similar pattern emerges. Lines usually call at one of the two large Benelux ports (Antwerp or Rotterdam) and at one of the German ports (Hamburg or Bremerhaven). In fact, Hamburg is usually the first port of call, followed by Antwerp. Rotterdam is only called at once for the nine shipping routes.

In order to assess the comprehensiveness of the available data, Table 36 indicates the relative importance of the alliances analysed above in terms of their market share of total cargo throughput in TEUs in the port of Rotterdam in 2003. The alliances analysed in Table 32 and Table 33 represent around [confidential] percent of the total container throughput of the port of Rotterdam in 2003.¹¹³

¹¹³ The remaining alliances or lines analysed by the Drewry Shipping Quarterly are not listed in the top 40 alliances and hence we do not have data for these remaining alliances on the TEU throughput in Rotterdam. However the Top 40 alliances represent [confidential] of total throughput of the port of Rotterdam.

Table 36: Market share of alliances in total TEU throughput in 2003 in the port of Rotterdam

Alliance	Market share of alliance
Grand Alliance	[confidential]
Maersk Sealand	[confidential]
CKYH	[confidential]
Evergreen/Lloyd Triestino	[confidential]
CMA-CGM	[confidential]
CSCL China Shipping Container Lines Co.	[confidential]
Star Shipping	[confidential]
MSC	[confidential]
New World Alliance	[confidential]
Melbridge Container Line	[confidential]
OCCL	[confidential]
UASC United Arab Shipping Corporation	[confidential]
Others ¹¹⁴	[confidential]
Total cargo throughput in 2003 (7,107,000 TEUs)	100.00%

Totals may not add up to 100 due to rounding.

Source: Based on information received from the HbR on 26th July 2004. Although P&O Nedlloyd is part of the CMA CGM/Contship/Marfret alliance in the transatlantic trade, it is also part of the Grand Alliance in the Europe Far East trade. The market share was calculated assuming that P&O Nedlloyd is part of the Grand Alliance (P&O Nedlloyd's independent market share is 8%). Similarly, APL is also part of both the New World Alliance and CMA CGM/Norasia and was added to the New World Alliance. Maersk Sealand and New World Alliance are part of one alliance in the Europe transatlantic trade.

The analysis confirms that generally three main hinterland regions are distinguished for container terminal operators:

1. “North Continent West”, which comprises all terminals in the range between Rouen and Amsterdam, with competitive pressures primarily focused between Antwerp and Rotterdam, with additional capacity at Le Havre;
2. “North Continent East” consists primarily of the ports of Bremerhaven and Hamburg;
3. The “United Kingdom/Ireland market” encompasses the British Isles and includes the major United Kingdom gateway terminals.

As a fourth region, the “Scandinavia/Baltic market” can be identified. However, this market is primarily served by feeder links from terminals located in one or more of the three regions identified above.¹¹⁵

¹¹⁴ This includes liners calling at Rotterdam but not listed in Tables 32 and 33 and liners not part of the Top 40 listed in the data received from the HbR. The Top 40 alliances accounted for [confidential] of total cargo throughput in TEU of the port of Rotterdam in 2003.

¹¹⁵ See Regulation (EEC) No 4064/89 dated 03/07/2001, p. 12.

In the Hutchison/RCPM/ECT decision, the Commission reports a number of quotes that indicate that competition from Southern European ports is seen as very limited and therefore excluded from the analysis.¹¹⁶ Moreover, it is concluded that the United Kingdom/Ireland and the continental markets constitute separate relevant product markets. The European Commission does not investigate whether the two markets in the North Continent (West and East) are to be considered as separate relevant product markets. However, it states that it can be concluded from market studies that there is a significant degree of overlap between the various North Continent hinterland markets.¹¹⁷ Note an important distinction between the market for terminal services and the market for providing port infrastructure. While terminal handling costs are largely charged per TEU, harbour dues are largely based on ship characteristics and not on the cargo loaded and discharged. Thus, from a harbour's point of view, the number of calls is more important than the actual throughput. Stevedorers are concerned about throughput.

In a benchmarking study on the competitive position of the port of Rotterdam with regard to container services, PWC, in agreement with the task force of the port authority of Rotterdam, selected seven alternative ports to be studied in a benchmarking exercise. The selection was based on the geographic position and the existing hinterland connections and modes of transports available at the ports. The selected ports were Rotterdam, Vlissingen, Antwerp, Hamburg, Wilhelmshaven, Le Havre, and Felixstowe (PWC 2001). In a later update of the study, different ports were selected: Rotterdam, Antwerp, Hamburg, Bremerhaven, Le Havre (IBM 2003).

The port authorities in Antwerp and in Rotterdam both consider each other as the most important competitor in container services. There is little disagreement on the fact that Antwerp is the most relevant alternative to the port of Rotterdam.¹¹⁸

7.5 Structure of harbour dues and other relevant prices

In the port of Rotterdam, there are two tariffs for “container vessels in liner service”, depending on whether less or more than 51.3% of the GT of the vessel is loaded and/or discharged in the port. If the quantity of cargo moved is equal or higher than 51.3% of the vessels GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved is lower than 51.3% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

¹¹⁶ See Regulation (EEC) No 4064/89 dated 03/07/2001, pp. 12 to 14.

¹¹⁷ See Regulation (EEC) No 4064/89 dated 03/07/2001, p. 14.

¹¹⁸ Statement by the HbR representative and statement by [confidential].

Table 37: Tariff for (deep-sea) container vessels in liner service (Tariff LC)

Share of the GT ¹¹⁹ of the vessel that is loaded and/or discharged	Tariff structure
51.3% or more	€0.424 per GT of vessel
Less than 51.3%	€0.211 per GT of vessel + €0.416 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

Roughly speaking this tariff structure implies that if more than a quarter of a ship's capacity is discharged and the same amount loaded at the port of Rotterdam, the harbour dues are a fixed sum per call, the size of which depends on the capacity of the ship. If less than a quarter of the capacity is moved in and out respectively, less than half of the harbour dues per call is determined, depending also on the weight of the throughput.

Which tariff is applied also depends on the size of the vessel as larger vessels typically discharge and load less cargo relative to their GT capacity. 60% of the small container vessels (smaller than 50,000GT) harbour dues are based on GT and cargo throughput. This figure increases for midrange vessels (50-80,000 GT) to 80-90% and for very large vessels to 97%.

Shortsea/feeder tariffs apply to vessels operating in liner service smaller than 10,000 GT that transport only general cargo and having a sailing area restricted to Europe, the Mediterranean, the Black Sea, Morocco, the Canary Islands, Madeira and the Cape Verde Islands. Similar to the dues for container liners, harbour dues for shortsea and feeder vessels are set per GT of the vessel if 50% or more of the vessel's GT is loaded and/or discharged in Rotterdam. If less than 50% of the GT is moved, an additional fee per metric ton of loaded/discharged cargo applies.

¹¹⁹ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

Table 38: Tariff for shortsea/feeder container vessels in liner service (Tariff LF)

Share of the GT ¹²⁰ of the vessel that is loaded and/or discharged	Tariff structure
50% or more	€0.362 per GT of vessel
Less than 50%	€0.158 per GT of vessel + €0.408 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

The HbR list prices include a reduction for a second call in liner service as well as a frequency reduction if a specific vessel in liner service calls at Rotterdam regularly (“frequency reduction on name of vessel in liner service”).

HbR provides discounts to some container lines. According to HbR almost all shipping lines benefit from these discounts, reflecting reductions in the order of 20 to 30 percent. In 2004 discounts will be equivalent to about €16 million. Some discounts are lump sum, others partly dependent on the amount of cargo. We have not received more detailed information on these discounts. However, HbR explicitly confirmed that in their view the benchmarking data that we used provides a good picture of relative pricing of the different ports. We therefore base most of our analysis below on the pricing information that was included in a report by IBM Business Consulting Services 2003, which was provided by the port of Rotterdam on request.

While it would be impracticable for a port authority to differentiate pricing by the origin or destination of each specific container, the ports have some crude indications for the origin and destination of the containers shipped. It is customary, for example, to distinguish main different trades, e.g. the Far East/Europe trade and the Transatlantic/Europe trade. These different trades not only vary regarding the typical cargo types shipped in the containers (which may influence how captive the cargo is) but are also associated with different vessel sizes, which is another way to distinguish between different trade flows.

Port authorities also have knowledge about the traditional business of large liner shipping companies, for example whether they have a known focus on the Far-East trade or the transatlantic trade. Thus, by differentiating tariffs agreed with these liners, HbR can, in principle, respond to some extent to different market positions in different trades.

Port authorities can further distinguish between transshipment and hinterland traffic. Given that transshipment requires a shortsea/feeder and a deep-sea vessel, it is on top of that possible

¹²⁰ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

to differentiate prices between transshipment and hinterland traffic by setting the prices of the shortsea/feeder ships.

7.6 Benchmarking

7.6.1 HARBOUR DUES

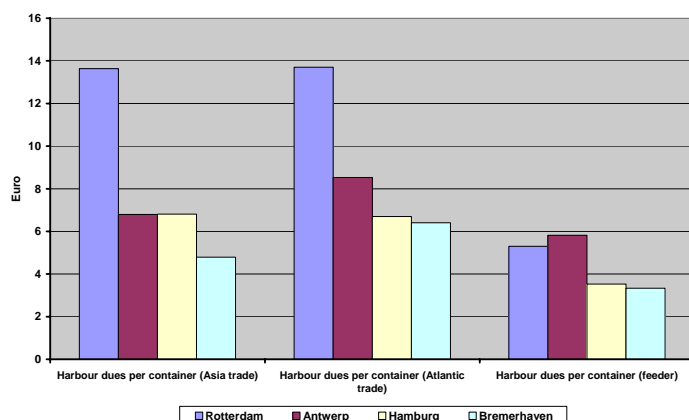
In order to get a first indication of pricing power by HbR in the relevant harbour dues for the container market, as well as to give proper attention to the cellophane fallacy problem in doing so, we compare the harbour dues and lease-related prices per TEU (container) or per ton (other cargo). In the short-run port authorities do not have the means to influence the quality of the basic service of providing port infrastructure such as quay walls, jetties and roads.¹²¹ Thus, a higher price does not reflect a better service provided by the port authority.. This means that higher pricing of the port of Rotterdam would then be an indication of pricing power relative to the relevant alternative ports.¹²² Note that the reverse conclusion is not possible. That is, if harbour dues for comparable services do not differ between ports, this may well reflect that current prices are competitive. However, it would also be consistent with ports operating in different relevant markets, and each port having pricing power, or, in fact, with collusion among the ports. Indications of differences in harbour dues, therefore, are an indication of pricing power relative to rival ports.

The benchmarking approach that this logic suggests is relatively simple for those cargo types for which comparative pricing data exists. It also is meaningful regarding the assessment of pricing power reflected in existing prices. However, it does not answer the question whether there is scope to increase prices (which we address in the following sections).

HbR has provided us with comparative information on harbour dues for typical vessels for containers. These statistics show the harbour dues per container for the main alternative ports.

¹²¹ Port authorities do, however, maintain the existing infrastructure, for example by dredging.

¹²² Higher prices at the port of Rotterdam may also reflect different policies regarding the financing of investments. Pricing power relative to competing ports does not have a direct implication for an assessment of welfare in a dynamic context.

Figure 7: Containers – harbour dues per container in main alternative ports in 2003

Source: CRA calculations based on IBM Business Consulting: “Concurrentiepositie van de haven van Rotterdam in the containeroverslag”, 24 November 2003, pp. 15-20 and 23. Note that this graph does not include Le Havre due to the port’s structure of harbour dues, which differs strongly from the other ports and does not allow meaningful comparisons.

The figures clearly reveal that harbour dues in Rotterdam are significantly higher than in the benchmarked ports for containers except for shortsea/feeder vessels. Table 39 shows the price differences compared to Antwerp.

Table 39: Harbour dues per container for a typical vessel 2003

	Harbour dues per container (€) Regina Maersk (Far East Trade)	Difference to Rotterdam (%)	Harbour dues per container (€) Ever Round (Transatl. Trade)	Difference to Rotterdam (%)
Rotterdam	14	0%	14	0%
Antwerp	7	-50%	9	-38%
Hamburg	7	-50%	7	-51%
Bremerhaven	5	-65%	6	-53%

Source: CRA calculations based on IBM study.

We note that Antwerp charges a higher amount of harbour dues per container on a typical vessel on the transatlantic trade than on the Far East trade. Antwerp is much stronger on the transatlantic trade than on the Far East trade (see Section 7.4). Nevertheless, the over-all price level at the port of Antwerp is considerably lower than that in the port of Rotterdam.

The higher difference in harbour dues for larger vessels reflects different pricing structures. In Hamburg harbour dues are capped for larger vessels. In Antwerp harbour dues also increase with the size of the vessel but not as much as in Rotterdam.

The benchmarking analysis therefore suggests that current pricing for container services reflects pricing power. Indeed, the difference to those ports, which are considered as the most relevant alternatives to Rotterdam is significant. This suggests that if the port of Rotterdam were to charge the same prices as Antwerp or Amsterdam, it could profitably raise prices by more than 5 to 10%. Thus, the evidence suggests that the services of the port of Rotterdam are to be considered the relevant geographic market. The finding in the benchmarking section has no implications for the ability to raise prices further. HbR and other ports offer discounts to the shipping lines. We have not received evidence on these discounts and have therefore used the data provided by HbR.

For completeness, we report the harbour dues for feeder ships below. These will be discussed more extensively in the section on transshipment.

Table 40: Harbour dues per container for a typical feeder ship 2003

	Harbour dues per container (€)	Difference to Rotterdam (%)
Rotterdam	5	0%
Antwerp	6	10%
Hamburg	4	-33%
Bremerhaven	3	-37%

Source: CRA calculations based on IBM study

7.6.2 LEASE RELATED PRICES

In the benchmarking study provided by HbR, lease related costs in Rotterdam, Antwerp, Hamburg, Bremerhaven and Le Havre were compared. The comparison (see Table 41) shows that in this respect, Rotterdam is also the most expensive port in this group of European ports. We briefly discussed the results of this study in Section 5. Here we discuss the results in more depth.

Table 41: Lease price (terreinconcessies) 2003

	Price per square metre (€)	Difference to Rotterdam (%)	Difference of price per square metre compared to 2001 (%)
Rotterdam	4.60		4
Antwerp	3.51	-24	3
Hamburg	2.50	-46	0
Bremerhaven	2.50	-46	Not available
Le Havre	4.21	-9	61

Source: IBM study, p. 56

Table 42: Quay dues for a typical container terminal (kadeelden) 2003

	Price per metre (€)	Difference to Rotterdam (%)	Difference of price per metre compared to 2001 (%)
Rotterdam	749		0
Antwerp	0	-100	0
Hamburg	590	-21	0
Bremerhaven	590	-21	Not available
Le Havre	0	-100	-100

Source: IBM study, p. 57.

Using the characteristics of a typical container terminal, one can determine the lease related price (lease price and quay dues) per container.

Table 43: Lease related prices per container 2003 (quay dues and lease price)

	Price per container (€)	Difference to Rotterdam (%)	Difference of price per container compared to 2001 (%)
Rotterdam	6.72		3
Antwerp	4.12	-39	3
Hamburg	3.96	-41	0
Bremerhaven	3.96	-41	Not available
Le Havre	4.95	-26	38

Source: IBM study, p. 57.

Note that for Rotterdam the costs per square metre are more important than the quay costs. For a representative container-handling terminal, they are €5.42 (lease) and €1.30 (quay dues) per container respectively.

7.6.3 LEASE RELATED PRICES AND HARBOUR DUES

In this section we combine the results from both analyses above. The results presented in Table 44 and Table 45 show that lease related fees and harbour dues are the highest in Rotterdam, followed by Antwerp which charges 38% (typical vessel transatlantic trade) to 46% (typical vessel Far East trade) less than Rotterdam.

Table 44: Lease related fees and harbour dues per typical container on the Far East trade 2003 (Regina Maersk)

	Lease related cost per container (€)	Harbour dues per container (€)	Sum (€)	Difference to Rotterdam (%)
Rotterdam	7	14	20	0%
Antwerp	4	7	11	-46%
Hamburg	4	7	11	-47%
Bremerhaven	4	5	9	-57%

Source: CRA calculations based on IBM study.

Table 45: Lease related fees and harbour dues per typical container on the transatlantic trade 2003

	Lease related cost per container (€)	Harbour dues per container (€)	Sum (€)	Difference to Rotterdam (%)
Rotterdam	7	14	20	0%
Antwerp	4	9	13	-38%
Hamburg	4	7	11	-48%
Bremerhaven	4	6	10	-49%

Source: CRA calculations based on IBM study.

The tables show that also when taking into account the lease payments Rotterdam charges significantly more than Antwerp.

7.7 Cargo flow analysis: Overview

A complementary approach to the harbour dues benchmarking method is to analyse cargo flows. If for a given origin-destination pair we know the different cost elements in the transport chain for shipping the cargo through alternative ports, we can determine the maximum differential of harbour dues that is possible before the shipper would be indifferent between the destinations (assuming constant quality between ports). If for a given type of cargo a large quantity of cargo flows are captive in the sense that it would not be moved to another port if harbour dues (or lease-related prices) were to increase by 5%, this would suggest that a 5% price increase would be profitable. The better the available data, the finer

an analysis is possible. If the analysis reveals, however, that it would not be possible for a port to profitably raise prices, this would suggest that one would have to add competing ports and analyse whether such a price increase would be profitable for them if they were to raise prices jointly (as in the hypothetical monopolist or “SSNIP” test). This analysis assumes that existing prices are fairly competitive in the sense that price-cost margins are not too large.

The analysis needs to be complemented with a number of further elements including the analysis of capacity constraints, limited port choice due to draught restrictions, and network effects. Note that it certainly is not only the capacity of the ports that matter. The relevant bottleneck may also be other relevant infrastructure such as warehousing facilities or hinterland transport connections.

A detailed cargo flow analysis was part of the suggested module B for this study, which was however not chosen by the client in this stage of the study. We have, however, been able to gather some useful evidence from existing reports. We have also included some questions in our survey questionnaire that may allow indicative conclusions (see enclosed questionnaires).

Note that in order to improve exposition, we do not always explicitly refer to the possibility that existing prices may represent pricing power. We discuss the implications of high margins and the associated cellophane fallacy in Section 2.3.

There are two interlinked analyses given below: the first is a generalised cost analysis that determines the importance of harbour dues and lease-related prices in call costs and the overall transport chain. The second part of the study reported below is a captive business analysis that compares generalised costs of choosing alternative harbours for given origin and destination pairs in order to generate estimates of the captive business for various price differentials between ports.

7.7.1 GENERALISED COST

First, it is generally known that harbour dues (and lease-related prices that could be passed on to port users) account only for a small part of total transport cost. This results from the fact that HbR’s charges are only a small portion of total call costs. If, for example, the percentage of a shipper’s cost for a given cargo/route pair that is “caused” by HbR services is 10%, an increase in HbR’s prices of 10% will result in a change in total shipping cost for that cargo/route pair of about 1%. Given that the pricing of HbR affects only a small share of total cargo shipment costs that a shipper must pay, shippers may be less likely to switch to another port in response to a price increase by HbR. The fact that other costs make up for most of the call costs implies that HbR may enjoy fairly high pricing power, due to the limited pass-on of its price increases that generate substitution effects.

There are other, non-monetary, factors that affect the “cost” of a particular cargo routing, e.g. the time required for the shipment. In order to compare different routings, transport

economists sometimes use the concept of “generalised cost”. These costs include all monetary costs of using a route but also monetary values for other factors, like the time required for the shipment. Thus, where the analysis of the monetary factors above already indicates that the harbour dues are only a very small part of total transport cost, their importance for switching decisions is even further lessened when the other factors that affect the generalised cost of choosing a particular route are also taken into account.

HbR says not to have a fully quantified model of generalised cost, but it did provide us with studies that have assessed total transport cost and, on a qualitative basis, a number of the other factors that affect the generalised cost of routing cargo through different ports. The following items come up as relevant in these studies:

Transport cost

- ❑ Sea transport cost
- ❑ Call costs
 - Harbour dues
 - Towage
 - Pilotage
 - Mooring/unmooring
 - Other
- ❑ Container handling cost
 - Sea move, land move
- ❑ Hinterland transportation
 - Barge, road, rail

Non-monetary factors that affect generalised transport costs

- ❑ Transport time
- ❑ Availability of connections, frequency regarding the hinterland and feeders
- ❑ Quality and speed of container handling

7.8 Cargo flow analysis: Port related and sea-side costs

Based on the results of the call cost model used by the port authority of Rotterdam, we can confirm the general intuition that harbour dues are only a small part of total transport chain costs.

For containers, the share of harbour dues in total port-related costs is relatively low. The main part of total port-related costs are usually cargo handling costs, which can be up to 25 times higher than harbour dues (e.g. in Hamburg and Bremerhaven).

For both the transatlantic trade and the Far-East Europe trade, Le Havre is the closest port to call at coming from the sea. As the differences in sea-side costs for the different ports are independent of the hinterland transportation, we have included the difference in sea-side costs compared to Le Havre in the computations of the port related costs. We only include the additional and not the total sea transport costs for each port as the largest part of the sea-transport costs are independent of which port in Northern Europe is chosen.

Table 46 and Table 47 below show the port related costs per container for a typical call of Regina Maersk, representative for the Far East trade, and for a typical call of Ever Round, which is smaller than Regina Maersk and representative for the transatlantic trade.

Table 46: Port related costs per container for a typical call of Regina Maersk, Far East trade 2003

	Rotterdam	Antwerpen	Hamburg	Bremerhaven
Harbour dues per container	14	7	7	5
Other harbour call costs per container	11	9	14	12
Cost of container land move	110	85	137	137
Additional cost of sea transport per container (compared to Le Havre)	9	10	26	19
Total	144	111	184	173
Total excluding harbour dues	130	104	177	168

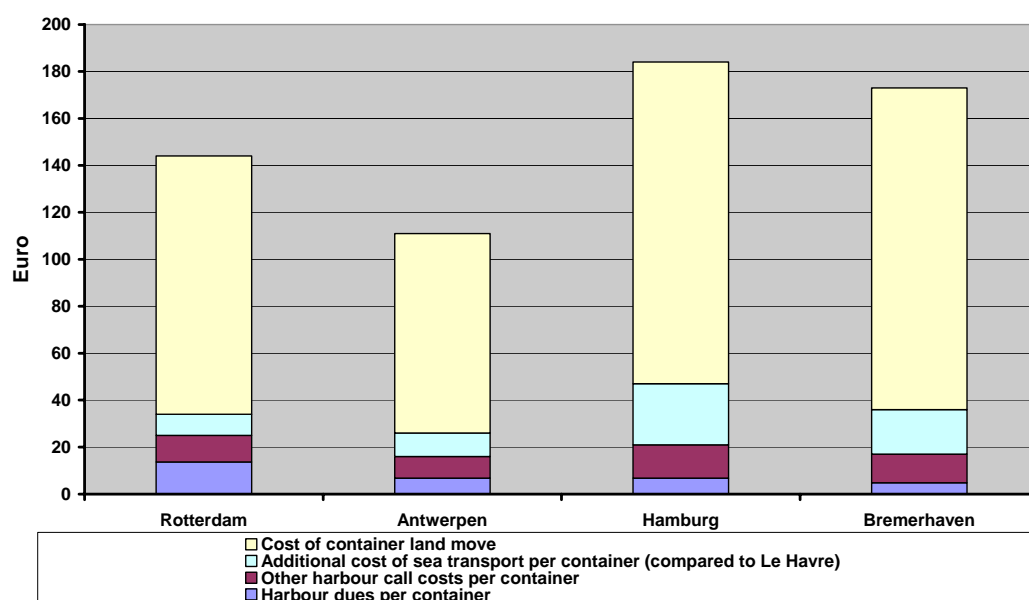
Source: CRA calculations based on IBM study

Table 47: Port related costs per container for a typical call of Ever Round, transatlantic trade 2003

	Rotterdam	Antwerpen	Hamburg	Bremerhaven
Harbour dues per container	14	9	7	6
Other harbour call costs per container	16	14	18	17
Cost of container land move	110	85	137	137
Additional cost of sea transport per container (compared to Le Havre)	10	11	29	23
Total	150	119	191	183
Total excluding harbour dues	136	110	184	177

Source: CRA calculations based on IBM study.

Although there are differences, the broad pattern is similar for both typical calls analysed. We evaluate the pattern in more detail focussing on the Far East trade, which is the more important trade for HbR.

Figure 8: Port-related costs per container for a representative Asia trade vessel (Regina Maersk, 6.400TEU)

Source: CRA calculations based on IBM Business Consulting: "Concurrentiepositie van de haven van Rotterdam in de containeroverslag", 24 November 2003, pp. 15-20, 23 and 29. Note that these figures exclude the cost of sea transport, but do consider the additional cost of shipping the container further than to the port of Le Havre (the first port in Northern Europe that container vessels coming from Asia (could) call at).

The figures for Regina Maersk, which is a good representative ship for the Far East trade, illustrate the relative importance of other port related costs. Comparing the current harbour

dues at Rotterdam of €14 per container with the other port related cost of €130 per container shows that at given price levels at Rotterdam a ten percent difference in harbour dues (€1.4) would be outweighed by a difference in other port related cost of 1.1 percent.

An analysis of the data shows that the actual differences in other port related costs are significant. Compared to Rotterdam, other port related costs are 19 percent lower in Antwerp and 30 percent higher in the port with the highest other port related cost, Hamburg.

These figures also show that given current prices an increase in harbour dues in Rotterdam by 10 percent affects total port related costs of a liner company by less than 0.9 percent.

7.9 Cargo flow analysis: Hinterland transportation costs

The costs of hinterland transport from and to Rotterdam are about €0.90 per container per kilometre, e.g. €191 from Rotterdam to Genk, €359 from Rotterdam to Frankfurt/Main and €402 from Rotterdam to Hanover (see Table 48). It is clear from these figures that a few kilometres difference in distance can compensate large differences in harbour dues and even lease-related prices. A difference of 10 kilometres in the distance of hinterland transportation is equivalent to about €9 per container and could easily compensate a 50% difference (€7) in harbour dues between Rotterdam and another port. Put differently, an increase in harbour dues by ten percent (€1.4) would, other things being equal, compensate a difference of 1.6 kilometres in the distance of hinterland transportation.

Table 48: Cost of hinterland transport for containers shipped through Rotterdam in 2003

Hinterland origin / destination	Transport cost per container in €	Distance from Rotterdam in km	Price per container per km in €
Genk	191	187	1.02
Hannover	402	416	0.97
Frankfurt/Main	359	456	0.79
Strasbourg	335	576	0.58
Paris	425	447	0.95
Prague	735	863	0.85
Average	408	491	0.86

Source: CRA calculations based on IBM Business Consulting: "Concurrentiepositie van de haven van Rotterdam in the containeroverslag", 24 November 2003, p. 27. Distances according to www.viamichelin.com.

These figures reveal that hinterland transportation costs are important for port choice. They also explain why, when being asked which port competes most intensively with Rotterdam, most respondents immediately point to Antwerp.¹²³ It is, however, also important to note that

¹²³ The port authorities of both ports made this statement.

the catchment areas of ports in the ARA range, i.e. those ports that are located between Antwerp and Amsterdam, have substantial overlap. This is due to the shared geographical proximity to the Benelux countries (see Figure 9) but also due to the shared access to Rhine corridor via waterways. The latter is discussed in more detail in Section 10. Finally, our survey results show that for those origins and destinations where most respondents¹²⁴ chose Rotterdam as the preferred port for shipments Antwerp was chosen by the second highest number of respondents (Strasbourg, Bochum, Frankfurt/Main, Stuttgart, Munich). The only exceptions are Prague and Hanover where Rotterdam was named most often and one of the German ports (Bremerhaven, Hamburg) attracted the next highest number of choices. For Paris Le Havre was mentioned most often, Antwerp second and Rotterdam third. For Gent the port of Gent was chosen most often and Antwerp second, Rotterdam third.

Figure 9: The Hamburg-Le Havre range



Source: CRA

Combined with existing data on cargo flows by country, it is possible to confirm some of the more heuristic eliminations of ports. For example, for most cargo types the overlap of catchment areas of the port of Rotterdam and the port of Le Havre is so limited, that those ports are unlikely to be in the same relevant market.

¹²⁴ Note that the evaluation reported here refers to all respondents, not restricted by cargo type.

Table 49: Hinterland transport cost per container per km in € (2003)

	Rotterdam	Antwerp	Hamburg	Bremerhaven	Le Havre
Genk	1.021	1.382	0.975	0.980	1.120
Hannover	0.966	0.878	1.258	1.257	1.073
Frankfurt/Main	0.787	0.904	0.665	0.650	1.013
Strasbourg	0.582	0.705	0.856	0.843	0.870
Paris	0.951	0.663	0.938	0.967	1.303
Prague	0.852	0.917	0.773	0.713	1.036
<i>Average price</i>	<i>0.860</i>	<i>0.908</i>	<i>0.911</i>	<i>0.902</i>	<i>1.069</i>

Source: CRA calculations based on IBM study, p. 27.

In order to make a more precise statement it would be helpful to weigh the different destinations against the existing traffic flows. If most of the containers are transported to locations very close to the relevant port, a change in harbour dues will have a smaller impact on volume shipped through this port than if final destinations are mostly in a range that can be served cost effectively from several ports.

HbR has not been able to provide us with any data on hinterland traffic of containers coming from Asia. Based on containers coming from the US, HbR has made some forecasts for hinterland traffic to Germany, France and the Benelux countries for 2002 and 2010, but these forecasts are about 6 years old. HbR is currently working on new forecast studies, but those will only be available in a year or so. However, HbR provided some information on the destinations of transatlantic container traffic, which is based on information on the destinations of shipments that came from ports in the United States.¹²⁵

Figure 10 shows the density of containers shipped from the US to the various destinations in Europe in 2002. The density levels are defined as follows: Each area comprises hundred square kilometres. Areas with 1-9 TEUs per area are marked “0”, 10-99 TEUs per area “1”, 100-999 TEUs per area “2”, 1,000-9,999 TEUs per area “3”, 10,000-99,999 TEUs per area is marked “4”, and, finally, areas with more than 100,000 TEUs per area are marked “5”. The highest density is around the ports, which shows that the port bound traffic is also significant in container traffic.

Figure 10: Density of US containers

[confidential]

Source: GHR.

¹²⁵ Phone conversation with Maurits van Schuylenburg (HbR) on 15 July 2004. GHR: “Krimpt het achterland van Rotterdam?” August 2003.

Figure 11 shows the ideal location of the ARA range ports for most of the high-density destinations. Figure 11 and Figure 12 show the increasing role of Antwerp as the leading port for most of the overlapping catchment area. The substitution between Rotterdam and Antwerp as leading ports for a similar catchment area confirms that the overlap between these two ports is much more significant than the overlap with the German ports. This result is reinforced when taking into account that most of the high-density areas are in the Antwerp/Rotterdam catchment area.

Figure 11: Leading ports by destination

[confidential]

Source: GHR.

Figure 12: Market share of the port of Rotterdam by destination

[confidential]

Source: GHR.

HbR's (then GHR) own analysis of these developments points to the following reasons for the increasing role of Antwerp:¹²⁶

- The merger of Maersk and Sealand lead to a move of more traffic to Antwerp. Sealand was the home carrier of Rotterdam. Feeder services and intermodal services (rail and road) were routed via Rotterdam. After the merger these services were spread over a number of ports.
- The success of MSC, the home carrier of Antwerp has played an important role. MSC feeders significant cargo amounts via Antwerp.
- The different forms of cooperation of the shipping lines and the mergers imply that the containers are now shipped closer to the final destination while on sea.
- Many shipping lines opened their own offices in various ports and stopped working with agents. These offices have regional targets and budgets while the agents were less keen to lure away containers from colleagues in other ports.

It is interesting to note that the change in prices is not mentioned in the note, not even changes in relative call costs, container handling costs or hinterland transportation costs.

Altogether the analysis of hinterland transportation confirms that Antwerp is by far the most important alternative port to Rotterdam. The German ports (in particular Hamburg) are a relevant alternative for destinations like Hanover and Prague. However, these are much less economically relevant than the Rhine-Ruhr area and the Benelux countries, which are generally better served from Rotterdam or Antwerp than from the German ports.

¹²⁶ GHR: "Krimpt het achterland van Rotterdam?" August 2003.

7.10 Qualitative differences of ports

According to HbR, as advertised on its website, Rotterdam owes its position as the main European container port to factors, such as:¹²⁷

- Excellent accessibility, also for the most recent generations of container ships;
- Nautical safety;
- Dedicated terminal facilities, both on the landside and the waterside;
- European transport hub function;
- Excellent hinterland connections, especially via inland vessel, short sea/feeder and rail;
- Possibilities for expansion and setting up new operations;
- Fast turnaround times; and
- Attractive location for bunkering, among other things as a result of competitive tariffs.

The IBM study we have drawn on above provides a qualitative benchmarking of the large container ports. The analysed “quality” features include nautical access, terminal facilities, and access to the hinterland. For the Far East, the port of Rotterdam receives the highest score of all ports with 86%. Antwerp follows with 76%, then Hamburg with 67%, Bremerhaven 62% and Le Havre 54%.¹²⁸

Table 50: Assessment of qualitative features of ports (2003)

	Rotterdam	Antwerp	Hamburg	Bremerhaven	Le Havre
Far East – Hinterland	86	76	67	62	54
Transatlantic – Hinterland	85	76	67	63	53
Far East – Feeder	86	70	72	63	68
Transatlantic – Feeder	85	70	73	67	65
<i>Unweighted average</i>	86	73	70	64	60
<i>Diff in score to Rotterdam</i>		-15%	-18%	-25%	-30%

Source: IBM study.

¹²⁷ http://www.portofrotterdam.com/Business/UK/Cargo_and_Terminals/Containers/Index.asp

¹²⁸ The scores have been transformed into the percentage figure shown in Table 50 by multiplying the scores in Table 51 to Table 53 with the weights (critical is factor 5, important is factor 3). The percentage assessment was then determined by the difference of the actual points to the minimum points achievable, expressed as a percentage of the difference between the maximum and minimum points achievable

Table 51, Table 52 and Table 53 below show the assessment of the individual factors that were used for the determination of the index using the example of a Far East shipment to the hinterland.

Table 51: Nautical "quality" of container ports for a Far East-Hinterland shipment*

	Weight	RTM	ANR	HAM	BRV	LEH
Sailing time from Far East locations	Important	4	4	3	3	4
Nautical accessibility	Critical	4	3	3	3	4
Traffic volume	Important	4	3	3	2	2

* RTM (Rotterdam), ANR (Antwerp), HAM (Hamburg), BRV (Bremerhaven), LEH (Le Havre). The score ranges from 1 to 4 with 1 being "bad", 2 "neutral", 3 "good" and 4 being "excellent".

Source: IBM study 2003, provided by HbR.

Table 51 confirms the good position of the port of Rotterdam regarding nautical criteria like sailing time and nautical accessibility.

Table 52: Terminal "quality" of container ports for a Far East-Hinterland shipment*

	Weight	RTM	ANR	HAM	BRV	LEH
Hub potential	Important	4	3	3	3	2
Terminal size	Important	4	4	3	3	3
Additional capacity at existing terminals	Important	3	1	3	3	4
Flexibility (labour productivity, lay-out...)	Critical	2	3	3	3	2
Future options for expansion	Critical	4	4	2	2	4

* RTM (Rotterdam), ANR (Antwerp), HAM (Hamburg), BRV (Bremerhaven), LEH (Le Havre). The score ranges from 1 to 4 with 1 being "bad", 2 "neutral", 3 "good" and 4 being "excellent".

Source: IBM study 2003, provided by HbR.

Table 53: Hinterland "quality" of container ports for a Far East-Hinterland shipment*

	Weight	RTM	ANR	HAM	BRV	LEH
Proximity of "non-captive market"	Critical	3	4	3	3	2
Size "captive market"	Important	3	3	3	3	2
Volume of hinterland traffic	Important	4	3	3	2	2
Multimodal connections	Important	4	4	2	2	3
Quality and frequency: road	Critical	3	2	4	4	2
Quality and frequency: waterways	Important	4	4	1	1	1
Quality and frequency: rail	Important	4	4	4	4	2
Quality and frequency: shortsea/feeder	Important	4	3	4	3	2
Availability of logistical services	Important	4	4	4	4	3

* RTM (Rotterdam), ANR (Antwerp), HAM (Hamburg), BRV (Bremerhaven), LEH (Le Havre). The score ranges from 1 to 4 with 1 being "bad", 2 "neutral", 3 "good" and 4 being "excellent".

Source: IBM study 2003, provided by HbR.

Table 53 shows that Rotterdam has an excellent position regarding the hinterland. However, it also shows that Antwerp is in a similar position, with a higher score for proximity to the "non-captive" market, e.g. in Germany. The lower score for road connections is temporary and due to the current works on the ring of Antwerp. The scores also confirm a result that we discuss more extensively in Section 10. Rotterdam and Antwerp have much better access to inland waterways than the German ports or Le Havre.

7.10.1 SEASIDE ACCESS

One of Rotterdam's key strengths is its unrestricted and fast access from the sea. Table 54 shows the tidal windows for selected ports, referring to the terminal with the best accessibility in the port.

Table 54: Tidal windows for selected ports (largest window available 2001)

Port	Tidal window (%) at draught of 14m	Tidal window (%) at draught of 15m
Rotterdam	100	100
Antwerp	36	22
Zeebrugge	57	40
Hamburg	83	63
Bremerhaven	100	82
Le Havre	100	100
Felixstowe	77	52
Southampton	51	38
Thamesport	52	38

Source: European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, Annex 1.

Table 54 clearly reveals the substantial disadvantage of Antwerp with respect to nautical accessibility. Not only is the tidal window considerably smaller than one third of that of Rotterdam, the additional planning constraint over time, with the tide coming twice a day, gives the port of Antwerp a considerable disadvantage in terms of attractiveness for shippers. Note that the table refers to the year 2001. According to the port of Antwerp the river Scheldt, which links Antwerp to the navigable trade lanes of the world, has since further deepened its maximum draught to 15.6 metres for vessels sailing upriver of 14 metres for vessels sailing downriver. Ships with draughts up to 12.3 metres can use the Scheldt independently of the tide and can sail up or down river at any time.¹²⁹ The port has recently announced that the largest existing container ship, with over 8,000 TEUs capacity, has called at Antwerp. However, tidal restrictions and the associated planning problems are significant for ships of this size.

In the IBM study, the depth of the access waterway was judged to be a critical quality factor. Antwerp, Hamburg and Bremerhaven scored 3, Le Havre and Rotterdam 4 out of 4 points.

HbR told us that the disadvantages of the port of Antwerp regarding sea-side access explain the differences in harbour dues that were identified in the IBM benchmarking study.

Another factor that provides a disadvantage in terms of sea-side access for the port in Antwerp is the four to five hours required to cover the almost 80 km of difficult and relatively slow distance between the sea and the harbour on the river Scheldt. Note however, that this translates, for some important hinterland destinations, into shorter hinterland transport time.

¹²⁹ http://www.portofantwerp.be/asp/news_detail.asp?id=391.

7.10.2 HINTERLAND

The level of hinterland connections is a decisive factor for port choice. This is illustrated by the example of the Ceres terminal in Amsterdam. This terminal was built around 3 years ago and has as of yet not attracted any noteworthy amount of container handling. We have asked in our questionnaire why the shipping lines do not start to call at Amsterdam. The two prime reasons stated were the lack of hinterland connections and difficult sea-side access.

Just how important those factors are shows from the fact that both the container handling charges and the harbour dues in Amsterdam are about half the level of Rotterdam.¹³⁰ This implies that in terms of monetary value the reduction must be several times the harbour dues of Rotterdam. Nevertheless, Amsterdam to date failed to attract shipping lines. The logistical operations are not easily transferred. At a recent capacity shortage at Rotterdam P&O Nedlloyd re-routed a few thousand containers to Amsterdam. According to HbR these containers were then shipped on the road to the port of Rotterdam for further handling.¹³¹ [Confidential] Clearly this shows the importance of the capture effect of port infrastructure and connections.

The port of Zeebrugge also offers low handling charges, but has apparently had similar difficulties attracting significant volumes from established major ports.¹³²

The port of Antwerp reports to believe that the relative position of Antwerp and Rotterdam with regard to hinterland transport is quite similar. This is especially true for inland waterways, where both have the same links. Antwerp is slightly advantaged for rail access, but still both ports have a rail share of hinterland transportation of about 9%.¹³³

7.11 Evidence of switching

We asked the port authority of Rotterdam to provide evidence of switching to or from HbR, with a particular emphasis on the role of the harbour dues set by HbR or rival ports. According to HbR,

*“[t]here are no examples of explicit pricing related switching. It is always a combination of service, time, price, quality, etc. Coming closest to this kind of switching are the withdrawal of some container services from Maersk (AE2 2001 to Antwerp) and P&ONL (loop D 2001 to Antwerp)”.*¹³⁴

This assessment is confirmed by our survey results. We asked port users whether they could provide an example when they switched volume to another port as a result of an increase in

¹³⁰ Interview with HbR.

¹³¹ Interview with HbR on 14 Oct 2004.

¹³² European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, p. 31.

¹³³ Interview with [confidential] on 8 July 2004.

¹³⁴ Information provided by HbR on 16 September 2004.

harbour dues. The only liner shipping company that provided an example of such switching was [confidential], pointing to the move from Rotterdam to [confidential]. In a subsequent interview it was pointed out that the main reason for the move was that customers demanded additional calls at [confidential], partly due to an increase in growth of the traditional markets of [confidential], like the trade with Africa. That is, demand pull hinterland reasons where behind this switch, rather than, at least not in the first place, prices.

While there does not seem to be evidence of price-induced switching in the past therefore, many users of the port of Rotterdam in the container business that responded to our survey (12 out of 15) stated that they would reduce volume if harbour dues were to increase permanently by 10%. For a change in total shipping cost, all respondents indicated that they would expect volume in Rotterdam to be reduced.

The survey also asked respondents what share of the container volume they shipped through Rotterdam they considered to be “captive” volume that could not be switched if harbour dues increased by 10%. Weighing the answers by the respondents’ share of volume out of total volume of all companies answering the question yields a captive volume estimate of 16%, which indicates that the container sector is, at given price levels, indeed one of the most competitive ones among the different cargo types. However, some respondents also referred to the capacity constraints at other ports, which mean that – even if liners wanted to move cargo to other ports – they might not be able to switch as much as they would like. In particular, one large container liner answered that in principle there was no captive volume, but that due to capacity shortages at other European ports, a maximum of 40% could be moved away from Rotterdam.¹³⁵

In terms of the share of volume shifted to other ports following an increase of total port costs (call costs plus cargo handling costs), the weighted average of all respondents’ estimates was 50%, again supporting the view that the container business is relatively competitive. Nevertheless, the same caveats with regard to capacity constraints apply.

Table 55: Captive volume and switched volume estimates based on the CRA survey

Segment	Weighted average captive volume in %	Switched volume after price increase of 10%
Containers	16	50

Source: CRA questionnaire.

For strategic reasons, in questionnaires customers often overestimate their response to hypothetical price increases. The absolute values of the switching information provided should therefore be interpreted with care. However, the survey provides valuable evidence on the relative importance of rival ports. One question of our questionnaire asked to what extent respondents see other ports in the HLH as possible alternatives for the port of Rotterdam and

¹³⁵ CRA questionnaire.

how they evaluate those ports' quality as a substitute for Rotterdam. The table below shows the responses to this question. They clearly confirm our finding that Antwerp is the most important competitor of the port of Rotterdam. In total 15 out of 16 respondents labelled Antwerp as a possible substitute for Rotterdam, with an (unweighted) average quality assessment of 1.5 (on a scale from -2 (very poor) to +2 (very good)). Amsterdam and Hamburg came in second, with Hamburg achieving an even higher quality score than Antwerp. Zeebrugge and Vlissingen were also mentioned by a significant share of respondents (44% and 38% respectively).

Table 56: Substitute ports for container respondents

Alternative port	Number of respondents seeing port as possible alternative for Rotterdam, n=16	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good), n=16	Average share of total volume shifted away from Rotterdam moved to this port (n=15)
Antwerp	15	1.5	48%
Amsterdam	10	0.8	16.7%
Hamburg	10	1.7	14.3%
Bremen/Bremerhaven	6	1.5	8.3%
Zeebrugge	7	0.6	4.7%
Vlissingen	6	0.3	3.3%
Dunkerque	3	0	0.1%
Le Havre	3	-0.3	0.7%
Wilhelmshaven	3	2	0%
Felixstowe	3	-0.7	2.3%
Gent	1	0	0%
Thamseport/Southampton	1	0	N/A

Source: CRA questionnaire. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

The table above also shows the average of respondents' estimate of the share of volume shifted from Rotterdam to the other ports following an assumed increased of total shipping costs for Rotterdam (port call costs and cargo handling costs) by 10%. The shares, and in particular the ranking of the ports, are generally consistent with respondents' answers with regard to possible substitutes for the port of Rotterdam. The largest share – almost half – of the volume shifted away from Rotterdam would be re-routed to Antwerp. According to the survey results, also Amsterdam and Hamburg would benefit from the reduction of cargo in

Rotterdam, followed by Zeebrugge and Vlissingen. The survey respondents would allocate more cargo volume from Rotterdam to Felixstowe than would be expected based on the ranking of the UK port as an alternative for Rotterdam. However, this is likely to reflect the importance of transshipment in the container segment.

In our analysis of the survey results, we also took a weighted average of the shares of volume that respondents would shift from Rotterdam to the other ports, weighted by respondents' shipments through Rotterdam in 2003. Just like the simple average, the shares analysis confirmed the view that Antwerp is the most important competitor for Rotterdam, receiving 43.1% of the volume shifted away from Rotterdam. The importance of Amsterdam dropped compared to the simple average, from 16.7% to 6.3%. On the other hand, the share of volume moved to Hamburg is somewhat higher for a weighted average, 19% compared to 14.3% with a simple average. However, the strong position of the German ports is also evident using the simple average. In both cases – with a weighted and simple average – only a very small share of volume can be expected to be shifted to Le Havre (2.7% and 0.7% respectively), which supports the hypothesis that Le Havre is not a significant competitor for the port of Rotterdam.

The survey evidence suggests a ranking in the relevance of rival ports at given prices. Antwerp is by far the most important competing port, confirming the results obtained in the analysis of call pattern (see Section 7.4), hinterland (see Section 7.9), as well as general perception. The non-weighted average suggests that Amsterdam follows as the next most important rival. Note, however, that Amsterdam already charges only half the harbour dues paid in Rotterdam and, more importantly, only half the terminal dues of Rotterdam without attracting business. This suggests a danger of error of the cellophane fallacy kind, if no adjustment is made for existing price differences. Adjusting for these and taking into account that the weighted average suggests a much lower importance of Amsterdam, the next most important competing ports are the two German ports, with Hamburg coming first, followed by Bremerhaven. The ARA range ports then follow, with Amsterdam being in a clear waiting position.

In a recent merger inquiry by the European Commission, the collected evidence of carriers switching volume between ports suggested that switches of entire liner shipping services, or of individual strings, occur almost exclusively between ports in the same hinterland region (for example between Rotterdam and Antwerp, Felixstowe and Thamesport, Hamburg and Bremerhaven).¹³⁶

“The investigation has furthermore revealed that the port handling charges are only one, and not the most important, factor when the shipping lines choose which port to call at. That choice is instead dictated primarily by hinterland connections, availability of feeder and relay services, direct coastal access and draught of access channels and berths as well as the timetable and schedule of the service in question. Service levels are also important. Once a

¹³⁶ European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, p. 10

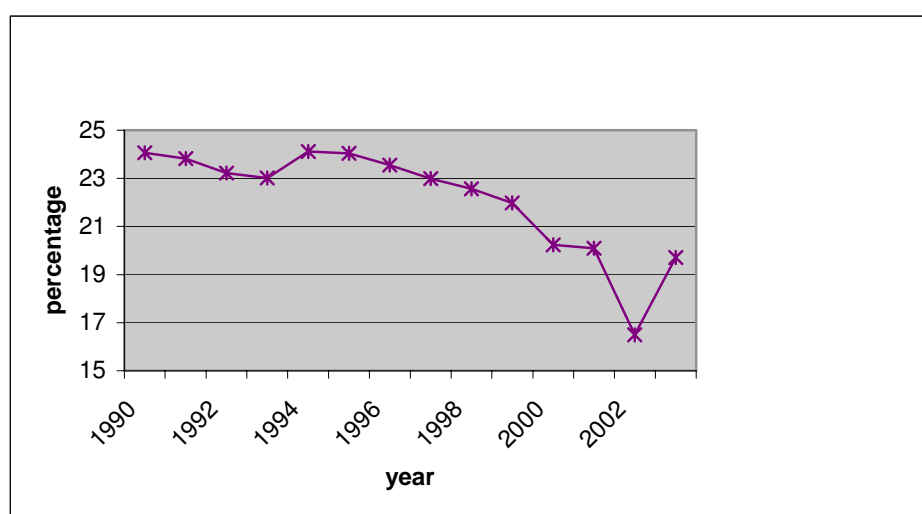
*shipping line has started to operate a successful service calling at a particular port, they are therefore faced with a strong incentive to continue to call at the port in question.*¹³⁷

In the inquiry, ECT, Hutchison and a subsidiary of HbR provided empirical evidence of port switches (partial switches and switches of entire services) between the years 1996 and 2001. The Commission points out that the evidence "...does not show that the switch of port has been motivated by price considerations. On the contrary, available data suggests that the switches have been motivated primarily by operational considerations (for example, MSC's partial switch of larger vessels from Antwerp to Le Havre) or restructuring following new consortium arrangements. In case of the switch of Maersk Sealand transshipment volumes (feeder traffic to Norway and the Baltic) from Rotterdam to Bremerhaven in 2000, the prime drivers were the improvement of the feeder services and the loss of capacity at the old Delta Sea-Land terminal. The relative dearth of switches and the fairly stable market shares of the leading ports between 1997 and 1999 would tend to demonstrate that switches are not undertaken lightly by shipping lines."¹³⁸

7.12 Transshipment

Figure 13 shows that the share of transshipment TEUs in Rotterdam has been declining since the mid 1990s. The reasons are that more volume leads to more direct calls from the big ships to more ports, more multiporting. And also other ports haven't invested quite much to improve their handling. So the competitive advantage of market leader Rotterdam has become less.

Figure 13: Percentage of transshipment TEUs in Rotterdam



¹³⁷ European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, p. 40

¹³⁸ European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, p. 41.

Source: Information provided by HbR on 12 July 04.

There are two main reasons for the significant drop in the 2002 figure. First Maersk-Sealand transferred transshipment to Scandinavia and the Baltic region from Rotterdam to Bremerhaven. Second, there were problems with customs, which also led to transfer of transshipment containers to other ports.¹³⁹

HbR expects that the transshipment rate will rise again up to round about the 22% mark.

According to the recent merger decision of the European Commission referred to above, container terminal throughput can be split into cargo destined for the respective port's hinterland and into transshipment cargo that is transported to other ports by vessel. Within transshipment traffic, one can further distinguish between relay traffic (containers moved from a deep-sea vessel to another deep-sea vessel, e.g. on its way from the Far East to the US) and feeder traffic (containers moved from a deep-sea vessel to a short-sea vessel, e.g. on its way from the Far East to the Baltic Sea). Based on industry reports (mainly a study undertaken by Ocean Shipping Consultants¹⁴⁰), the European Commission has argued that the range of ports competing for hinterland cargo and transshipment cargo is different and that there appears to be a "transshipment hub port market" including all North continental ports plus the UK ports and "various regional hinterland port markets" (North Continent West from Rouen to Amsterdam, North Continent East with Hamburg and Bremerhaven, the UK/Ireland ports and ports located in Scandinavia and the Baltic Sea).¹⁴¹

However, as argued above, hinterland and transshipment traffic are closely interlinked, especially given that most deep-sea container vessels carry containers that are destined for the hinterland and for transshipment. The European Commission acknowledges that considerations with regard to hinterland traffic are significantly more important for the choice of port than transshipment. We concur with this observation. In fact, we believe that there are two reasons why the effect of an increase in harbour dues will be less likely to induce switching of transshipment volume than a change in terminal handling costs:

- First, harbour dues are much lower than terminal handling costs, which means that a change in prices changes relevant costs only to a very small extent.
- Second, given that harbour dues are mainly based on the size of the vessel and only to a smaller percentage on the weight of the containers loaded and discharged, the effect of a change in harbour dues on the transshipment decision will be much less pronounced. It is therefore no surprise that transshipment volume is the highest where hinterland volume is the highest, the number of calls determine the potential transshipment volume. The actual transshipment volume will then only to a very minor degree be influenced by the charges for the deep-sea vessel.

¹³⁹ Information provided by HbR on 25 October 2004.

¹⁴⁰ Ocean Shipping Consultants: "North European Containerisation", 2000.

¹⁴¹ European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, paras 30-31.

The second reasoning does not apply to the same extent for harbour dues charged for the feeder vessel. By reducing the amount of TEUs transhipped at a port, the number of feeder vessels calling at the port will be affected. However, logistical constraints remain. A shipment for the Baltic region is unlikely to be transhipped at Le Havre.

These views are confirmed by representatives from the liner shipping industry, who stated that it is more effective to focus on attracting mother ships than feeder vessels. Whichever port gets the mother ship gets the feeder traffic.¹⁴²

7.13 Capacity expansion plans

There are a number of known future changes in terminal capacity, which will affect the relative importance of competing ports.

Table 57: Container terminal capacity developments in the HLH-range 2003 to 2007 (million TEUs)

	2003 Capacity	Capacity Addition 2004	Capacity Addition 2005	Capacity Addition 2006	Capacity Addition 2007	2007 Capacity	2003 Capacity shares (%)	2007 Capacity Share (%)
Rotterdam	7.5	0.3	0.5	0.5	0.5	9.3	27	22
Hamburg	7.2	0.5	0.6	1.6	0.3	10.3	26	25
Antwerp	5.4	0.3	2.6	2.3	0.4	11	19	26
Bremerhaven	3.5	0.5	0.3	1.0	0.0	5.2	12	12
Le Havre	2.0	0.1	0.9	0.3	0.0	3.3	7	8
Zeebrugge	1.6	0.0	0.0	0.0	0.0	1.6	6	4
Amsterdam	1	0	0	0	0	1	4	2
Total	28.2	1.6	4.9	5.7	1.2	41.7	100	100

Source: Information provided by the HbR on 25 October 2004. The information source for Amsterdam is the Ceres website, see www.ceresglobal.com/pages/pressre.html, accessed on 21 Oct. 2004. Wilhelmshaven's annual capacity, operational from 2010, will be 1.7 m TEU.

As shown in Table 57 the total capacity will increase from 28 million TEUs in 2003 to 41 million TEUs in 2007. Rotterdam's capacity share will be reduced slightly. Given the importance of Antwerp as a competitor, the increase of capacity at Antwerp will be most relevant to Rotterdam. As the more detailed description below shows, this will begin to show effects in the second half of 2005.

¹⁴² Interview with [confidential] on 6 July 2004.

7.13.1 ANTWERP (2005-2008)

One important addition of capacity will be in Antwerp. At the port of Antwerp a new container facility, Deurganckdok West is expected to become partly operational in the second half of 2005, completing the first phase of development and providing an additional capacity of nearly a million TEU to the port of Antwerp.¹⁴³ Together with an increase of capacity of 1.45 million TEU in the HNN terminals (HNN Europe and HNN Nordzee Terminal), an increase in the MSC Home terminal of one million TEU and an increase of 0.3 million TEU in the HNN Deurganckdock, the total increase of capacity amounts to 2.75 million TEU in 2005. The second phase will be completed September 2006, providing an additional capacity of 1.2 million TEU at the HNN Deurganckdock terminal. The HNN terminals will also expand their capacity by 0.7 million TEU in 2006. After the completion of the third phase of the Deurganckdok will be completed September 2007 and will provide a capacity of three million TEU, adding a capacity of 0.75 million TEU in 2007. Additionally, an expansion of 1.3 million TEU at the HNN terminals is expected in 2007. The capacity at the HNN terminals will also increase by 1.2 million TEU in 2007. The final phase is expected to be completed in July 2008, and will provide a capacity of 3.6 million TEU. The container tidal dock will be situated closer to the sea than existing terminals, reducing vessel sailing time. Moreover, the new terminal is planned to have a quay length of 2,750 metres and a surface area of 200 hectares. When fully operational, the terminal will be equipped with more than 100 straddle carriers and 24 quay cranes, capable of handling vessels up to 20 containers wide. The container traffic in Antwerp grew by 14% in 2003, to 5.5 million TEUs. The Deurganckdok West is expected to provide a total container capacity of at least 5.5 million TEUs and therefore eventually double the present handling capacity of Antwerp.¹⁴⁴

7.13.2 AMSTERDAM

As discussed in Section 7.10 Amsterdam may attract business in order to utilise existing terminal facilities. For that, it seems important that the port attracts a critical mass of volume in order to further develop its hinterland connections and on site cargo handling abilities.

7.13.3 WILHELMSHAVEN (2009/2010)

The JadeWeserPort Development Company is planning to construct the first deep-sea port and container terminal in Germany in the port of Wilhelmshaven. The construction of deep-

¹⁴³ The Deurganck dock is being built in several phases: phase 1: 1,260 metre quay wall on the western side. Phase 2: 1,370 metre quay wall on the eastern side and 400 metre extension on the western side. Phase 3: 1,080 metre quay wall on the western side and 680 metres on the eastern side and 400 metre extension on the eastern side. Phases 1 and 2 are due to enter service in mid-2005.
(http://www.portofantwerp.be/asp/news_detail.asp?id=392).

¹⁴⁴ Information on the capacities of the different phases has been provided by the HbR on 25 October 2004.
http://www.portofantwerp.be/asp/news_detail.asp?id=414 and
http://www.portofantwerp.be/asp/news_detail.asp?id=391.

sea container terminal is deemed to be essential in view of the growth in the flow of goods. Moreover, new growth opportunities are opening up in the Baltic, particularly in Russia. Wilhelmshaven is considered to be a supplementary location to the ports of Hamburg and Bremerhaven and is the furthest east located deep-water port of the European North Range. Moreover, the continually increasing transfer capacities in the ports of Hamburg and Bremerhaven will reach their limits in the future because of their dependency on tides. According to the founding managing director of the JadeWeserPort, “We must be ready when the big ships come”.¹⁴⁵

One of the crucial factors that influenced the decision in favour of the JadeWeser port was the present depth of the water (18 m below keel at low tide). Additionally, Wilhelmshaven offers relatively good seaside access (23 sea miles).¹⁴⁶ The port is expected to have an annual container handling capacity of 2,7 million TEU and a container handling area of 120 ha.¹⁴⁷ The port is expected to be in operation around 2009/2010.

7.13.4 BREMERHAVEN (2005 TO 2007)

The Eurogate and NTB terminals are planned to be expanded (CT IV), adding a capacity of 1.5 million TEU per year.¹⁴⁸ Partial backyard space will be ready by mid 2005 and the terminal is expected to be fully operational in 2007.

7.13.5 WESTERSCHELDE CONTAINER TERMINAL/VLISSINGEN-OST

The planned Westerschelde Container Terminal involves the construction of a container quay with a transshipment capacity of one million TEUs per year.¹⁴⁹ However, it is not certain whether the plans will stand the test of ‘serving an imperative public need’. The highest administrative court in the Netherlands and a part of Zeeland dismissed the earlier plan for the construction of a large container terminal.¹⁵⁰ The port of Rotterdam and a large, globally operating transshipment company from Antwerp are currently involved in the plans.

7.13.6 PORT 2000/LE HAVRE (2005)

Le Havre has gradually increased capacity in recent years. Starting from 1.5 million TEU in 2000 capacity is expected to increase to three million TEU in 2006. The planned terminals

¹⁴⁵ See http://www.jadeweserport.info/web_en/index.php for a description of the planned port.

¹⁴⁶ “Overview of the JadeWeser port”, see http://www.jadeweserport.info/web_en/index.php.

¹⁴⁷ “Overview of the JadeWeser port”, see http://www.jadeweserport.info/web_en/index.php.

¹⁴⁸ Information provided by the HbR, 25 October 2004

¹⁴⁹ Port News Number 43, September 2004, see <http://www.zeeland-seaports.com/download/port%20news/port%20news%2043.pdf>

¹⁵⁰ Port News Number 43, September 2004, see <http://www.zeeland-seaports.com/download/port%20news/port%20news%2043.pdf>

will be accessible independently from tide times. The first four berths are expected to become operational mid-2005 and the remaining quays will be constructed depending on the traffic.¹⁵¹ The berths will be owned by Maersk/CMA CGM (2 each).¹⁵²

7.13.7 ALTENWERDER, BURCHARDKAI, EUROGATE, TOLLERORT/HAMBURG (2010)

The port of Hamburg is currently capable of handling 3.7 million TEU of container traffic a year and once the Altenwerden and other expansion projects are finished, this amount will increase to 8 million TEU per year in 2010.¹⁵³ The capacities of the existing container terminals (Eurogate, Burchardkai, Altenwerder and Tollerort) will be enhanced over the years, while the waterways frequented by vessels arriving from abroad as well as the berths including quay walls will be adjusted to the increasing size of container vessels.¹⁵⁴ The reconstructed berth at the Eurogate terminal will be ready in mid 2005, the second berth will be ready early 2007 and the third berth early 2008. The eventual capacity at the Eurogate terminal will be three million TEU. The additional capacity of 0.2 million TEU is expected to be in operation from 2006.¹⁵⁵ The Altenwerder container terminal in Hamburg has a current capacity of 1.1 million TEU a year. This capacity will increase by 0.5 million TEU in 2005.¹⁵⁶ The container terminal Burchardkai is the largest terminal for container handling in the port of Hamburg with a current capacity of 2.6 million TEU per year and plans are currently under way to increase the throughput to four million TEU annually. A majority of the expansion will take place between 2005 and 2006 with an expansion of 1.3 million TEU.¹⁵⁷ The expansion of the HHLA TCT is undergoing continuous expansion and is expected to reach a capacity of 1.9 million TEU by 2008.¹⁵⁸ Hamburg and the Bundeswasserstrassenverwaltung are making preparations to adapt the waterways of the River Elbe to meet the demands of increasingly larger ships.¹⁵⁹

7.13.8 ZEEBRUGGE

In October 2004 APM Terminals signed a letter of intent to manage and operate a container terminal in the port of Zeebrugge. Zeebrugge shares some of the advantages of the port of Rotterdam. It is located directly at the open sea and offers more than 15 metres water depths.

¹⁵¹ “Les objectifs, Port 2000”, see <http://www.havre-port.net/pahweb.html>

¹⁵² Information from a document on North Europe Terminal Capacity, provided by the HbR, 25 October 2004

¹⁵³ “Altenwerden Container Terminal”, see <http://www.port-technology.com/projects/altenwerder/>

¹⁵⁴ “Port enlargement – capacity expansion and infrastructural adaptation”, July 2004, see <http://www.hafen-hamburg.de/html-engl/home.htm>

¹⁵⁵ Information from a document on North Europe Terminal Capacity, provided by the HbR, 25 October 2004

¹⁵⁶ “Factsheet Altenwerder”, see <http://www.hhla-cta.de/en/index.htm>

¹⁵⁷ “Container Terminal Burchardkai”, see <http://www.hhla-cta.de/en/index.htm>

¹⁵⁸ Information from a document on North Europe Terminal Capacity, provided by the HbR, 25 October 2004

¹⁵⁹ “Port enlargement – capacity expansion and infrastructural adaptation”, July 2004, see <http://www.hafen-hamburg.de/html-engl/home.htm>

7.13.9 ROTTERDAM ECT AND EUROMAX

A new container terminal planned to be built on the northwest corner of the Maasvlakte in Rotterdam. Euromax, a 50/50 joint venture between P&O Nedlloyd (PONL) and ECT will develop, build and operate the terminal. The works are expected to begin in the first half of 2005 and should be completed by the end of 2008. The new terminal will be progressively operational after 2007 with an annual capacity of 1.2 million TEU rising to 1.8 million TEU.¹⁶⁰ Over the next fifteen years, container traffic is expected to grow at about 8% per year and, according to HbR, the capacity added by Euromax is expected to be sufficient to accommodate traffic growth until 2011.¹⁶¹ According to information provided by the HbR, capacity in the ECT Delta terminal will be expanded as the market expands. The APMT terminal will expand to the former DMU terminal.¹⁶²

7.13.10 ROTTERDAM MAASVLAKTE II

When the container business started to develop, Rotterdam had some problems as a result of the fact that most of the space was taken by oil refineries, which need deep-sea access for the large oil tankers. Therefore, the container industry first started to locate in other port areas (i.e. not Maasvlakte I and not Europoort). Today, about 95% of the container business is located on the first Maasvlakte. Still, between 1975 and 1980, the port of Rotterdam recognised the need to develop more deep-sea areas for container terminals, which is why the plans for Maasvlakte II emerged.¹⁶³ It is expected that Maasvlakte II will be developed by 2012. The capacity is not yet determined but will have a minimum capacity of 3 million TEU.¹⁶⁴

HbR aims at developing the new terminals on Maasvlakte II, so that the extensions of port space will be efficiently used. The port says it is not willing to allow the set-up of only dedicated terminals that will then not be fully utilised. HbR argues in this context that there is always the need for a multi-purpose container terminal operated by an independent stevedoring company.¹⁶⁵

¹⁶⁰ Information from a document on North Europe Terminal Capacity, provided by the HbR, 25 October 2004

¹⁶¹ [confidential] questionnaire response and http://www.portofrotterdam.com/news/UK/Pressreleases/Pressreleases/HBR_28062004_01.asp?ComponentID=57244&SourcePageID=0.

¹⁶² Information from a document on North Europe Terminal Capacity, provided by the HbR, 25 October 2004

¹⁶³ Interview with HbR on 5 July 2004.

¹⁶⁴ Information from a document on North Europe Terminal Capacity, provided by the HbR, 25 October 2004

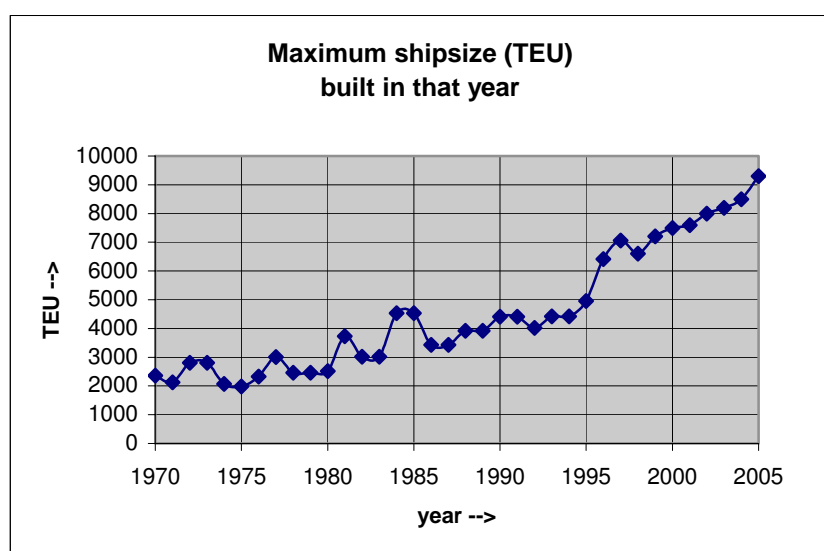
¹⁶⁵ Interview with HbR on 5 July 2004.

7.14 Trends

During the course of our research we identified a number of trends that may affect the market position of the port of Rotterdam. As many of these trends have offsetting effects the overall effect on the market position of the port of Rotterdam is ambiguous.

It is generally perceived to be the case that the trend to larger container vessels will lead to a concentration in port calls and an increase in transshipment.¹⁶⁶ However, HbR also pointed out that with the increase in container traffic smaller ports get called at more often.

Figure 14: Maximum shipsize (TEU) built that year



Source: Information provided by HbR on 12 July 04.

The maximum ship size expected by HbR will be about 12500 TEU with a draught of 16-17m. The current maximum draught is 14.5 metres; in the next years maximum draught will be 15 metres. The increase in the shipsize will benefit ports like Rotterdam, which can offer unrestricted access for large vessels.

We identified the following other relevant trends:

- The share of carrier haulage differs across shipping companies. However, generally, forwarders are expected to take over more of the hinterland transport from liners.¹⁶⁷
- The Hamburg terminal operator HALA works together with Deutsche Bahn and has traditionally tried to attract trade flows to Bremerhaven and Hamburg. Whether they will be able to do so in the future is unclear now that DB has bought NS cargo. Railion has a strong influence on the direction of cargo flows. DB owns about 70-80%

¹⁶⁶ European Commission, Case No. COMP/JV.55 Hutchinson/RCPM/ECT, 3 July 2001, p. 34.

¹⁶⁷ Interview with [confidential] on 6 July 2004.

of the German inland ports and hubs (e.g. in Munich). A change in this policy is believed to potentially benefit the port of Rotterdam. Liner companies are also trying to increase their influence on these hubs.¹⁶⁸

- The introduction of road tolls in Germany is likely to have an effect on road mileage in Germany and could re-direct cargo flows from Hamburg and Bremerhaven to Rotterdam.¹⁶⁹
- The works at the motorway ring of Antwerp currently negatively affect Antwerp. Once finished the hinterland road network of Antwerp will be of higher quality.
- P&O Nedlloyd's planned investment in the Euromax terminal (a joint venture with the existing terminal ECT) commits this line to Rotterdam. Moreover, the European Rail Shuttle (ERS), which departs from Rotterdam, is owned by Maersk Sealand and P&O Nedlloyd. ERS operates a rail shuttle network in Continental Europe, interlinking Rotterdam and the German seaports with more than 18 destinations. According to ERS its success is based on the availability of the base volume of the two shareholders, "which ensured and still ensures continuity and long term stability".¹⁷⁰

The increasing containerisation implies that more and more general cargo (which is bound to the port) is shipped by container. This implies that in the future a higher share of containers may be "captured" and that ports that have traditionally focused on specific general cargo types (like Amsterdam on cacao) may have to attract container services to remain attractive.

¹⁶⁸ Interview with [confidential] on 6 July 2004.

¹⁶⁹ Interview with [confidential] on 6 July 2004.

¹⁷⁰ <http://www.ersrail.nl/facts.html>

8 Roll-on/roll-off and other general cargo

Roll-on/roll-off (roro) and other general cargo are the two least important cargo types in the port of Rotterdam, measured in terms of throughput in tons. Roro represents 3.2% and other general cargo 2.5% of total throughput in Rotterdam. These low shares reflect the strength of Rotterdam in bulk goods, but also the ongoing trend to containerise general cargo. The share of general cargo other than containers and distribution in total revenues is slightly higher than the share in total throughput. General cargo other than containers and distribution accounts for 8% of the harbour dues and 11% of the lease related revenue.¹⁷¹

8.1 Roll-on/roll-off

8.1.1 OVERVIEW

Roro comprises cars and other vehicles that are shipped as trade goods and freight that is kept on trucks or on a trailer. Rotterdam has facilities for both accompanied and unaccompanied transport and containers on chassis.

Over 90% of HbR's revenue in this sector is generated by ferry services between Rotterdam and the east coast of the United Kingdom.¹⁷² In this trade, it is possible to distinguish routes across the Short French Sea (e.g. Calais-Dover), Western Channel routes (north coast of France and the south of the UK), and North Sea routes. Ferries from Rotterdam operate exclusively on the North Sea routes. The destinations served by Rotterdam are also served by the ports of Amsterdam (including IJmuiden), Antwerp, Vlissingen and Zeebrugge.

Zeebrugge accounts for the largest roro throughput of ports that operate on the North Sea trade. According to the Havenplan 2020 of HbR, competition with Zeebrugge is limited as most of the origin and destination of the roro cargo shipped through Rotterdam is located near the port of Rotterdam (Westland) or along the Rhine.

This is confirmed by the benchmarking of harbour dues. Harbour dues for a representative roro vessel in Zeebrugge are almost half of those at Rotterdam. Rotterdam charges higher harbour dues than all other Benelux ports that operate on the North Sea trade, with one significant exception: Antwerp, which charges twice the harbour dues to be paid in Rotterdam.

As with other cargo types, harbour dues are only part of generalised costs of a chosen trade route. However, the share of harbour dues in total call costs is higher than for containers and,

¹⁷¹ HbR Rentabiliteitsberichtgeving 2003.

¹⁷² Havenplan 2020, p. 38 and information provided by HbR 26 October 2004.

depending on the nature of the cargo, the terminal costs may also be significantly lower (trucks do not require handling). However, other factors play an important role, like the time spent on sea (mostly overnight services) and the hinterland transportation costs in the United Kingdom. A small change in total route cost is therefore unlikely to lead to a significant shift from the North Sea trade to other Anglo/Continental trades. This suggests an upper bound for the relevant geographical market that is shown in Table 58.

Table 58: Roll-on/roll-off market shares for Benelux ports servicing North Sea routes in 2003

	Throughput (million tons)	Share
Amsterdam	0.7	2%
Rotterdam	10.5	35%
Antwerp	6.0	20%
Vlissingen	2.1	7%
Zeebrugge	11.1	37%
Total	30.4	100%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on port of Rotterdam, "Port Statistics 2003" and information on the website of the port of Vlissingen.

The key points that lead to this definition were the following:

The non-existence of routes and the geographical location of ports suggest that it is currently not economical to serve the east coast of Great Britain from other ports than those included in the North Sea ferry market. Close to 90% of the respondents to our survey said that they would switch to one of the markets included in our definition. HbR considers Zeebrugge, which accounts for the largest roro throughput of ports that operate on the North Sea trade, as the most important competitor. There is also evidence that the hinterland on the continent is to a large extent local, or confined to the Benelux countries and locations in Germany along the Rhine.

For the decision to move cargo from the North Sea to the French short sea market total generalised cost (including hinterland transportation in Great Britain) are to be considered. Given the low share of harbour dues in total generalised cost, an increase in harbour dues by five to ten percent is unlikely to lead to a significant shift from the North Sea ferry market to other ferry markets, like the market for the French short sea.

Even across the ports serving the North Sea ferry market the port of Rotterdam can sustain higher price differences compared to Zeebrugge (46% less expensive), Amsterdam (-23%) and Vlissingen (-23%). The only exception to the rule that HbR's harbour dues over all its types of cargo are the largest of all ports is roro harbour dues in Antwerp, which are double those of Rotterdam. According to HbR, however, this situation is likely to reflect the fact that the tariff benchmark in Antwerp captures the tariff for car cargo vessels rather than ferry

services. Antwerp has traditionally focussed more on cars, whereas Rotterdam's main roro business is ferry services. The markets are likely to be separate, and the differentiated but equally raised harbour dues are an indication of pricing power of both Antwerp (for cars) and Rotterdam (for ferry services), rather than a competitive discipline for HbR.

Comparing the ports that operate in the North Sea ferry market shows that the port of Rotterdam has a market share of 35%. In the Havenplan 2020, published by HbR and other bodies, competition with the most important rival in that market, Zeebrugge, was seen as limited. This conclusion was based on Hinterland considerations. This conclusion is confirmed by the benchmarking analysis. Note, however, that the finding that roro traffic is the least captive cargo type would suggest that competition within the North Sea ferry market should be more intense. Contrary to cargo types like bulk cargo, specific investments and the availability of industry at the port seems less relevant. The choice of port seems mainly driven by transport cost considerations for the origin and destination pairs of the cargo.

8.1.2 PORT USERS

The following table shows the four most important roro customers of HbR in terms of income generated through harbour dues.

Table 59: Top four roro clients at the port of Rotterdam in 2003 in terms of harbour dues

Name of roro company	Harbour dues paid in 2003
[confidential]	[confidential]
[confidential]	[confidential]
[confidential]	[confidential]
[confidential]	[confidential]

Source: Information provided by HbR on 16 September 2004.

All named companies operate ferry services between Rotterdam and the United Kingdom.

8.1.3 MAIN ROUTES AND THROUGHPUT IN THE ANGLO/CONTINENTAL MARKET

More than 90% of the roro throughput in Rotterdam is freight on ferries between Rotterdam (including Hoek van Holland, which is managed by HbR) and central and north United Kingdom.¹⁷³ Some of the ferries also carry passengers but in both Antwerp and Rotterdam, passenger traffic plays a minor role and we do not analyse it separately.¹⁷⁴

¹⁷³ Havenplan 2020, Rotterdam 2004, p. 38.

¹⁷⁴ Interview with [confidential] on 12 July 2004.

From the shippers' perspective, ro-ro is part of the market for unitised freight services, which includes, besides the maritime services, freight services via the Channel Tunnel operated by Le Shuttle (Eurotunnel).

The Anglo/Continental ro-ro traffic can be divided in:

- Short Sea consisting of routes across the Short French Sea (Calais, Dieppe, Boulogne, Dunkirk (and the Channel Tunnel)), the Belgian Straits (Ostend) and Dover, Folkstone, Ramsgate, and Newhaven in England.¹⁷⁵
- North Sea consisting of routes between Zeebrugge, Rotterdam, Vlissingen¹⁷⁶, Amsterdam¹⁷⁷ and ports at the east coast of the United Kingdom.¹⁷⁸
- Western Channel consisting of routes between ports on the south coast of the United Kingdom and ports on the north coast of France (e.g. Le Havre).

The duration of a crossing of a Short Sea service is considerably shorter than a crossing on the North Sea or the Western Channel and the Short Sea offers the highest number of frequencies. In 2000 roughly 5.2 million freight units were carried on the Anglo/Continental market (including Eurotunnel), with short Sea accounting for about half of that volume.¹⁷⁹ The highest market shares for unitised freight services in this trade are at Calais, Le Shuttle and Zeebrugge.¹⁸⁰

Four ferry operators calling at Rotterdam serve ports at the East Coast of the UK. P&O North Sea Ferries run an overnight ferry service between the English port of Hull, Zeebrugge in Belgium and Rotterdam in Holland. Stenaline operates a Harwich – Hoek of Holland service with a duration of crossing of about 6 hours on a normal ferry and a high speed service with a transit time of 3 hours and 40 minutes. Cobelfret operates services from the CdMR Botlek terminal at the port of Rotterdam to Purfleet and Immingham.¹⁸¹ Both destinations are also served from Zeebrugge. DFDS Tor Line operates services to Immingham (transit time about 9 hours) as well. Rotterdam furthermore has a number of ro-ro services to Scandinavia.

According to the Havenplan 2020, the cargo on the ro-ro routes consists mainly of industrial and agricultural goods from Westland. Competition with Zeebrugge is said to be limited

¹⁷⁵ <http://www.zeebruggeport.be/N/beleidsplan.pdf> and EEC 4064/89: P&O Stena Line merger decision, 7.8.2002.

¹⁷⁶ The port of Vlissingen is managed by Zeeland Seaports port authority which also manages the Port of Terneuzen.

¹⁷⁷ DFDS Seaways operates a ferry service between Newcastle and Ijmuiden. The port of Ijmuiden is managed by the Amsterdam port authority.

¹⁷⁸ In <http://www.zeebruggeport.be/N/beleidsplan.pdf> the port of Scheveningen was also mentioned. The Norfolkline, a subsidiary of Maersk, operates a ferry service from Felixstowe to Scheveningen. We have not included Scheveningen because no ro-ro statistics are available and in 2002 the *total* throughput of the port was limited to 4.6 million tons. The possibilities for expansion are limited as the harbour is surrounded by housing areas (see <http://www.minvenw.nl/dgg/dgg/nl/scheveningen.shtml>).

¹⁷⁹ EEC 4064/89: P&O Stena Line merger decision, 7.8.2002.

¹⁸⁰ <http://www.zeebruggeport.be/N/beleidsplan.pdf>

¹⁸¹ http://www.cobelfret.com/con_03_01.html. According to HbR the port served by Cobelfret is Killinghome.

because of the regional origin and destination of the cargo.¹⁸² HbR identifies the Benelux countries and locations in Germany along the river Rhine as the most important hinterland destinations.

Table 60 lists market shares (in metric tons) for the ports that operate on the North Sea routes. Note that the reported ro-ro volume includes some non Anglo/Continental traffic.

Roro statistics for the entire HLH are not easily available as some ports include ro-ro traffic in general cargo and some also include lift-on/lift-off traffic, which can also be categorised as container traffic. Below we report the figures provided by HbR for all Benelux ports that operate ferries on North Sea routes.

Table 60: Roll-on/roll-off market shares for Benelux ports servicing North Sea routes in 2003

	Throughput (million tons)	Share
Amsterdam	0.7	2%
Rotterdam	10.5	35%
Antwerp	6.0	20%
Vlissingen	2.1	7%
Zeebrugge	11.1	37%
Total	30.4	100%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on port of Rotterdam, "Port Statistics 2003" and information on the website of the port of Vlissingen.

Rotterdam is considered a small car port. The Rotterdam Car Terminal has room for 35,000 cars. The main car ports in the HLH range are Zeebrugge (1.5 million cars per year) and Bremerhaven (1.2 million). However, Antwerp¹⁸³ is also considered a large car port and other car ports are Emden and Barcelona.¹⁸⁴

8.1.4 STRUCTURE OF HARBOUR DUES

Rotterdam has a specific tariff for ro-ro vessels (whether or not in liner service). There are two tariffs for sea-going ro-ro vessels, depending on whether less or more than 67.8% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the quantity of cargo moved in Rotterdam is equal or higher than 67.8% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 67.8% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

¹⁸² Havenplan 2020, Rotterdam 2004, p. 38.

¹⁸³ There are specialised terminals operated by Hessenatie and Mexico Natie but motor cars are also handled by a number of non-specialised terminals.

¹⁸⁴ Interview with [confidential] on 8 July 2004.

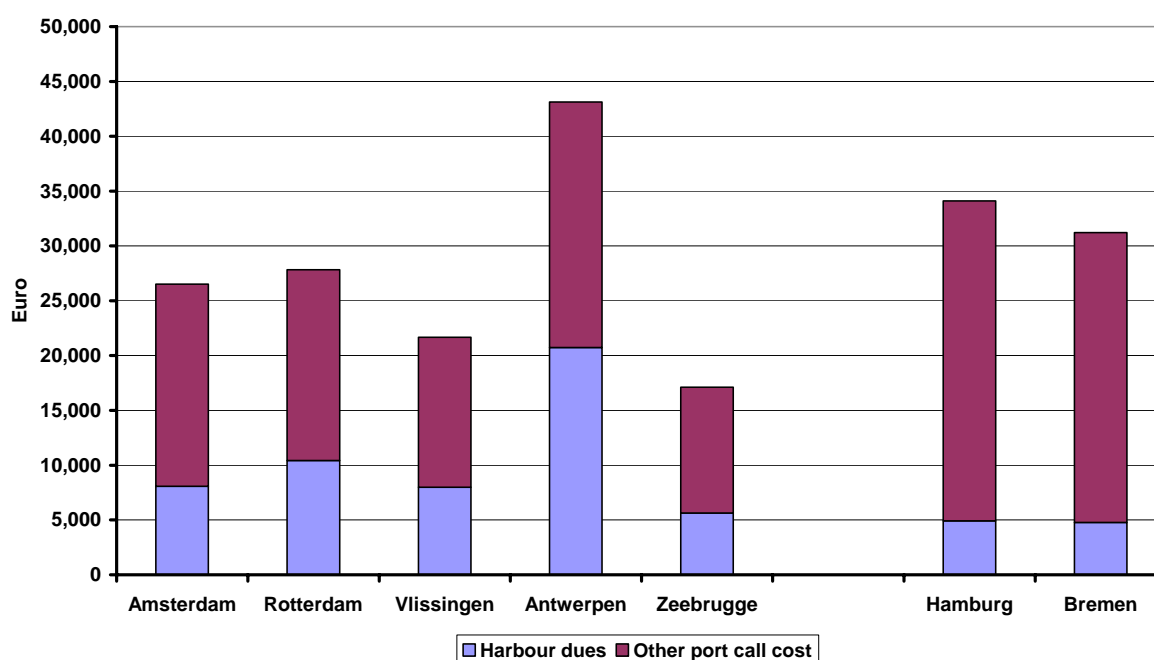
Table 61: Tariff for roro vessels (Tariffs LR1/TR1 and LR2/TR2)

Share of the GT ¹⁸⁵ of the vessel that is loaded and/or discharged	Tariff structure
67.8% or more	€0.405 per GT of vessel
Less than 67.8%	€0.123 per GT of vessel + €0.416 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

8.1.5 BENCHMARKING AND CARGO FLOW ANALYSIS

Figure 15 shows the harbour dues for a typical roro vessel for a number of ports. The vessel has an assumed capacity of 48,393 GT, spends 2 days in the port, loads 5,000 tons and discharges 6,200 tons.

Figure 15: Harbour dues and other call costs for a typical roll-on/roll-off vessel

Source: CRA calculations based on HbR data.

The simulation shows a significant difference in harbour dues.

¹⁸⁵ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

Table 62: Percentage difference in harbour dues compared to Rotterdam

	Harbour dues per call	Difference to Rotterdam
Rotterdam	10,425	
Amsterdam	8,074	-23%
Vlissingen	7,988	-23%
Antwerp	20,721	+99%
Zeebrugge	5,643	-46%
Hamburg	4,912	-53%
Bremen	4,776	-54%

Source: CRA calculations based on HbR data.

The benchmarking suggests significant price differences between ports. Antwerp charges double the amount of the next highest harbour dues per call (Rotterdam). According to HbR, however, this situation is likely to reflect the fact that the tariff benchmark in Antwerp captures the tariff for car cargo vessels rather than ferry services. Antwerp is big in cars, whereas Rotterdam's main roro business is ferry services. Rotterdam in turn can price significantly higher than the other Benelux ports that operate in the North Sea ferry business.

Thus, with the exception of Antwerp the price benchmarking confirms the general picture that Rotterdam is at the upper end of the pricing range. Particularly interesting is the large difference to Zeebrugge, which serves similar destinations in central and north United Kingdom. This suggests that the port of Rotterdam has some pricing power.

For the given information the benchmarking would suggest that at equal prices, Rotterdam would be significantly constrained by Antwerp. Antwerp and Rotterdam together would not be constrained by the rival ports.

Harbour dues account for 37% of total call costs for the typical vessel (see Figure 15). For freight on trucks terminals costs are lower than those for containers and the hinterland transport mode is on the road. For accompanied freight, the time on ship is also a major factor determining cargo flows. Thus, compared to the analysis of container cargo flows in Section 7.8, harbour dues play a more important role in total call costs and terminal handling fees are likely to be lower for most shipments. However, hinterland transportation and the cost for the ferry are the largest cost items (see also Section 7.9). They have significant influence on the choice of the cargo routing. The fact that ferry operators offer transfers to Zeebrugge and Rotterdam from the same British ports despite the large difference in harbour dues is illustrative for this result.

8.1.6 EVIDENCE OF SWITCHING

We have not obtained evidence of switching in response to changes in harbour dues, confirming the overall picture obtained for other cargo types. However, we received only 3 responses from the sector in total.

The port choice of car terminals and car manufacturers depends on the logistical requirements of the car manufacturers. For example, Toyota imports 250,000 cars per year and has chosen Zeebrugge as a hub, because of the good short sea connection (they have introduced a hub and spoke system with spokes to UK and Valencia). Mazda has a greater focus on the North West European hinterland and has chosen Antwerp as the main port.¹⁸⁶

In our survey we received responses from two firms operating in the car segment. Both have pointed to Zeebrugge and Antwerp as possible substitutes for their operations at Rotterdam. One respondent also regards Le Havre and Amsterdam as possible substitutes. One other respondent pointed out that there is no captive volume and that cargo could easily be shifted to Amsterdam.

A forwarding agency that specialises in general cargo and operates facilities in Rotterdam and Hamburg points to Antwerp and Hamburg as substitutes for Rotterdam.

8.1.7 TRENDS

HbR expects an increase in hinterland shipments of cars by barges to Germany. The port authority also hopes to accommodate another roro company in the port.

¹⁸⁶ Interview with [confidential] on 8 July 2004.

8.2 Other general cargo

8.2.1 OVERVIEW

Other general cargo consists of products like fruit, forest products and goods in lash units (iron, steel, paper). The sector had been continuously declining, also reflecting the increase in containerisation. However, in 2003 other general cargo increased again by 14%.¹⁸⁷

One important segment in Rotterdam is the agri-food throughput, which is often transported on specialised reefers and on pallets. The port of Rotterdam claims to have Europe's most important trade and distribution centre for fresh fruit, vegetables and fruit juices.¹⁸⁸ More than 200 specialised importers, exporters and distributors and more than fifty specialised transport companies are located at or very near the port. These companies offer temperature controlled storage space and offer services like quality and stock control, reconditioning, re-packaging, ripening and labelling.¹⁸⁹

The availability, quality and price of these value added services are likely to be important factors for the choice of port for general cargo. The trade pattern are heterogenous, there are no major trade routes.

There is no available evidence on past switching in response to an increase in harbour dues. The survey respondents pointed to Antwerp as the most important substitute port. Interestingly, a number of respondents also pointed to Vlissingen as a less important but relevant alternative.

Our benchmarking analysis confirms the general picture obtained for other cargo types. Rotterdam is the most expensive port, although harbour dues are very similar to those in Amsterdam. This evidence, the fact that switching is confined mostly to the ARA-range ports and the overlap in the hinterland suggests that the ARA-range is an upper bound on the relevant market.

¹⁸⁷ HbR Annual report 2003.

¹⁸⁸ Havenplan 2020, p. 39.

¹⁸⁹ HbR Fruitport brochure.

Table 63: Market shares in the ARA range

	Throughput (million tons)	Market share (%)
Amsterdam	5.8	17%
Rotterdam	8.3	25%
Antwerpen	14.4	43%
Vlissingen	5.3	16%
Total	33.8	100%

*Totals may not add up to 100 due to rounding.
Source: CRA calculations*

Compared to the other cargo types, the results also indicate that pricing power for other general cargo is not as pronounced as for, for example, liquid bulk.

8.2.2 PORT USERS

The following table shows the main customers of HbR for other general cargo in terms of income generated through harbour dues.

Table 64: Top four general cargo clients at the port of Rotterdam in 2003 in terms of harbour dues

Name of liner company	Harbour dues paid in 2003
[confidential]	[confidential]
[confidential]	[confidential]
[confidential]	[confidential]
[confidential]	[confidential]

Source: Information provided by HbR on 16 September 2004.

8.2.3 THROUGHPUT IN THE HLH-RANGE

Table 65 shows the throughput in the HLH range. Note that the figures for Hamburg and Bremen are inflated as they include ro-ro traffic as well. The statistics exclude Zeeland Seaports (Vlissingen and Terneuzen), which report a throughput of 5.3 million tons for other general cargo.

Table 65: Throughput and market shares of ports in the HLH-range for general cargo other than ro-ro and containers (2003)

	Throughput (million tons)	Market share (%)
Hamburg*	2.6	6%
Bremen*	6.5	14%
Amsterdam**	5.8	12%
Rotterdam	8.3	18%
Antwerpen	14.4	31%
Gent	1.9	4%
Zeebrugge	0.7	1%
Duinkerken	1.6	3%
Le Havre	0	0%
Vlissingen**	5.3	11%
<i>Total</i>	<i>47.1</i>	<i>100%</i>

*Includes ro-ro traffic. ***Includes IJmuiden. ***Includes Terneuzen.
 Totals may not add up to 100 due to rounding.
 Source: HbR port statistics

Table 65 shows that Antwerp, Rotterdam and Amsterdam account for 68% of the throughput in the HLH range.

8.2.4 TRADE PATTERN

For general cargo, there is no specific major trading route, but trading routes are worldwide.¹⁹⁰ In 2003, about 66% of the throughput at the port of Rotterdam that was classified as “other general cargo” was incoming cargo, 34% was outgoing cargo.¹⁹¹

8.2.5 STRUCTURE OF HARBOUR DUES

Generalised cargo (other than container and ro-ro) is usually shipped in tramp vessels, i.e. vessels that are chartered on a case-by-case basis and do not follow a specified schedule of calls. In Rotterdam, there are two tariffs for sea-going tramp vessels, depending on whether less or more than 133.2% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the quantity of cargo moved in Rotterdam is equal or higher than 133.2% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 133.2% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

¹⁹⁰ Information provided by HbR on 16 September 2004.

Table 66: Tariff for tramp vessels (Tariffs TS1 and TS2)

Share of the GT ¹⁹² of the vessel that is loaded and/or discharged	Tariff structure
133.2% or more	€0.858 per GT of vessel (TS 1)
Less than 133.2%	€0.271 per GT of vessel + €0.441 per metric ton loaded and/or discharged (TS2)

Source: Port of Rotterdam Tariffs 2004

Should a sea-going general cargo vessel operate in liner service, a different tariff is applicable. Again, there are two tariffs for non-container liner vessels, depending on whether less or more than 62.1% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the quantity of cargo moved in Rotterdam is equal or higher than 62.1% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 62.1% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

Table 67: Tariff for liner vessels (Tariffs LS1 and LS2)

Share of the GT ¹⁹³ of the vessel that is loaded and/or discharged	Tariff structure
62.1% or more	€0.518 per GT of vessel (LS1)
Less than 62.1%	€0.260 per GT of vessel + €0.416 per metric ton loaded and/or discharged LS2)

Source: Port of Rotterdam Tariffs 2004

The most relevant tariff is TS2, the tramp vessel tariff that is charged if the weight of the cargo loaded or discharged is less than 133.2% of the GT of the vessel. 84% of HbRs revenue in this segment stems from this tariff. 9% is billed according to the liner tariff LS2.¹⁹⁴

¹⁹¹ Port of Rotterdam, Port Statistics 2003.

¹⁹² Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

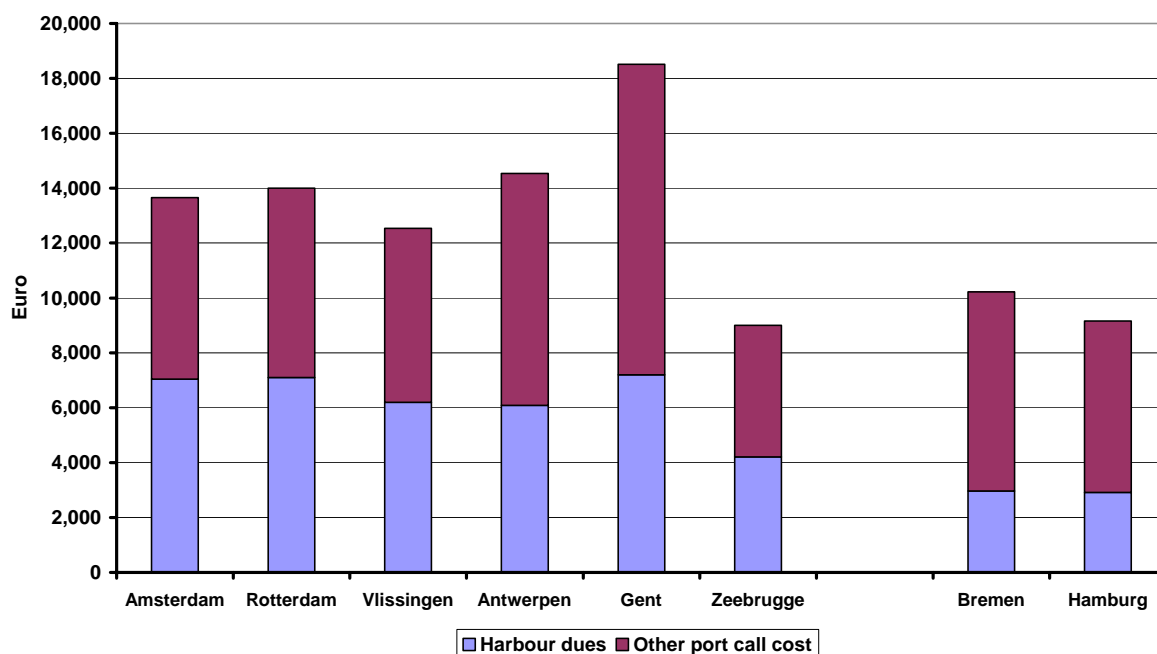
¹⁹³ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

¹⁹⁴ Information provided by HbR 26 October 2004

8.2.6 BENCHMARKING

Figure 16 shows the harbour dues for a typical multipurpose vessel. The vessel has an assumed capacity of 8,448 GT, loads 5,000 tons and discharges 10,000 tons.

Figure 16: Harbour dues and other call costs for a typical multipurpose vessel



Source: CRA calculations based on HbR data.

These calculations show that Rotterdam is at the upper end of the harbour dues. However, differences are not as significant as for other cargo types that are shipped on larger vessels and also total call costs do not vary as much as seen for other cargo types.

Table 68: Percentage difference in harbour dues compared to Rotterdam: multipurpose vessel

	Harbour dues per call	Difference to Rotterdam
Rotterdam	7,105	
Amsterdam	7,046	-1%
Vlissingen	6,201	-13%
Antwerp	6,084	-14%
Zeebrugge	4,211	-41%
Hamburg	2,915	-59%
Bremen	2,968	-58%

Source: CRA calculations based on HbR data.

The benchmarking suggests less pronounced price differences between the Dutch ports. However, Rotterdam remains the most expensive port.

8.2.7 EVIDENCE OF SWITCHING

The respondents to our questionnaire reflect the variety of other general cargo. One of the respondents provides freight forwarding, inland shipping and warehousing for paper, timber and plywood. The respondent considers 50% of the total volume as captive, mainly due to specific investments in facilities at or near the port but also because of long-term contracts with other service providers in the port and due to the fact that generalised route cost is lower for Rotterdam than for other ports. The respondent would shift volume in response to a ten percent increase in total cost of shipping cargo through Rotterdam. The main destination would be Antwerp (50%) followed by Bremen and Hamburg (15% each), Felixstowe (10%) and Amsterdam and Vlissingen (5% each).

Another respondent operates in the segment for specialised cargo. This respondent considers all shipments as captive. He mentioned that Antwerp tried to lure customers away from other ports by offering package deals for new type of cargo, mainly for offshore tug and barge. The respondent complained that HbR had no interest in special cargo and would not show any flexibility, which would lead to switching to other ports including Vlissingen. The respondent would choose Antwerp and Vlissingen as equally attractive alternative ports.

Yet another respondent that operates in freight forwarding of project cargo and machinery felt that there is no captive volume at all. The respondent mentioned that it had switched due to an increase in total call cost, however, and not due to a specific increase in harbour dues.

Another freight forwarding company that operates with steel tubes and oilfield related materials also felt that there is no captured volume. The respondent pointed out that there are less and less possibilities for break bulk liner shipments at the port of Rotterdam, which lead to a transfer of cargo to Vlissingen over the past 15 years. The transfer was also attributed to the high call cost at Rotterdam. In response to a 10% increase in total cost of shipping cargo through Rotterdam, that respondent would shift 50% of cargo to other ports, mainly to Antwerp (80%), but also to Vlissingen (20%).

On average about 50% of the cargo volume is considered as captive and only 22% of volume would be switched in response to a ten percent increase in total port related costs.

No respondent said to have switched in the past in response to an increase in harbour dues.

8.2.8 TRENDS

HbR hopes to acquire more general cargo (mainly steel and forest products) as a result of the accommodation of new breakbulk terminals at the port.

9 Dry bulk

9.1 Overview

Dry bulk accounts for about one quarter of total cargo throughput in the port of Rotterdam, 86 tons out of a total of 328 tons in 2003. Considering all ports in the HLH range, in 2003 Rotterdam had a market share of 35% of total dry bulk throughput.¹⁹⁵ In that year, the dry bulk segment generated revenues of almost €69 million for the port authority, accounting for 17% of HbR's total revenues. The segment's EBIT in 2003 was close to €18 million, yielding a rate of return on invested capital of 4.9%.¹⁹⁶

In January 2003, dry bulk occupied 461 ha of land in the port of Rotterdam, i.e. 10.7% of the total port area suitable for renting out to business and industry at that time.¹⁹⁷ About 1,300 people work in this segment within the port.¹⁹⁸

Dry bulk primarily consists of raw materials used as input for production processes in the European industry. There are four main categories that ports generally distinguish in the dry bulk segment:

- Iron ore & scrap (used as input for the production of steel);
- Coal (steam coal for electricity generation and coke coal for the steel production);
- Agribulk (grains, animal feed etc.); and
- Other dry bulk (mainly minerals).

In Rotterdam, the largest dry bulk category is iron ore & scrap, which accounted for almost half of total dry bulk throughput in the port in 2003. Coal accounted for about 30% and agribulk and other dry bulk for a bit more than 10%. Reflecting the fact that most dry bulk shipments are inputs for the European industry, roughly 90% of total dry bulk throughput handled in Rotterdam is incoming cargo (77.5 million tons in 2003) and only about 10% is outgoing (8.4 million tons in 2003).¹⁹⁹

¹⁹⁵ HbR Port Statistics 2003.

¹⁹⁶ HbR Port Statistics 2003 and HbR Rentabiliteitsberichtgeving 2003, provided by HbR on 14 October 2004.

¹⁹⁷ HbR Ruimtebalans 2003, p. 8. Note that on 1 January 2003, the total area suitable for business and industry on the port territory was 4,974 ha. Today, this has increased to 5,036 ha.

¹⁹⁸ HbR Port Statistics 2003 and information provided by HbR on 16 July 2004.

¹⁹⁹ HbR Port Statistics 2003, and information received from HbR on 16 September 2004.

All dry bulk cargoes share certain characteristics. For example, the same handling facilities can be used for the different cargo types.²⁰⁰ Most dry bulk terminals in the port of Rotterdam handle at least two or even more dry bulk cargo types without the need to make any major changes to the handling infrastructure. The two largest dry bulk terminal operators in Rotterdam (EMO and EECV) handle both iron ore and coal. Moreover, one of the respondents to our survey confirmed that the same facility capacities can indeed be used for these two cargo types. EBS, the third largest terminal operator, handles coal, agribulk and other dry bulk. Iron ore and coal are also interrelated to some extent due to the fact that in many cases both substances are needed for the same end use, the production of steel. Many large customers, in particular German steel producers such as Thyssen Krupp Stahl (TKS), ship both commodities through Rotterdam regularly.

In general, dry bulk cargo is mainly carried by panamax vessels (60,000-79,000 DWT). For iron ore shipments and coal, capesize vessels with 80,000 DWT and more are also commonly used. For minerals and other dry bulk, handysize carriers are widely employed as well (10,000-39,000 DWT).²⁰¹ The different vessel sizes used have important implications for the necessary draught of the ship. In particular, many capesize vessels can – when fully loaded – only call in Rotterdam and at no other port in the ARA range, i.e. the ports between Amsterdam and Antwerp.

The overwhelming majority of dry bulk vessels does not operate in liner service. Hence, the tariff specified for general tramp vessel harbour dues is applicable. It depends on the vessel's gross tonnage and in some cases on the amount of cargo discharged and/or loaded in Rotterdam. Almost 80% of all dry bulk throughput in Rotterdam is charged with a fixed fee per GT of the vessel. HbR does not price differentiate between coal, iron ore and other dry bulk vessels, but offers a frequency reduction scheme for agribulk vessels. The introduction of these rebates was triggered by strong demand from agibulk shippers.²⁰² There is also a special tariff for non-container liner vessels, but this has practically no relevance.²⁰³

Contrary to Rotterdam, other ports in the ARA range – in particular Amsterdam and Antwerp – cap their tariffs for very large dry bulk vessels in order to compensate shippers for the less favourable draught restrictions at these ports. This implies that, due to the absence of draught restrictions in Rotterdam, HbR can be expected to have more pricing power for larger vessels.

²⁰⁰ This applies especially to transshipment, i.e. discharging and loading, equipment. (Floating) cranes can handle in principle all dry bulk cargoes. For storage, separate facilities may be required in order not to mix up the different cargo types.

²⁰¹ Benchmark Droge Bulk, p. 24 and additional information provided by HbR on 16 July 2004.

²⁰² Other reasons for the introduction of this discount were the declining EU market for grains and efforts of the port of Rotterdam to maintain its market shares.

²⁰³ Very late in the process of this study, HbR reported that for agribulk and dry bulk exceptional discounts are granted for new volumes brought to Rotterdam. The negotiation of harbour dues also for dry bulk and mainly for agribulk and other dry bulk shipments was confirmed by our survey results. However, HbR did not provide any information about the level of these discounts, whether other ports granted similar incentives etc. Hence, we do not consider these discounts in our analysis, but assume that relative harbour dues for dry bulk cargo are reflected by the ports' official list prices.

HbR provided us with a list of ports that it perceives as its most important competitors in the dry bulk segment. We have not restricted our analysis to these ports, but have instead included all ports in the HLH range in our detailed analysis of dry bulk throughput and capacity, draught restrictions, pricing of harbour dues, other port related costs and hinterland transport. We have also taken the results of our survey into account. Based on these inputs, we have defined the different markets for dry bulk based on the different cargo types. Our result is similar to, but not identical with the assessment of HbR. In particular, based on the evidence available to us, we define the relevant geographic markets as follows:

- Iron ore & scrap: Rotterdam as a lower bound and Rotterdam, Amsterdam, Antwerp and Vlissingen as an upper bound.
- Coal: Rotterdam as a lower bound and Rotterdam, Amsterdam and Antwerp as an upper bound.
- Agribulk: Rotterdam as a lower bound and Rotterdam, Amsterdam, Antwerp and Gent as an upper bound.
- Other dry bulk: Rotterdam as a lower bound and Rotterdam, Amsterdam, Antwerp, Gent, Zeebrugge and Vlissingen as an upper bound

In 2003, market shares of the port of Rotterdam in these markets ranged from 70% (iron ore & scrap) over 50% (coal) and 44% (agribulk) to 29% (other dry bulk), as can be seen in the tables below.

Table 69: Relevant market for iron ore & scrap – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	39.9	70%
Amsterdam	10.3	18%
Antwerp	6.9	12%
Vlissingen ²⁰⁴	0.2	0%
Total	57.3	100%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on HbR Port Statistics and information on the website of the port of Vlissingen.

²⁰⁴ Note that although the market share of Vlissingen is very low in this market at the moment, this port still provides fringe capacity for iron ore & scrap.

Table 70: Relevant market for coal – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	24.7	50%
Amsterdam	17.0	34%
Antwerp	7.7	16%
Total	49.4	100%

*Totals may not add up to 100 due to rounding.
Source: CRA calculations based on HbR Port Statistics.*

Table 71: Relevant market for agribulk – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	10.8	44%
Amsterdam	9.7	39%
Antwerp	1.3	5%
Gent	2.8	11%
Total	24.6	100%

*Totals may not add up to 100 due to rounding.
Source: CRA calculations based on HbR Port Statistics.*

Table 72: Relevant market for other dry bulk – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	10.6	29%
Amsterdam	7.7	21%
Antwerp	10.1	27%
Gent	6.3	17%
Zeebrugge	1.5	4%
Vlissingen	0.9	2%
Total	37.1	100%

*Totals may not add up to 100 due to rounding.
Source: CRA calculations based on HbR Port Statistics and information on the website of the port of Vlissingen. For Vlissingen, throughput data for other dry bulk had to be estimated due to different classification systems used by the port authority. We distributed all dry bulk cargo not accounted for by iron ore & scrap and coal equally between agribulk and other dry bulk to both agribulk and other dry bulk*

We base our suggested definition of the relevant markets on the following considerations. For iron ore & scrap and coal shipments, draught restrictions are the most important capacity constraint for competition between ports. Rotterdam is the only port that can accommodate large capesize vessels with more than 16.5 metres of draught. This means that at least between 62% (iron ore) and 11% (coal) of the current throughput volume in Rotterdam can be considered as captive business. Vertical integration of the main users also adds to the captivity of dry bulk cargo in Rotterdam. Both factors provide HbR with pricing power, which increases with the size of the respective vessel. The existence of price differentials is confirmed by our benchmarking analysis.

Iron ore & scrap and coal are the most important dry bulk cargoes for the port of Rotterdam, both in terms of throughput and revenues generated for HbR. For both cargo types, German steel producers and power plants located in the hinterland in the Rhine/Moselle/Main area are the most important customers of the port of Rotterdam and all other ports in the ARA range. The overlap in hinterland with the German ports is marginal and not relevant for iron ore and coal. Moreover, our benchmarking analysis shows that harbour dues in Rotterdam are significantly higher than harbour dues in Hamburg. For agribulk and mineral dry bulk, the same hinterland and benchmarking considerations apply, which leads us to conclude that the German ports do not represent a competitive constraint on the pricing of HbR and are therefore not part of the relevant markets for any of the dry bulk cargo types.

The importance of the other ARA ports, in particular Amsterdam and Antwerp, was confirmed by the responses to our survey.

Due to relatively favourable maximum draught conditions (although still worse than in Rotterdam) and resulting fringe capacity, we included the port of Vlissingen in the relevant markets for iron ore and scrap and other dry bulk. This was confirmed by our survey results.

Based on our hinterland analysis and our survey results, we also added Gent to the relevant markets for agribulk and other dry bulk. For other dry bulk, Zeebrugge was considered to be relevant too.

The French port of Dunkerque shares some of the hinterland with the ARA ports, in particular in Belgium and Northern France. Still, although HbR indicated that volumes have been switched from Rotterdam to Dunkerque in the past, we have found no evidence for switches induced by harbour dues only. Also, the large majority of iron ore and coal shipped through Rotterdam is destined for German industry end users (83% and 63% respectively). Hence, the overlap in the hinterland is only very small. In addition, our survey responses indicate that Dunkerque is not considered as a suitable alternative to the port of Rotterdam for the various dry bulk goods. Even if it was mentioned as an alternative, respondents would not shift any volume there if prices in Rotterdam increased. Note that the latter argument also applied to Le Havre, which we excluded also due to hinterland considerations.

Note that we have not defined different markets for smaller and larger vessels, although in all of the markets as defined above there are vessels that can only call in Rotterdam and at none of the other ports, due to Rotterdam's good open sea access with no draught restrictions for fully loaded vessels. Given this competitive advantage, it is clear that the pricing power of HbR is less restricted by its competitors the larger the respective vessel is. This is especially relevant for iron ore and coal, which are often carried in large capesize vessels that need more than 17 metres of draught. Nevertheless, our analysis has shown that HbR has pricing power not only for large vessels, but also with respect to smaller vessels. This is confirmed by the benchmarking of harbour dues, which shows that while price differences between Rotterdam and other ports in the relevant market are largest for large vessels (harbour dues per ton of shipped cargo were 54% lower in Amsterdam than in Rotterdam for a shipment of 150,000 tons of steam coal in 2001), they can also be significant for smaller vessels. For example, in 2003 harbour dues per ton of shipped cargo for a shipment of 55,000 tons of coal were 18% less in Amsterdam than they were in Rotterdam.

9.2 Port users

As mentioned already, the primary type of dry bulk goods shipped into Europe is materials for industrial production in Europe. The European industry is dependent on imports of iron ore, coal, agribulk and other minerals.

For iron ore & scrap and coal, European and especially German steel and electricity companies are the most important end users of the cargo shipped through Rotterdam. 80% of the iron ore shipped through Rotterdam is destined to German steel producers. With regard to coal, more than 60% is shipped onwards to German end users, both for electricity generation and steel production. The port of Rotterdam accounts for about 40% of all German coal imports. The decreasing coal production in Germany translates into higher demand for coal shipments through the European ports.²⁰⁵

End users of agribulk are, for example, the European food and cattle feed industry. Other dry bulk (such as minerals like chromium ore, magnesite, ilmenite, lead and zinc concentrate, bauxite, mineral sands, vermiculite and kaoline) are used mainly for construction and as input for the chemical industry.²⁰⁶ The majority of agribulk and other dry bulk throughput shipped through Rotterdam is transported onwards to the Dutch and German hinterland.

Contrary to the container segment, dry bulk is mainly a tramp business, i.e. vessels are chartered for a particular shipment on a case-by-case basis and there are hardly any liner

²⁰⁵ HbR Annual Report 2003, p. 10

²⁰⁶

http://www.portofrotterdam.com/Business/UK/Cargo_and_Terminals/Dry_Bulk/Investmentinformation/Agribulk/Index.asp,
http://www.portofrotterdam.com/Business/UK/Cargo_and_Terminals/Dry_Bulk/Investmentinformation/Mineralsandotherdrybulk/Index.asp and HbR Annual Report 2003, p. 10.

services.²⁰⁷ Due to the nature of the business, the influence of end users on the choice of port is much stronger in the dry bulk segment than it is for example for containers. The ultimate decision through which port to ship a certain cargo is usually taken by traders working for the receivers of the cargo. The direct customers of HbR in the dry bulk business are agents representing the various end users. Some agents are subsidiaries of the actual end users and sometimes not only organise the shipment of the cargo to Rotterdam, but also the hinterland transport to the final destination. An example of such a vertically integrated agency/inland shipping company is Thyssen Krupp Veerhaven, which acts as the agent for all dry bulk shipments of Thyssen Krupp Stahl through the ARA ports and – as an inland shipping company – is also responsible for shipping the cargo to its final hinterland destination, the port of Duisburg.²⁰⁸

In 2003, HbR's top seven key accounts for dry bulk together accounted for almost [confidential] of the port's total dry bulk throughput, as can be seen in Table 73. The majority of the agents shown in Table 73 represent power generation companies ([confidential]) and steel producers ([confidential]). This reflects the relative importance of iron ore and coal over the other dry bulk cargo types. Most of the end users represented by HbR's dry bulk key accounts are located in the German Ruhr area.

Table 73: HbR key accounts for dry bulk in 2003

Name of agent	Companies represented	Number of calls in 2003	Throughput	Total harbour dues paid
[confidential]	[confidential]	[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]	[confidential]	[confidential]
[confidential]		[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]	[confidential]	[confidential]
[confidential]	[confidential]	[confidential]	[confidential]	[confidential]
Total		[confidential]	[confidential]	[confidential]

Source: Information provided by HbR on 16 July 2004.

²⁰⁷ However, some logistics companies offer parcel services to their customers. Parcel services are especially relevant for agribulk and other dry bulk, where shipments are usually smaller than for iron ore and coal. Parcel services allow the bundling of cargo of different end users on one vessel and thereby reduce costs for the end users. Currently, the only terminal handler offering such parcel service facilities in the ARA range is IGMA in Amsterdam. In Rotterdam, various shippers offer parcel services for coal from South Africa, minerals from South Africa and minerals from the Far East.

²⁰⁸

http://www.veerhaven.com/Page.asp?chapter_id=1&content_id=1&news_id=&job_id=&specs_id=&lan_id=2.

For all dry bulk categories, the markets of end users are relatively concentrated. While this is especially significant for iron ore and coal, concentration is also increasing in the agribulk sector.²⁰⁹

For iron ore and coal, only a few end users account for a relatively high share of total cargo throughput in Rotterdam. For example, [confidential], the agent and inland shipping subsidiary of [confidential], shipped between [confidential] and [confidential] million tons of iron ore and coal through Rotterdam in 2003, representing [confidential] of total iron ore & scrap and coal throughput in that year (64 million tons).²¹⁰ According to our survey, a large electricity company, which operates a power generation facility on the Maasvlakte, shipped [confidential] million tons of coal through Rotterdam in 2003, accounting for [confidential] of total coal throughput in that year (25 million tons).²¹¹

The significance of major end users shipping dry bulk through Rotterdam is further enhanced by the fact that some of them (e.g. Thyssen Krupp Stahl and RAG) have stakes in dry bulk terminal facilities at the port of Rotterdam. Thyssen Krupp owns (together with its subsidiary Thyssen Krupp Veerhaven and Hüttenwerke Krupp Mannesmann) EECV, the second largest coal and iron ore terminal in the port of Rotterdam. In fact, the annual cargo throughput accounted for by Thyssen Krupp utilises [confidential] of the capacity of EECV.²¹² As already mentioned, a large electricity company [confidential] receives the coal for its facilities directly from the EMO terminal via conveyor belts.²¹³ To the extent that end users have made such investments, it can be expected that they have an interest in fully utilising their facilities and hence shipping cargo through Rotterdam. Clearly, vertically integrated port users will be less willing to shift volume away from Rotterdam in case of an increase in harbour dues by HbR.

The main origins of dry bulk cargo shipped to Rotterdam are Latin and North America, South Africa, and Australia. Some minerals also come from Asia and Europe. Table 74 shows the main trade routes for dry bulk cargo shipped to Rotterdam.

²⁰⁹ Benchmark Droge Bulk, p. 21, provided by HbR on 16 July 2004.

²¹⁰ Interview with [confidential], Port Statistics 2003.

²¹¹ CRA questionnaire and Port Statistics 2003.

²¹² Interview with [confidential], and information from www.eecv.nl.

²¹³ [Confidential] and information provided by HbR on 5 July 2004.

Table 74: Main trade routes of dry bulk shipments coming to Rotterdam

Cargo type	Main trade routes
Iron ore	Transatlantic (Brazil – Rotterdam, Canada – Rotterdam) Australia – Europe
Coal	Transatlantic (South Africa – Rotterdam, Colombia – Rotterdam) Australia-Europe (Newcastle, Australia – Rotterdam)
Agribulk	Transatlantic (Lower Mississippi – Rotterdam, Colombia – Rotterdam, Brazil – Rotterdam)
Other dry bulk	Transatlantic (S. Africa-Rotterdam) Asia-Europe Intra Europe

Source: Information provided by HbR on 16 July 2004 and 26 October 2004.

9.3 Throughput and capacity constraints of dry bulk ports in the ARA range

Table 75 shows the dry bulk throughput in the whole Hamburg-Le Havre range in 2003. Table 76 shows the corresponding market shares. Note that the throughput data for Amsterdam includes data for all Amsterdam ports, i.e. Amsterdam, Beverwijk, Velsen/IJmuiden and Zaanstadall.

Table 75: Dry bulk throughput in the HLH range in 2003, in million tons

	Iron ores & scrap	Coal	Agribulk	Other dry bulk
Hamburg	10.2	4.9	6.6	6
Bremen	4.6	1.5	1	1.6
Wilhelmshaven	0	1.5	0	0.7
Amsterdam	10.3	17	9.7	7.7
Rotterdam	39.9	24.7	10.8	10.6
Antwerp	6.9	7.7	1.3	10.1
Gent	4.1	3.6	2.8	6.3
Zeebrugge	0	0	0	1.5
Dunkerque	12.7	9.1	1.1	2.9
Le Havre	0	2.1	0.7	2.1
Vlissingen	0.2	1.1	0.9	0.9
Terneuzen	0	0.8	2.5	2.5
Total	88.9	74	37.4	52.9

Source: HbR Port Statistics 2003. Amsterdam data includes throughput data for all ports in the "Havenregio", i.e. Amsterdam, Beverwijk, Velsen/IJmuiden and Zaanstadall. For Vlissingen and Terneuzen, information taken from the websites of the port authorities. For Vlissingen and Terneuzen, throughput data for agribulk and other dry bulk had to be estimated due to different classification systems used by the port authorities. We distributed all dry bulk cargo not accounted for by iron ore & scrap and coal equally between agribulk and other dry bulk to both agribulk and other dry bulk.

Table 76: Dry bulk market shares in the HLH range in 2003

	Iron ores & scrap	Coal	Agribulk	Other dry bulk
Hamburg	11%	7%	18%	11%
Bremen	5%	2%	3%	3%
Wilhelmshaven	0%	2%	0%	1%
Amsterdam	12%	23%	26%	15%
Rotterdam	45%	33%	29%	20%
Antwerp	8%	10%	3%	19%
Gent	5%	5%	7%	12%
Zeebrugge	0%	0%	0%	3%
Dunkerque	14%	12%	3%	5%
Le Havre	0%	3%	2%	4%
Vlissingen	0%	1%	2%	2%
Terneuzen	0%	1%	7%	5%
Total	100%	100%	100%	100%

Totals may not add up to 100 due to rounding.

Source: HbR Port Statistics 2003. Amsterdam data includes throughput data for all ports in the "Havenregio", i.e. Amsterdam, Beverwijk, Velsen/IJmuiden and Zaanstadall. For Vlissingen and Terneuzen information was taken from the websites of the port

authorities. For Vlissingen and Terneuzen, throughput data for agribulk and other dry bulk had to be estimated due to different classification systems used by the port authorities. We distributed all dry bulk cargo not accounted for by iron ore & scrap and coal equally between agribulk and other dry bulk to both agribulk and other dry bulk.

Based on the whole HLH range, the market share of the port of Rotterdam ranges from 20% for other dry bulk to 45% for iron ore & scrap. Based on Table 76, the main dry bulk ports in the HLH range clearly are Rotterdam and Amsterdam. Zeebrugge does not seem to play a role at all for iron ore & scrap, coal and agribulk, but has some limited other dry bulk business.

Capacity constraints due to draught restrictions

For many dry bulk shipments, the most direct constraint with regard to the choice of port is the maximum draught the various ports allow for. Typical vessels for the shipment of iron ore are capesize vessels with a draught of about 17 metres and more. Coal is also often shipped in capesize vessels (about 50%) or in panamax vessels, which can have a draught of up to 14 metres.²¹⁴ Table 77 shows the maximum draught possible in the various ports in the ARA range as well as in Gent and Dunkerque. These are the main ports that were mentioned by port users and by HbR as possible substitute ports for Rotterdam in the dry bulk business. The numbers in Table 77 show that Rotterdam is the port with the best open sea access and the maximum draught. The EECV terminal on the Maasvlakte can accommodate dry bulk vessels with a draught of up to 23.65 metres. The second-deepest berth is available in Dunkerque, where vessels with a draught of up to 18 metres can call.

Table 77: Maximum draught for dry bulk carriers in the ARA ports

	Main terminals	Maximum draught
Rotterdam	EMO, EECV, EBS	23.65 m
Amsterdam ports	OBA Bulk, Rietlanden, IGMA	16.5 m at Ijmuiden locks ²¹⁵ 13.72 m in Amsterdam
Antwerp	Delwaidedok Terminal, Kanaaldok Terminal, Leopolddok/Hansadok Terminal, Belgian Scrap Terminal Waasland Canal	15.6 m (restricted by depth of the Scheldt, max draught at berth 17.5 m)
Vlissingen/Terneuzen	OVET	16.5 m ²¹⁶
Gent		13.5 m
Dunkerque	Novrac / Seabulk	18 m

Source: Websites of the ports of Amsterdam/Ijmuiden, Rotterdam, Vlissingen/Terneuzen, Gent, Zeebrugge and Dunkerque and websites of terminal operators located at these ports.

²¹⁴ Information provided by HbR on 16 July 2004 and 26 October 2004.

²¹⁵ According to HbR, there are plans to increase the draught in Amsterdam to 17.5 metres in 2005 (information provided by HbR on 26 October 2004). If these plans are realised, our capacity constraint analysis might need to be revised.

²¹⁶ According to HbR, there are plans to increase the draught in Vlissingen to 17 metres. However, the timing of this expansion is unclear (information provided by HbR on 26 October 2004).

Some clarifying remarks on the choice of ports in the table above are due:

- Neither HbR nor our survey respondents mentioned Zeebrugge as an important port for iron ore & scrap, coal and agribulk. To our knowledge, Zeebrugge does not have any handling facilities for these cargo types and we therefore did not analyse its draught restrictions, which would mainly apply to iron ore and coal shipments.²¹⁷
- In our survey, Moerdijk was mentioned by some respondents as a possible substitute for the port of Rotterdam for iron ore & scrap and coal. However, Moerdijk forms part of the Moerdijk/Rotterdam ports, in which the harbour dues set by HbR apply. Hence, we do not treat Moerdijk as a separate entity in the remainder of this study.
- Neither HbR nor any of our survey respondents considered the German ports as competitors of the port of Rotterdam for iron ore & coal. As we will show, this is confirmed by our cargo flow and hinterland analysis.²¹⁸ For agribulk and other dry bulk, HbR indicated that Hamburg may play a role too. However, based on our benchmarking and hinterland analysis, we conclude that the German ports are not part of the relevant markets for agribulk and other dry bulk either.
- In principle, the port of Dunkerque, with a maximum draught of 18 metres, could represent an alternative for the port of Rotterdam for large dry bulk carriers. However, it was not mentioned by any respondents to our user survey when being asked which ports represent potential alternatives for Rotterdam for iron ore & scrap, coal and agribulk shipments. One respondent mentioned Dunkerque as a potential alternative for other dry bulk. However, respondents did not expect any other dry bulk cargo to be re-routed from Rotterdam to Dunkerque in case of an increase in total port related costs in Rotterdam. The same survey results apply to Le Havre.²¹⁹ Based on these survey results we conclude that – despite their unconstrained seaside access – the French ports do not form a competitive constraint for HbR. In the following, we will therefore exclude them from the analysis of the relevant markets for all dry bulk cargo types.²²⁰

²¹⁷ Compare Port of Zeebrugge, “Beleidsplan MBZ NV”. This strategic document does not discuss dry bulk cargo at all. Also, Zeebrugge did not have any iron ore & scrap or coal throughput in 2003 (Port Statistics 2003).

²¹⁸ Hansaport, the largest dry bulk operator in Germany located in Germany, ships 65% of its incoming iron ore and coal to the steel manufacturing plants of Salzgitter AG in North Germany. Most of the hinterland transport is done by rail, which is in sharp contrast to the hinterland transport patterns of the ARA ports (<http://www.hafen-hamburg.de/html-engl/handbook/3.4.html>). Due to hinterland transport restrictions, the ARA ports are not considered to be competitive in this area, which suggests two different geographic markets.

²¹⁹ CRA questionnaire.

²²⁰ According to HbR, Dunkerque belongs to the most important competitors of the port of Rotterdam with regard to iron ore and coal, especially for end users in Belgium and Northern France. However, 80% of the iron ore throughput and 63% of the coal throughput in Rotterdam are shipped to Germany, which means that the overlap in the Belgian and French hinterland is relatively small. Very late in the process of this study, HbR indicated that in the past there has been switching of iron ore volume from Rotterdam to Dunkerque. However, HbR did not provide any details on this switch and it was not confirmed by our survey responses. Hence, we still conclude that Dunkerque does not form part of the relevant market for iron ore and coal.

The draught restrictions at other ports displayed in Table 77 show that a number of vessels, although not necessarily the cargo contained in them, are captured in Rotterdam when they are fully loaded.²²¹

Table 78 presents the share of throughput for the different cargo types in Rotterdam by draught of the respective vessel.

Table 78: Share of dry bulk throughput by vessel draught

Vessel draught	Iron ores	Coal	Agribulk	Other dry bulk
Unknown	0.5%	2.5%	5.4%	4.0%
<10 m	8.0%	4.0%	34.2%	61.6%
10-15 m	4.3%	18.1%	60.4%	31.8%
15-17.5 m	25.3%	64.4%	0.0%	2.6%
>17.5 m	61.9%	11.1%	0.0%	0.0%
Total	100%	100%	100%	100%

Totals may not add up to 100 due to rounding.

Source: Information provided by HbR on 26 October 2004.

The data in Table 78 shows the importance of large carriers especially for iron ore, but also for coal. For iron ore, about 62% of all cargo throughput was shipped in vessels with a draught of more than 17.5 metres, which means that they could not have called at any other port in the ARA range. For coal, the share of throughput shipped in vessels with more than 17.5 metres of draught was around 11%. Hence, at least 62% of the iron ore throughput and at least 11% of the coal throughput currently shipped through Rotterdam are captive business for the port, based on the current structure of vessels being used. Note that the share of captive throughput could be even higher, given that at least some of the vessels in the 15-17.5 metre category are likely to have a draught of more than 16.5 metres, which would mean that Rotterdam is the only ARA port where those vessels can call.

There are 2 to 3 vessels used for dry bulk shipments today that can only call at the port of Rotterdam at all times. One of them is the Berge Stahl, which was specifically designed and built for the transport of iron ore from Ponta da Madeira, Brazil, to Rotterdam. The Berge Stahl calls at Rotterdam about nine or ten times a year, carrying about 365,000 tons of iron ore each time.²²² The vessel has a draught of 22.5 metres, which means that it is totally captured in the port of Rotterdam. No other port in the ARA range provides an alternative. Hence, about 3.65 million tons of iron ore – the maximum total shipments of the Berge Stahl

²²¹ In principle, up to a maximum draught of 18 metres these vessels could call at Dunkerque too. However, for the reasons explained above, we exclude Dunkerque from our analysis based on the survey evidence we gathered.

²²² http://www.veerhaven.com/News.asp?chapter_id=30&News_ID=10

per year – are captive iron ore business for the port of Rotterdam. This was about 9% of the total iron ore throughput in Rotterdam in 2003.²²³

As already mentioned, the usual vessel size employed for the shipment of agribulk and other dry bulk is significantly smaller than for iron ore and coal. As Table 78 shows, for agribulk, most throughput in Rotterdam was shipped in vessels with a draught between 10 and 15 metres, which means that the main ARA ports (Amsterdam, Antwerp and Vlissingen) could have accommodated the vessels too. For agribulk, there is currently no throughput that is bound to Rotterdam due to draught restrictions. For other dry bulk, there is some potentially captive throughput volume, but compared to iron ore and coal it is marginal (at most 2.6%). Most vessels shipping other dry bulk through Rotterdam could have called at any other ARA port.

Note that our estimates for captive business provided above are based on the assumption that the current pattern of vessel sizes remains constant. According to HbR, the size of the ships and the cargo load is ultimately determined by the brokers and charterers and those always have the option to choose smaller vessels that can call at other ports in Europe.²²⁴ While this argument is in principle true, it is nevertheless important to consider that a change in vessel size involves extra costs. Choosing smaller vessels in order to be able to call at other ports in the ARA range will mean giving up on the economies of scale of using large vessels for the sea transport of bulk cargo. Coming back to the example of the Berge Stahl, it seems very unlikely, that Thyssen Krupp would use a different ship than the one specifically built for the purpose of transporting iron ore from Brazil to Rotterdam.

While in principle many vessels are captured in Rotterdam due to their draught requirements, by discharging part of their cargo even the largest vessels can reduce their draught and subsequently enter many more European ports. In the ports of Amsterdam for example, large dry bulk vessels can be lightened, i.e. partly unloaded, in IJmuiden (maximum draught of 16.5 metres) and subsequently pass the lock and enter the port of Amsterdam (maximum draught of 13.72 metres).²²⁵ The same approach can be applied in Antwerp, where vessels can be lightened on the river Scheldt before passing the port locks. Note that although the maximum draught at the terminals in Antwerp is 17.5 m (capesize), only vessels with a maximum of 15.6 m can steam up the river Scheldt, which effectively restricts access to the port of Antwerp to panamax and smaller vessels.²²⁶

According to HbR, it happens regularly that fully loaded vessels with a deep draught first call at Rotterdam, are partially unloaded and then ship their remaining cargo to another port with higher draught restrictions than Rotterdam.²²⁷ However, when fully loaded, these vessels are still obliged to call in Rotterdam before moving on to the next port. This “call pattern” could

²²³ HbR Port Statistics 2003.

²²⁴ Information provided by HbR on 16 July 2004.

²²⁵ <http://www.amsterdamports.com>

²²⁶ “Port of Antwerp – The dry bulk alternative in the heart of Europe”, p. 3.

²²⁷ Information provided by HbR on 26 October 2004.

represent a competitive constraint on HbR's price setting if these partially unloading vessels generated significantly lower harbour dues than vessel who fully discharge in Rotterdam. However, HbR provided information that shows that almost 80% of all dry bulk throughput in Rotterdam is charged according to the tariff TS1, which is set as a fixed fee per GT and is levied only if 133.2% or more of the GT of the vessel are discharged and/or loaded in Rotterdam (see Section 9.5 for a detailed description of the tariff structure applicable to dry bulk vessels). Hence, for the majority of dry bulk cargo shipped through Rotterdam, partial unloading (at least not below 133.2% of their GT) does not seem to be employed.

In addition to the practical considerations discussed above, a more general comment applies. In general, given that port costs account for only a small share of total transport chain cost of shipping dry bulk cargo (i.e. sea transport, port related costs and hinterland transport, compare Section 9.8), switching of port users in response to an increase in port dues, especially if it involves potential extra costs for lightening and the use of smaller vessels, is highly unlikely. Hence, we conclude that the port of Rotterdam has considerable pricing power with regard to larger dry bulk vessels, mainly as a result of its maximum draught conditions, to which some vessels have – in fact – been tailored. As the data in Table 78 reveal, this is especially relevant for iron ore and coal, where many large dry bulk vessels are used. For agribulk and other dry bulk, this particular constraint is less strict.

Terminal capacity

Table 79 presents information on the three main dry bulk terminal operators in the port of Rotterdam. These three operators – Europees Massagoed Overslagbedrijf (EMO), Ertsoverslag Europoor C.V. (EECV) and European Bulk Services (EBS) – generate about 80% of HbR's total dry bulk related revenue and handle 86% of the port's total dry bulk throughput.²²⁸

EMO, EECV and EBS are mainly active in the handling of iron ore & scrap and coal. EBS also handles agribulk and minerals. For these cargo types, there are also various other, smaller terminal operators such as Marcor, EP Stevedoring, Maas Silo, Van Uden Stevedoring, Borax and Rotterdam Bulk Terminal.²²⁹

²²⁸ Based on information provided by HbR.

²²⁹ Information provided by HbR on 5 July 2004.

Table 79: Dry bulk terminal operators in Rotterdam

Terminal operator	Main cargo handled	Deepest quay (m)	Annual throughput	Maximum handling capacity	Maximum storage capacity
Europees Massagoed Overslagbedrijf (EMO) Maasflakte	Iron ore, coal	23.0	ca. 13 million tons of ore ca. 20 million tons of coal (2003: total of 35 million tons)	Discharge 140,000 tons/day Loading 50,000 tons/day Annual throughput capacity 60 million tons	6 million tons
Ertsoverslagbedrijf Europoort C.V. (EECV) Europort	Iron ore, since Dec 2003 also coal	23.65	22 million tons	33 million tons Discharge 3,000 tons/hour, barge loading 4,000 tons/hour	Iron ore: 2.5-3.5 million tons Coal: 850,000 tons
European Bulk Services (EBS) Europort	Agribulk	16.0	10 million tons	Loading/discharge 500-1,500 tons/hour	N/a
European Bulk Services (EBS) Botlek	Minerals, coal	14.5			

Source: HbR, CRA questionnaire and information provided at www.eecv.nl, www.emo.nl and www.ebsbulk.nl.

Interestingly, the major dry bulk terminals in Rotterdam are (at least partly) owned by major users of the port, in particular steel and electricity companies:

- EMO: RAG²³⁰, Thyssen Krupp Stahl, Usinor (France), H.E.S. Beheer Holding;
- EBS: H.E.S. Beheer Holding; and
- EECV: Thyssen Krupp Stahl, ThyssenKrupp Veerhaven and Hüttenwerke Krupp Mannesmann (dedicated terminal for TKS and HKM).

One of the smaller dry bulk terminals, Marcor Stevedoring, belongs to C. Steinweg Handelsveem, an integrated logistics company.

According to HbR, the main dry bulk cargo terminals in the Hamburg-Le Havre for dry bulk are located in the following ports:

- Amsterdam (Terminals: OBA, Rietlanden, IGMA/Cargill; traditional specialisation coal and agribulk);

²³⁰ According to HbR, RAG intends to sell its stake in EMO per 1 January 2005 (information provided by HbR on 26 October 2004).

- Antwerp (Terminals: Sea Invest, for minerals also Northern Mainport; traditional specialisation coal and minerals); and
- Gent (Terminals: Cargill, Sea Invest; traditional specialisation agribulk).²³¹

Table 80 shows the cargo throughput for iron ore & scrap and coal in Amsterdam, Antwerp, Vlissingen, Terneuzen, and Gent. Current throughput data is likely to correlate with current capacity and can thereby indicate the capacities available at the different ports.

Table 80: Iron ore & scrap and coal throughput in the main ARA ports and Dunkerque

	Iron ore & scrap and coal throughput in 2003 in million tons	Share of total
Rotterdam	64.6	56%
Amsterdam	27.3	23%
Antwerp	14.6	13%
Gent	7.7	7%
Vlissingen	1.3	1%
Terneuzen	0.8	1%
Total	116.3	100%

Totals may not add up to 100 due to rounding.

Source: Information provided by HbR on 5 July 2004.

From Table 80 it is clear that in 2003 Rotterdam handled by far the largest amount of iron ore & scrap and coal throughput – 56% – in the group of ports analysed here. The data suggest that the main ports for iron ore & scrap and coal competing with Rotterdam are Amsterdam, Antwerp and Gent. There seems to be limited fringe capacity available at Vlissingen and Terneuzen.

Interestingly, most of the dry bulk terminals in the ARA range are horizontally related through joint shareholdings. In the Netherlands, H.E.S. Beheer Holding Company holds stakes in various dry bulk terminals operating in Dutch ports: EBS Rotterdam (100%), Rotterdam Bulk Terminal (40%), EMO Rotterdam (31%), Maas Silo in Rotterdam (agribulk, 15%), OBA Group with terminals in Amsterdam and Vlissingen (49.97%), Overslagbedrijf Terneuzen “OVET” (33.3%), and other, smaller bulk terminals.²³² Sea Invest, a Belgian company based in Gent, operates dry bulk terminals in Antwerp and Gent and is also active in French ports, among others Dunkerque.²³³

²³¹ Information provided by HbR on 5 July 2004. As already explained, HbR also mentioned Dunkerque as a possible competitor and included terminals in Dunkerque in this list. As discussed above, we excluded Dunkerque from the relevant market due to hinterland considerations and our survey responses.

²³² <http://www.hesbeheer.com/dutch/deelnemingen/index.htm>.

²³³ www.sea-invest.be

9.4 Hinterland regions

The inland transport of dry bulk cargo from Rotterdam is dominated by barge transport. Table 81 shows the split of hinterland transport by mode for three of the four cargo types.

Table 81: Inland transport of dry bulk cargo arriving in Rotterdam

	Iron ore & scrap	Coal	Agribulk	Other dry bulk
Barge	76%	78%	55%	N/a
Rail	16%	8%	0%	N/a
Transshipment	8% (Germany and southern Europe)	4% (UK)	25% (outgoing sea vessels)	N/a
Conveyor belt	0%	10% (to E.On Maasvlakte)	20% (to ADM crusher)	N/a

Totals may not add up to 100 due to rounding.

Source: Calculations based on information provided by HbR on 5 July 2004.

The dominance of barge is typical for the hinterland transport of dry bulk cargo, which is less time sensitive than e.g. containers. Consequently, the hinterland of the port of Rotterdam for dry bulk is to a large extent shaped by the European inland waterway system.

“Rotterdam is linked to an extensive network of rivers and inland waterways that connect it with destinations in Germany, Belgium, France, Switzerland, Austria and beyond. The Rhine-Main-Danube Canal even makes Central and Eastern Europe accessible for inland shipping from Rotterdam. Transit times vary from less than 1 day for destinations in Germany and Belgium to 4 days for destinations in Switzerland.”²³⁴

More than 80% of all iron ore & scrap and more than 60% of all coal cargo arriving in Rotterdam is transported onwards to final destinations in Germany and in particular end users located along the Rhine and the Main. Table 82 shows the split of destination by country for iron ore & scrap and coal.

²³⁴ www.portofrotterdam.com

Table 82: Destination of iron ore & scrap and coal cargo arriving in Rotterdam

	Iron ore & scrap	Coal	Important end users
Netherlands	0%	23%	E.On, Essent, Electrabel
Germany	83%	63%	E.On, RAG, RWE, Grosskraftwerk Mannheim, Zentralkokerei Saar, Thyssen Krupp Stahl, Dillinger Hütte, Hüttenwerke Krupp Mannesmann
Belgium	6%	6%	Cocherill Sambre / Arcelor
France	3%	4%	Sollac / Arcelor
UK	0%	4%	Innogy
Austria	3%	0%	Voest Alpine
Turkey, Spain, Taiwan (scrap)	6%	0%	n/a

Totals may not add up to 100 due to rounding.

Source: Calculations based on information provided by HbR on 5 July 2004.

For agribulk, the most important destinations are end users in the Netherlands, Germany, other European countries and the Middle East. For other dry bulk, it is mainly end users in the Netherlands and Germany.²³⁵

According to HbR, the German steel industry and power plants are the most important customers for all ARA ports and therefore also for Rotterdam.²³⁶ Figure 17 shows some of the most important locations of the German steel industry. The density of steel mills is higher in the western part of Germany than it is in the north and the east. Also, most steel mills in the western part of Germany are located on inland waterways and thereby linked to the Rhine. This can be seen by comparing Figure 17 and Figure 18, which displays the German inland waterway system.

²³⁵ Information received from HbR on 5 July 2004.

²³⁶ Information provided by HbR on 26 October 2004.

Figure 17: Location of the most important steel production facilities in Germany



Source: http://www.stahl-online.de/english/business_and_politics/companies_and_markets/steel_companies_germany.htm.

Figure 18: The German inland waterway system



Source: http://www.binnenschiff.de/downloads/karten_wasserstr/bundeswasserstrassen.pdf

The location of many end users of dry bulk cargo along the river Rhine and its affluents provides a competitive advantage to the ARA ports compared to, for example, the German ports. From Hamburg, steel production sites in the northern and eastern parts of Germany (e.g. Peine and Salzgitter) can in principle be reached relatively easily by inland waterway transport over the Elbe and the Elbe-Seiten-Canal. Still, most of the bulk ore and coal shipped through Hansaport, the largest German dry bulk operator who is located in Germany, is transported to the hinterland by rail.²³⁷ It is widely known that e.g. Deutsche Bahn, the German railway operator, offers lower prices for cargo shipments from the German ports than from other ports in the ARA range.²³⁸ In addition, the majority of iron ore throughput of Hansaport is not destined to steel plants along the Rhine, but is transported to the steel plants of Salzgitter AG in the north of Germany.²³⁹ Many of the agribulk and other dry bulk operators in Hamburg also seem to focus more on Northern and Eastern Germany than the Western part.²⁴⁰ This indicates that, although there may be some small overlap, Hamburg and the German ports in general serve a different hinterland region than the ARA ports.²⁴¹

It is widely acknowledged that the western part of Germany and the Benelux countries belong to the hinterland region of all ARA ports. This is not necessarily dependent on the same access to inland waterways. For example, Antwerp has traditionally been a rail port, also for the hinterland transport to Germany. In Antwerp, only about 31% of all ores and coal are shipped to the hinterland by barge, compared to almost 80% in Rotterdam. Rail accounts for 55% and road transport for 14% in Antwerp.²⁴² This change in the modal split can be explained by the fact that for a very long time, Antwerp did not have a direct link with the river Rhine. The opening of the Scheldt-Rhine Canal has changed this and drastically reduced transport time from Antwerp to the Rhine and Moselle areas, which has led to higher growth of pushbarge hinterland transport in Antwerp.²⁴³

The port of Duisburg performs an important hub function in the hinterland of the ARA ports. This is for example reflected by the fact that the port authority of Amsterdam has a strategic alliance with the port of Duisburg and holds a stake in an inland coal terminal in Duisburg in order to improve its logistical chain.²⁴⁴ [Confidential]

9.5 Structure of harbour dues and other relevant prices

As already mentioned, dry bulk is usually shipped in tramp vessels, i.e. vessels that are chartered on a case-by-case basis and do not follow a specified schedule of calls. In

²³⁷ <http://www.hafen-hamburg.de/html-engl/handbook/3.4.html>

²³⁸ Interview with [confidential], 6 July 2004.

²³⁹ <http://www.hafen-hamburg.de/html-engl/handbook/3.4.html>

²⁴⁰ See e.g. <http://www.neuhof-hafen.de/besonder.html>.

²⁴¹ For a detailed discussion of the overlap in hinterland between the German and the ARA ports, see Section 7.

²⁴² “Port of Antwerp – The dry bulk alternative in the heart of Europe”, p. 6.

²⁴³ “Port of Antwerp – Mainport for the 21st century”, p. 13.

Rotterdam, there are two tariffs for sea-going tramp vessels, depending on whether less or more than 133.2% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the quantity of cargo moved in Rotterdam is equal or higher than 133.2% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 133.2% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

Table 83: Tariff for tramp vessels (Tariffs TS1 and TS2)

Share of the GT ²⁴⁵ of the vessel that is loaded and/or discharged	Tariff structure
133.2% or more	€0.858 per GT of vessel
Less than 133.2%	€0.271 per GT of vessel + €0.441 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

In the very rare occasion that a sea-going dry bulk vessel operates in liner service, a different tariff applies. Again, there are two tariffs for non-container liner vessels, depending on whether less or more than 62.1% of the GT of the vessel are loaded and/or discharged in the port of Rotterdam. If the quantity of cargo moved in Rotterdam is equal or higher than 62.1% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 62.1% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

Table 84: Tariff for liner vessels (Tariffs LS1 and LS2)

Share of the GT ²⁴⁶ of the vessel that is loaded and/or discharged	Tariff structure
62.1% or more	€0.518 per GT of vessel
Less than 62.1%	€0.260 per GT of vessel + €0.416 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

²⁴⁴ <http://www.amsterdamports.com/smartsite440.dws?highlight=100117105115098117114103>

²⁴⁵ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

²⁴⁶ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

The relevance of the liner tariff is only marginal. According to HbR, only some combination vessels that carry general cargo together with a parcel of dry bulk are charged according to the liner tariffs. The general irrelevance of liner tariffs for dry bulk is shown in Table 85, which presents the split of total dry bulk throughput by the tariff applied to the vessel call.

Table 85: Split of dry bulk throughput by tariff applied to the vessel call

Tariff Code	Share of throughput
LS1	0.03%
LS2	0.04%
TS1	78.29%
TS2	21.63%
Total	100.00%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on information provided by HbR on 26 October 2004.

In principle, the same tariff applies to all dry bulk shipments, irrespective of the actual cargo (i.e. there is no differentiation between coal and iron ore for example). However, there are special frequency reductions available for agribulk vessels larger than 10,000 GT that are charged according to the tramp vessel tariffs. The frequency reduction is related to the number of calls per line (not per individual ship) and re-imbursed upon request. The reduction ranges from 10% (minimum of 6 calls per year) to a maximum of 25% for calls 51 and more per year. Table 86 shows the details of this reduction scheme.

Table 86: Frequency reduction for agribulk vessels $\geq 10,000$ GT charged according to tramp vessel tariff (TS1 or TS2)

Calls a year	Reduction	Per call
1 – 5	None	
6 – 10	10%	(also for call 1 to 5)
11 – 20	10%	For call 1 to 10
	15%	For call 11 to 20
21 – 50	10%	For call 1 to 10
	15%	For call 11 to 20
	20%	For call 21 to 50
51 – >	10%	For call 1 to 10
	15%	For call 11 to 20
	20%	For call 21 to 50
	25%	For call 51 and more

Source: Port of Rotterdam Tariffs 2004

According to HbR, there are generally no discounts granted in the dry bulk business other than the frequency reductions for agribulk vessels. However, for agribulk and other dry bulk, incentives are granted on an exceptional basis for new cargo volumes brought to Rotterdam or moved to Rotterdam from other ports.²⁴⁷ HbR did not provide us with any details on these exceptional discounts and we could therefore not analyse them further but rely on published harbour dues for all ports. Note however that the granting of discounts for agribulk and other dry bulk is consistent with the responses we received to our user survey.

9.6 Benchmarking

9.6.1 HARBOUR DUES

In order to address the cellophane fallacy issues as well as to get a first indication of pricing power, we compare the harbour dues per ton. As discussed in Section 4, the basic service of providing port infrastructure such as quay walls, jetties and roads does not differ significantly between ports, which means that higher pricing of the port of Rotterdam would be an indication of pricing power relative to the relevant alternative ports.²⁴⁸ Note, as argued in Section 2.5 that the reverse conclusion is not possible. If prices do not differ, that is, this may reflect that current prices are competitive. However, it is also consistent with ports operating in different relevant markets and having pricing power or with collusion among ports.²⁴⁹

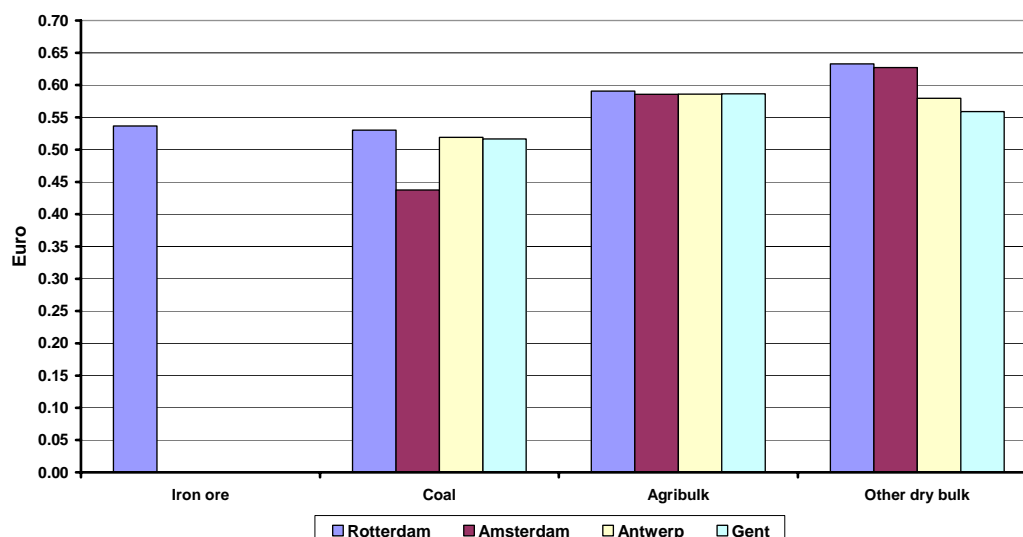
HbR has provided us with comparative information on harbour dues for typical vessels for dry bulk. These statistics show the harbour dues per ton for the main alternative ports as perceived by HbR.

²⁴⁷ Information provided by HbR on 26 October 2004.

²⁴⁸ Higher prices at the port of Rotterdam may also reflect different policies regarding the financing of investments. Pricing power relative to competing ports does not have a direct implication for an assessment of welfare in a dynamic context.

²⁴⁹ Note that – as discussed in Section 7 - the benchmarking approach is relatively simple for those cargo types for which comparative pricing data exists and it is meaningful regarding the assessment of pricing power reflected in existing prices. However, it does not answer the question whether there is scope to increase prices (which we address in the following sections).

Figure 19: Dry bulk – harbour dues per ton of shipped cargo for representative ships in selected alternative ports in 2003



Source: CRA calculations based on data provided by HbR on 16 July 2004.

The figures that received suggest that harbour dues in Rotterdam are higher than in the main alternative ports for coal, agribulk, and other dry bulk. Table 87 shows the price differences compared to Rotterdam. For agribulk, the difference is marginal. For coal, harbour dues in Amsterdam are significantly lower than in Rotterdam. For other dry bulk, harbour dues in Amsterdam are only marginally lower than in Rotterdam, but dues in Gent and Antwerp are again significantly lower. This suggests that HbR has pricing power with regard to coal and other dry bulk.

Table 87: Price differences in harbour dues per ton of incoming cargo in 2003 compared to Rotterdam

	Iron Ore (145,000 tons)	Coal (55,000 tons)	Agribulk (55,000 tons)	Other dry bulk (30,000 tons)
Amsterdam	N/a	-18%	-1%	-1%
Antwerp	N/a	-2%	-1%	-8%
Gent	N/a	-3%	-1%	-12%

Source: CRA calculations based on information provided by HbR on 16 July 2004.

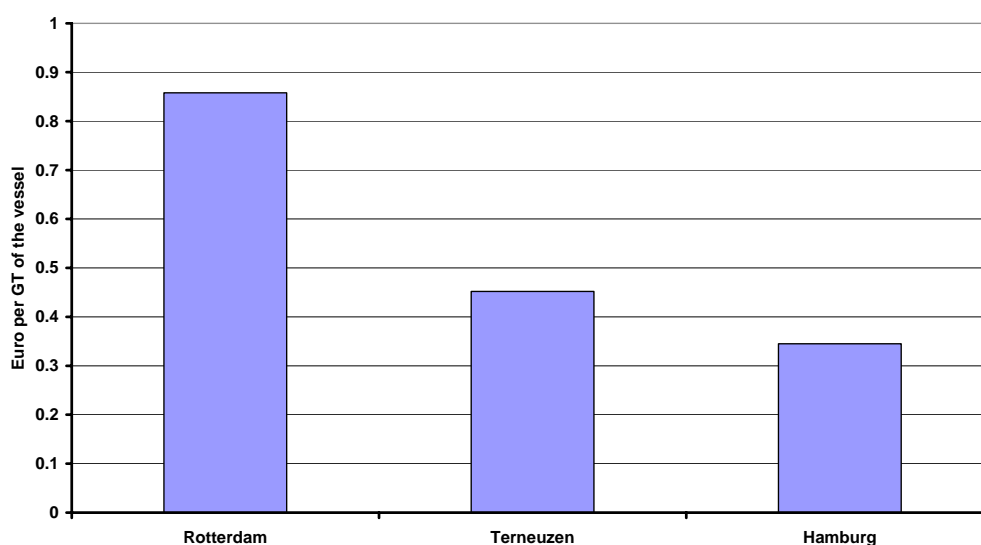
HbR has not provided us with estimates for harbour dues for an iron ore carrier in other ports. Hence, we were not able to conduct a benchmark analysis for this cargo type.

Figure 20 shows harbour dues for dry bulk vessels in Rotterdam, Hamburg and Terneuzen. The fees are taken from the ports' published price lists and apply to tramp vessels (for Terneuzen: iron ore, coal and mineral vessels) per GT. Hamburg has two different tariffs for

seagoing tramp vessels coming from or going to overseas, depending on whether the ships are smaller or larger than 4,000 GT. For all dry bulk cargo types, vessels are usually larger than this threshold, which means that a tariff of €34.50 per 100 GT applies, i.e. €0.345 per GT (note that the tariff for vessels smaller than 4,000 GT is even lower, namely €0.248 per GT). In Terneuzen, tariffs are structured similar to Rotterdam: harbour dues for dry cargo vessels are set at €0.452 of the vessel's GT or at €0.23 per GT plus €0.199 per ton of discharged/loaded cargo. The tariff leading to the total sum will be charged. Note that this tariff structure implies that a fixed fee per GT will only be charged if the cargo discharged and/or loaded is more than 111.6% of the vessel's GT. In Rotterdam, the threshold is set at 133.2% of the vessel's GT. Irrespective of the size of a vessel, harbour dues in Rotterdam are always higher than in Terneuzen.

For the simulation of harbour dues shown in Figure 20, it was assumed that more than 133.2% of the vessel's GT are discharged and/or loaded, which means that the fixed fee per GT is charged in both Rotterdam and Terneuzen. As can be seen in Figure 20, harbour dues in Rotterdam are significantly higher than in Terneuzen and in Hamburg.²⁵⁰

Figure 20: Simulation of harbour dues for tramp (dry bulk) vessels in 2004 per GT



Source: CRA calculations based on port of Rotterdam Port Tariffs 2004, "Gebührenverordnung für die Hafen- und Schifffahrtsverwaltung" Hamburg and price list published at www.zeeland-seports.com. We assume that the respective vessel is larger than 4,000 GT and that more than 133.2% of its GT are discharged/loaded in the port.

²⁵⁰ HbR pointed out that in addition to harbour dues, shippers also have to pay quay dues when calling at the port of Hamburg, which – according to HbR – has a significant impact on total port call costs in Hamburg. However, HbR also acknowledged that they did not know how these "Kajegebühren" are determined in practice. Further research and a phone conversation with the port of Hamburg revealed that there is indeed an extra charge, a so-called "Anlegegebühr", if vessels moor at a public berth. According to information from the port marketing agency in Hamburg, this extra fee is not charged if vessels moor at a berth that belongs to a terminal. For dry bulk cargo, there are no public quays available in Hamburg, which means that we do not need to consider the "Anlegegebühr" in our analysis. In general, note that this fee for mooring at a public quay would also have to be paid in Rotterdam if dry bulk vessels moored at a public quay.

Table 88 shows the price differences between Rotterdam, Terneuzen and Hamburg. A differential of 47% implies that the port of Terneuzen does not represent any constraints on the pricing of HbR. Together with the findings from the benchmarking study in 2001, the price differentials between Rotterdam and Bremen and Hamburg of around 60% also imply that Rotterdam does not compete with the German ports in the dry bulk business.

Table 88: Difference in harbour dues for tramp (dry bulk) vessels in 2004

	Terneuzen	Hamburg
Difference to Rotterdam	-47%	-60%

Source: Port of Rotterdam Port Tariffs 2004, "Gebührenverordnung für die Hafen- und Schifffahrtsverwaltung" Hamburg and price list published at www.zeeland-seports.com.

The benchmarking analysis suggests that HbR's current pricing for dry bulk services reflects some pricing power for coal and other dry bulk. We were not able to conduct an explicit benchmark analysis for large iron ore vessels. However, iron ore vessels are typically larger than coal vessels. Given Rotterdam's locational advantage and absence of draught restrictions, it can be expected that the pricing power of Rotterdam increases with the size of the vessel. In fact, most other ports in the ARA range employ caps on their harbour dues for larger vessels in order to compensate shippers for the lower draught and extra efforts (lightening, locks, additional sea transport on the river Scheldt).²⁵¹

Besides the "official" port call cost simulations provided by HbR, we also received a benchmark study for the dry bulk sector from the port authority, which was written in 2001 by a student as part of her masters thesis. HbR pointed out that the study is no exclusive study conducted by professionals on behalf of HbR and we therefore do not base any of our conclusions on information contained in this study. However, it is interesting to note that the study also included a price benchmarking for harbour dues for coal shipments through several ARA ports (Rotterdam, Amsterdam, Antwerp and Vlissingen). Price differences between the ports were much more significant for this shipment than in the simulations provided to us by HbR. Table 89 presents the results of the study for illustrative purposes.

²⁵¹ For example, in Antwerp tonnage dues for bulk carriers loading and/or discharging in the port are calculated for a maximum of 85,000 GT. Berthing dues are calculated for a maximum of 115,000 tons (Reglementen en gebruiken van de haven van Antwerpen, p. 38).

Table 89: Price differences in harbour dues per ton of incoming cargo in 2001 compared to Rotterdam

	Coal (150,000 tons)
Amsterdam	-54%
Gent	N/a
Bremen	N/a
Antwerp	-21%
Vlissingen	-15%

Source: CRA calculations based on “Benchmark Droge Bulk”, provided by HbR on 16 July 2004.

Interestingly, the study results confirmed what one would expect: for a larger coal shipment (150,000 tons on a capesize vessel instead of 55,000 tons shipped on a panamax as in the simulations provided by HbR), the price premium in Rotterdam is much more pronounced and ranges from 15% to 54%.

9.7 Cargo flow analysis: Overview

A complementary approach to the benchmarking method is to analyse cargo flows. If for a given origin-destination pair we know the different cost elements in the transport chain for shipping the cargo through alternative ports, we can determine the maximum differential of harbour dues that is possible before the shipper would be indifferent between the destinations (assuming constant quality between ports). If for a given type of cargo a large quantity of cargo flows are captive, in the sense that they would not be moved to another port if harbour dues were to increase by 5%, this would suggest that a 5% price increase would be profitable. The better the available data, the finer an analysis is possible. If the analysis shows that it would not be possible for a port to profitably raise prices, this would suggest that one would have to add competing ports and analyse whether such a price increase would be profitable for them if they were to raise prices jointly (that is, in accordance with the hypothetical monopolist, or “SSNIP” test). This analysis assumes that existing prices do not already reflect market power.²⁵²

²⁵² As discussed before, note that the analysis needs to be complemented – as it is in this report – by a number of further elements, including the analysis of capacity constraints, limited port choice due to draught restrictions, and the presence of network effects. Note that it is not only the capacity of the ports that matter. The relevant bottleneck may also be other relevant infrastructure such as warehousing facilities or hinterland transport connections.

9.7.1 GENERALISED COST

It is generally known that harbour dues (and lease-related prices that could be passed on to port users) only account for a small part of total transport cost. If, for example, the percentage of a shipper's cost for a given cargo/route pair that is "caused" by HbR services is 10%, an increase in HbR's prices of 10% will result in a change in total shipping cost for that cargo/route pair of 1%. Given that the pricing of HbR affects only a small share of total cargo shipment costs that the shipper must pay, he may be less likely to change switch to another port in response to a price increase by HbR. This means that HbR may enjoy higher pricing power.

It is important to keep in mind that there are also other, non-monetary, factors that affect the "cost" of a particular cargo routing, e.g. the time required for a shipment. In order to compare different routings, transport economists sometimes use the concept of "generalised cost", which include all monetary costs of using a route, plus monetary values for other factors, like the time required for the shipment. This means that while the analysis of the monetary factors already indicates that harbour dues are only a very small part of total transport cost, their share is even smaller when the other factors that affect the generalised cost of choosing a particular route are taken into account.

9.8 Cargo flow analysis: Port-related and sea-side costs

Based on the results of the call cost model used by the port authority of Rotterdam, we can confirm the general intuition that harbour dues are only a small part of total transport chain costs. Table 90 shows that harbour dues account for less than 1-2% of total chain costs for dry bulk cargo shipped through Rotterdam. Note that the data in Table 90 excludes cargo handling costs, which means that the share of 1-2% represents an upper bound.

Table 90: Dry bulk – split of transport chain costs in Rotterdam for representative ships and origin destination pairs (excluding cargo handling costs)

Share of total call costs	Iron ore (145,000 tons)	Coal (55,000 tons)	Agribulk (55,000 tons)	Other dry bulk (30,000 tons)
Sea transport	68%	59%	76%	47%
Harbour dues	1%	2%	1%	2%
Other port cost	0%	1%	1%	1%
Hinterland costs	30%	38%	22%	49%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on information provided by HbR on 16 July 2004. Note that cargo handling costs are not included.

According to HbR, cargo handling costs of dry bulk terminals range from €1 to €3 per ton. We took the average of this range (€2) and used it, together with the other data on shipment costs provided by HbR, to estimate total port related costs per ton for the different cargo types and the share of harbour dues. The results are shown in Table 91. It becomes clear that harbour dues also account for only a small share of port-related costs, i.e. the costs of shipping cargo through a particular port including call costs and cargo handling costs, but not considering sea transport costs. Still, due to the fact that discharging and loading of dry bulk is less technical and complicated than for example the discharging and loading of container vessels is, cargo handling costs charged by terminal operators represent a higher share of total port related costs than for other cargo types, especially containers. For dry bulk, their share is about 20%.

Table 91: Estimate of total port related costs per ton and share of harbour dues

	Total port related costs per ton in €	Share of harbour dues
Iron ore (145,000 tons)	2.72	20%
Coal (55,000 tons)	2.82	19%
Agribulk (55,000 tons)	2.90	20%
Other dry bulk (30,000 tons)	3.00	21%

Source: Based on information received by HbR on 16 July 2003. Cargo handling costs are assumed to be €2 per ton of cargo handled based on HbR estimate.

Unfortunately, we did not obtain data that would have allowed us to estimate port related costs at other ports. The already mentioned benchmark study provided by HbR included some data, but we decided not to present it here due to the disclaimers HbR attached to the study. Still, it should be said that based on our analysis of the data contained in this study, there is no evidence that port related costs are necessarily always higher in Rotterdam than in other ports. According to the study, the share of harbour dues in total port related costs is significantly higher for large vessels in Rotterdam than in the other ports. Yet, an increase in harbour dues of 10% in Rotterdam would still be outweighed by a change in other port related costs of 1.4% for agribulk for example. For coal shipped in capsize vessels, the change in other port related costs would have to be 2.3% in order to outweigh a 10% increase in harbour dues.

9.9 Cargo flow analysis: Hinterland transportation costs

Factories processing dry bulk are often located along rivers, mainly for logistical reasons. As a consequence, inland transportation for dry bulk is dominated by barge. This is true not only for Rotterdam, but also for most other ARA ports active in dry bulk. Access to inland waterways was mentioned by industry experts as a crucial qualitative factor for the choice of

port.²⁵³ Rail represents an alternative mode of hinterland transport. It is increasingly used to spread risks, e.g. the risk of low water levels on Europe's rivers during the last summers.²⁵⁴

In an interview with a representative of [confidential], an interesting fact regarding hinterland transport was discussed. In 2003, due to the hot summer, the water level of Europe's inland waterways was very low, which made barge transport of dry bulk from the ARA ports to the German hinterland difficult. As a consequence, the quantity of cargo shipped per barge was reduced in order to reduce the draught of the barges. Also, more cargo was shipped by rail instead of by barge. However, no cargo seems to have been re-routed to other ports as a result, e.g. to Hamburg from where it could in principle have been shipped to Duisburg by rail.²⁵⁵ This shows again that the overlap between the German ports and the ARA ports is only very limited.

According to HbR, the freight rates for the hinterland transportation by barge do not vary for ports in the ARA range, as can be seen in Table 92.

Table 92: Freight rates in inland shipping in €/ton

Destination	In €/ton from ARA ports
Rhine-Ruhr Canal	9.00
Moselle/Saar	15.50
Mannheim	12.50
Upper Rhine	16.80
Neckar	14.00
Mittelland Canal	11.50
Bremen	9.00
Hamburg	13.75
Berlin	13.00
Upper Elbe	19.80
Main	14.50
Main Danube Canal	17.50
Austria	23.00
Slovakia	28.00
Hungary	34.50

Source: HbR (indicative rates, period 5-2 January 200).

²⁵³ Interview with [confidential].

²⁵⁴ Compare "Benchmarking Droge Bulk", provided by HbR on 16 July 2004. The risk of low water levels and subsequent use of railways to ship dry bulk to the hinterland was also confirmed during an interview with [confidential].

²⁵⁵ Interview with [confidential].

The fact that hinterland transport costs from Amsterdam and Rotterdam are the same was confirmed by one respondent to our survey.²⁵⁶

Despite a generally similar cost level, we were pointed to the fact that hinterland transport possibilities differ between the different ARA ports due to qualitative factors. In particular, Rotterdam was reported to have the best inland waterway access due to the absence of locks and its proximity to the Rhine. Also, it benefits from network effects in the sense that the availability of barges is generally higher in Rotterdam than in other ARA ports. This could provide a competitive advantage and some pricing power to HbR.

However, it is again important to take into account that harbour dues account for only a small share of total generalised route costs. This clearly enhances the pricing power of HbR.

9.10 Qualitative differences of ports

According to HbR, Rotterdam owes its position as a main European port for dry bulk to factors such as:

- Rotterdam's excellent accessibility to ocean-going vessels: up to 75 feet with a DWT of 365,000.
- The fact that a single inland vessel can transport up to 15,000 tons of dry bulk in a single haul to and from locations in Germany, Belgium and France.
- Rotterdam's many outstanding facilities for the handling, storage, and processing of any volume.
- The expertise offered by the many specialized shipbrokers, surveyors, laboratories, trading houses, forwarding agents, et cetera that are present in the port.²⁵⁷

The dry bulk benchmarking study that HbR provided us with includes a qualitative assessment of the different ports for the shipment of agribulk and steam coal. In the absence of other qualitative information, we decided to present these results here. Note however that the general findings of the study were already pointed out to us by interview partners and respondents to our survey. Hence, we do not rely on the benchmark study to formulate our conclusions.

In the dry bulk benchmark study, it is notable that the differences in the qualitative assessment of the different ports are marginal for the shipment of agribulk. Rotterdam achieved the lowest scores for hinterland transport by barge (61%) and hinterland transport by rail (55%), but this compares to only 62% and 58% for the leading ports respectively. Still,

²⁵⁶ CRA questionnaire.

²⁵⁷ http://www.portofrotterdam.com/Business/UK/Cargo_and_Terminals/Dry_Bulk/index.asp.

the qualitative analysis shows that for agribulk, Rotterdam does not possess a qualitative advantage over other ports in the ARA range, in particular Amsterdam and Gent.²⁵⁸

The qualitative assessment for steam coal comes to a very different result. Here, Rotterdam is clearly the port with the highest quality score, both for barge and rail transport to the hinterland. Rotterdam achieved a score of 69% for barge transport and 66% for rail transport, which compares to 56% and 55% of the ports on the second place. Table 93 summarises the findings of the qualitative benchmarking. Factors considered ranged from sea accessibility and the availability of parcel services to the quality of terminal operators (access, working hours, quality control etc.) and a general assessment of the hinterland transport options, including proximity to the client.²⁵⁹

Table 93: Result of qualitative benchmarking of dry bulk ports in the ARA range

	Rotterdam	Amsterdam	Gent	Antwerp	Vlissinge
Agribulk					
Barge	61%	62%	N/A	N/A	N/A
Rail	55%	58%	58%	N/A	N/A
Steam coal					
Barge	69%	56%	N/A	52%	47%
Rail	66%	53%	N/A	55%	44%

Source: "Benchmark Droge Bulk", pp. 27 and 42, provided by HbR on 16 July 2004.

The qualitative benchmarking supports the finding that Rotterdam's position is stronger for large vessels than for smaller ships. The benchmarking simulation assumed a shipment of 150,000 tons of steam coal in a capesize vessel, but of only 30,000 tons of agribulk in a panamax vessel. The significantly higher score of Rotterdam, compared to the other ports for steam coal, underlines the finding that Rotterdam is likely to possess pricing power for the shipment of large quantities of cargo in large vessels. Again, this seems to be mainly due to the better sea accessibility of Rotterdam compared to other ports. In the benchmarking study, Rotterdam scored 20 points for sea access for steam coal, while the second best port in this area (Vlissingen) scored only 12 points.

With regard to hinterland transport, one can once again point to the fact that the quality of access to hinterland connections is significantly better in Rotterdam because the port does not have any locks and tidal restrictions like other ports, e.g. Amsterdam. Also, Rotterdam has a better layout, which allows barge shippers to operate more efficiently in the port (swift access and exit without detours and interference with sea going vessels) and the availability of barges is significantly better than in other ARA ports.²⁶⁰ These excellent hinterland

²⁵⁸ "Benchmark Droge Bulk", p. 27, provided by HbR on 16 July 2004.

²⁵⁹ "Benchmark Droge Bulk", pp. 27 and 42, provided by HbR on 16 July 2004.

²⁶⁰ Interview with [confidential].

connections in Rotterdam are one of the reasons why large end-users such as [confidential] ship the majority of their iron ore and coal imports through Rotterdam and have even invested in terminal facilities, even though this ties them to the port and makes them more vulnerable to possible pricing power of HbR.

With regard to rail access, Rotterdam achieved a slightly lower score in the benchmarking study than Gent and especially Antwerp. However, rail access in Rotterdam was judged to be comparable to Amsterdam and even significantly better than in Vlissingen.²⁶¹ Hence, the port of Rotterdam does not seem to have a competitive disadvantage in rail transport based on this study. The construction of the Betuwe railway line that is presently underway, is expected to eliminate, by 2007, any railway bottleneck situations that may currently exist in the port of Rotterdam. This will increase the attractiveness of the port of Rotterdam on this single dimension of hinterland connections on which it is at present inferior to some of its rivals.

9.11 Evidence of switching

HbR was unable to provide us with any evidence of switching between ports for dry bulk in response to a change in harbour dues only. Nevertheless, some respondents to our survey indicated that they have – in the past – reduced dry bulk volume at some port in the ARA range when harbour dues changed relative to the other ports. However, there was only one respondent who was able to provide any details on such an actual switch in the past. A tramp agency in the agribulk business, reduced volume in Rotterdam in 2001 following an increase in harbour dues in Rotterdam. The volume was moved to Amsterdam, where lower harbour dues were offered. In a phone interview following up on the survey, the respondent also pointed to the fact that another price advantage of Amsterdam compared to Rotterdam is that there is a cap on the vessel size, which limits the maximum total of harbour dues that are charged. In Rotterdam, harbour dues are charged per GT of the vessel and (if TS2 is applicable) also the volume of cargo discharged and/or loaded in Rotterdam without an upper limit. According to the respondent, a further important factor for port choice relates to the fact that the port of Amsterdam has a terminal that offers parcel services. Parcel services allow brokers to bundle cargo with volume shipped by others and hence reduce the costs of chartering a vessel.²⁶²

While there is no other specific evidence of switching in the past due to an increase in harbour dues, various respondents did indicate that they have in the past reduced volume at a port in response to increases in total port related costs, i.e. port call costs and cargo handling costs. Switching occurred exclusively between ports in the ARA range, e.g. Rotterdam-Antwerp (other dry bulk), Rotterdam-Moerdijk (other dry bulk), Rotterdam-Amsterdam (agribulk), Rotterdam-Antwerp (iron ore, coal, agribulk, it is not clear to which cargo type the answer related). The only evidence of switching outside the ARA range that we came across

²⁶¹ “Benchmark Droge Bulk”, pp. 27 and 42, provided by HbR on 16 July 2004.

²⁶² CRA questionnaire and phone interview with one respondent on 22 October 2004.

during this study was an attempt of [confidential] to ship its coal and iron ore through Wilhelmshaven instead of Rotterdam in the 1980s. However, this decision was soon reversed as a result of problems with the hinterland transport to Duisburg. Although our interview partner stressed that this shift of volume cannot provide an example for switching today, it does show that the ARA ports are uniquely positioned with regard to the hinterland of western Germany.²⁶³

While, therefore, there does not seem to be much evidence of switching in the past induced by changes in harbour dues, many users of the port of Rotterdam in the dry bulk business that responded to our survey (19 out of 19, that is) stated that they would reduce volume if harbour dues were to increase permanently by 10%. For a change in total shipping cost, 21 out of 24 respondents indicated that they would expect volume in Rotterdam to be reduced.

In terms of the share of volume shifted to other ports following an increase of total port related costs (call costs plus cargo handling costs) by 10%, the simple average of all respondents' estimates ranged from 42% for coal to 23% for iron ore & scrap, again supporting the view that the iron ore business is relatively captive.

For strategic reasons (and in our case possibly also because they give too little regard at first to their possibilities for passing on overcharges to their customers when all their rivals face similar harbour dues), customers often overestimate their response to hypothetical price increases. The absolute values of the switching information provided should therefore be interpreted with care. However, the survey provides valuable indication of the relative importance of rival ports. One question of our questionnaire asked to what extent respondents see other ports in the HLH as possible alternatives for the port of Rotterdam and how they evaluate those ports' quality as a substitute for Rotterdam. The tables below show the results of this question.

²⁶³ Interview with [confidential].

Table 94: Substitute ports for iron ore & scrap respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Antwerp	4	0.8	33%
Amsterdam	5	-0.2	33%
Vlissingen	4	0.3	13%
Gent	0		3%
Zeebrugge	0		3%
Le Havre	0		0%
Dunkerque	0		0%
Wilhelmshaven	0		0%
Bremen/Bremerhaven	0		0%
Hamburg	0		0%
Felixstowe	0		0%
Other (Terneuzen, Moerdijk, Dordrecht and other small ports)	2	-0.5	18%
<i>Total # of respondents</i>	<i>5</i>	<i>5</i>	<i>4</i>

Totals may not add up to 100 due to rounding.

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

Table 95: Substitute ports for coal respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Amsterdam	6	0.3	53%
Antwerp	3	0.3	40%
Gent	1		3%
Zeebrugge	0		3%
Le Havre	0		0%
Dunkerque	0		0%
Vlissingen	4	0.7	0%
Wilhelmshaven	1	2.0	0%
Bremen/Bremerhaven	1	2.0	0%
Hamburg	1	2.0	0%
Felixstowe	0		0%
Other (Terneuzen, Moerdijk)	1	-1.0	0%
<i>Total # of respondents</i>	6	6	3

Totals may not add up to 100 due to rounding.

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

Table 96: Substitute ports for agribulk respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Antwerp	3	1.3	38%
Amsterdam	3	1.7	37%
Gent	2	1.0	12%
Hamburg	2	2.0	9%
Zeebrugge	0		3%
Felixstowe	0		3%
Le Havre	0		0%
Dunkerque	0		0%
Vlissingen	2	1.5	0%
Wilhelmshaven	0		0%
Bremen/Bremerhaven	1	0.0	0%
Other	0		0%
<i>Total # of respondents</i>	<i>4</i>	<i>4</i>	<i>4</i>

Totals may not add up to 100 due to rounding.

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

Table 97: Substitute ports for other dry bulk respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Antwerp	6	1.2	23%
Amsterdam	5	0.6	20%
Wilhelmshaven	2	-0.5	14%
Zeebrugge	2	1.5	11%
Vlissingen	3	1.0	9%
Gent	3	0.7	6%
Hamburg	4	0.0	3%
Felixstowe	1	-2.0	1%
Le Havre	1	-1.0	0%
Dunkerque	1	2.0	0%
Bremen/Bremerhaven	1	-2.0	0%
Other (Moerdijk, Dordrecht, other small ports, North Killingholme)	2	-1.0	13%
<i>Total # of respondents</i>	<i>7</i>	<i>7</i>	<i>7</i>

Totals may not add up to 100 due to rounding.

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

The survey results confirm that the French ports, Le Havre and Dunkerque, are not particularly relevant as competitive constraints to HbR when it comes down to switching business between ports in response to increases in harbour dues. Even if they are mentioned as possible substitutes at all, respondents would not shift any volume to those ports in case of an increase of port related costs in Rotterdam by 10%.

Of the German ports, only Hamburg would receive more than marginal shares of volume of agribulk and Wilhelmshaven of other dry bulk. However, our hinterland and for Hamburg also the benchmarking analysis showed that the German ports do not represent any constraint for harbour dues in Rotterdam.

Other ports that were mentioned by respondents to our survey included Moerdijk, Dordrecht and Terneuzen for iron ore & scrap, coal and other dry bulk. However, our benchmarking analysis has shown that Terneuzen does not seem to constrain the pricing of HbR, even for small vessels. Hence, we do not consider it to be part of the relevant market. With regard to Moerdijk and Dordrecht, as already mentioned, we excluded the ports from this study because the harbour dues set by HbR are applicable in all ports in the Moerdijk/Rotterdam area and hence also in Moerdijk and Dordrecht. Obviously, given that the ports act as one price-setting entity, it does not make sense to assume that the ports of Moerdijk and Dordrecht would represent an alternative to the port of Rotterdam.

One survey respondent also mentioned the British port of North Killingholme as a possible substitute for shipments through Rotterdam. However, according to HbR the overwhelming share of other dry bulk cargo shipped through Rotterdam is destined for the Dutch and German hinterland. Possibilities to ship from the UK further on to the mainland are there, but would again require the services of one of the continental ports in the HLH region for these hinterlands. Although the possible use of smaller vessels would open up some new competitive alternatives, we believe it is justified to ignore competition from UK ports to the mainland destinations. Hence, we do not consider North Killingholme to be in the same market as Rotterdam.

Overall, the results of our survey confirm the remainder of our findings presented in this chapter and lead us to conclude that the relevant markets for the port of Rotterdam include at most Amsterdam, Antwerp and Vlissingen for iron ore & scrap, and Amsterdam and Antwerp for coal. For agribulk, we conclude that the relevant market includes at most Antwerp, Amsterdam and Gent. For other dry bulk, we define the market to include at most Antwerp, Amsterdam, Vlissingen, Gent and Zeebrugge. The following tables show the throughput and market shares of the different ports in these markets in 2003.

Table 98: Relevant market for iron ore & scrap – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	39.9	70%
Amsterdam	10.3	18%
Antwerp	6.9	12%
Vlissingen	0.2	0%
Total	57.3	100%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on HbR Port Statistics and information on the website of the port of Vlissingen.

Table 99: Relevant market for coal – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	24.7	50%
Amsterdam	17.0	34%
Antwerp	7.7	16%
Total	49.4	100%

Totals may not add up to 100 due to rounding.
Source: CRA calculations based on HbR Port Statistics.

Table 100: Relevant market for agribulk – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	10.8	44%
Amsterdam	9.7	39%
Gent	2.8	11%
Antwerp	1.3	5%
Total	24.6	100%

Totals may not add up to 100 due to rounding.
Source: CRA calculations based on HbR Port Statistics.

Table 101: Relevant market for other dry bulk – upper bound

	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	10.6	29%
Amsterdam	7.7	21%
Antwerp	10.1	27%
Gent	6.3	17%
Zeebrugge	1.5	4%
Vlissingen	0.9	2%
Total	37.1	100%

Totals may not add up to 100 due to rounding.
Source: CRA calculations based on HbR Port Statistics and information on the website of the port of Vlissingen. For Vlissingen, throughput data for other dry bulk had to be estimated due to different classification systems used by the port authority. We distributed all dry bulk cargo not accounted for by iron ore & scrap and coal equally between agribulk and other dry bulk to both agribulk and other dry bulk

Clearly, market shares of 70% for iron ore & scrap and 50% for coal indicate that HbR has market power for these two cargo types. This is in line with our finding that in general HbR has more pricing power the larger the vessels are that are used for a shipment. The largest dry bulk carriers are indeed used for the shipping of iron ore and coal. As already mentioned, at least about 62% of all iron ore & scrap and 11% of all coal vessels calling in Rotterdam have a draught of more than 16.5 metres and are thus captured in the port of Rotterdam.

For agribulk, a market share of 44% also implies that HbR is likely to have market power for the setting of harbour dues. For other dry bulk, where Rotterdam's market share is 29%, this is less evident. However, our benchmarking analysis showed significant premiums of harbour dues in Rotterdam compared to other ARA ports. Still, the less clear-cut findings for agribulk and other dry bulk are in line with the fact that for these cargo types, smaller vessels are more commonly used than for iron ore and coal, the two most important dry bulk cargo types in terms of throughput and generated revenues for HbR.

9.12 Capacity expansion plans

There do not appear to be any capacity shortages in the large ports for the handling of dry bulk. This is particularly relevant for coal, where imports are expected to continue to grow in the future, due to the closure of mines in Germany and other European countries. However, terminal operators seem to prepare for these developments.

In Rotterdam, EECV recently opened an additional coal terminal which is intended to handle about 5.5 million tons of coal each year.²⁶⁴ The final destination of this coal is the steel industry in Germany. The two other large coal terminal operators – EMO and EBS – also expanded or realised new loading and unloading facilities.²⁶⁵

In Amsterdam, two coal transshipment companies recently expanded, which will increase port transshipment capacity by 3.3 million tons and add storage capacity for over half a million tons. According to the port authority of Amsterdam, the expansion is intended to meet increasing demand for coal imports of the German industry.²⁶⁶

According to HbR, there are plans to increase the maximum draught in the Amsterdam ports to 17.5 metres in 2005 and to increase the maximum draught in Vlissingen to 17 metres (timing unknown).²⁶⁷ If these expansion plans are realised, this would provide shippers with a deep-draught alternative to Rotterdam in the ARA range and may therefore reduce HbR's pricing power. However, other qualitative factors such as the level and availability of hinterland connections are likely to remain. The same applied to the captive volume of major

²⁶⁴ www.eecv.nl

²⁶⁵ HbR Annual Report 2003, p. 10.

²⁶⁶ www.amsterdamports.nl

²⁶⁷ However, the timing of this expansion is unclear (information provided by HbR on 26 October 2004).

customers due to investments in facilities at the port (e.g. Thyssen Krupp and electricity companies), which is another factor leading to pricing power for HbR in the dry bulk sector, especially for iron ore and coal.

9.13 Trends

One significant trend in the dry bulk business seems to be the concentration and vertical integration of cargo owners (especially for coal and iron ore), who get involved in the actual shipping and cargo handling. Such a trend has been indicated by several industry experts. However, this trend has set in quite some time ago already. For example, the EECV terminal in Rotterdam was opened in the 1970 by a group of German steel companies in order to increase their control over the handling of their coal and iron ore imports.²⁶⁸

Another trend in dry bulk that has already been mentioned are parcel services, which allow brokers and agents to bundle their cargo with that of others and thereby realise economies of scale. Parcel services are likely to be more relevant for agribulk and other dry bulk (due to the lower volumes being shipped in these categories) than for iron ore and coal, where end-users usually import large quantities anyway. Currently the only parcel service provided by a terminal operator in the ARA range is located in Amsterdam. However, in Rotterdam several shippers and carriers offer parcel services for coal and minerals. In any case, it seems unlikely that the increased use of parcel services would reduce the pricing power of the port of Rotterdam, given that bundling cargo volumes could mean using larger vessels, for which Rotterdam might be the qualitatively best port to call at. Nevertheless, both developments – continued vertical integration and the increased use of parcel services – may well be long-term strategic reactions of port users to the dominant position of port authorities, for they are likely to increase their bargaining power if they are successful in the vertical and horizontal integration of production in the ports.

²⁶⁸ www.eecv.nl

10 Liquid bulk

10.1 Overview

Wet bulk accounts for almost half of total throughput (153 million tons in 2003) in Rotterdam and about half of HbR's total revenue from harbour dues (€101 million out of €201 million). Lease related revenue is below the throughput share and represents only 30% of total lease related income (€52 million out of €175 million).²⁶⁹ The importance of wet bulk is underpinned when looking at space utilisation at the port. In the port of Rotterdam, 2,400 ha of land are leased by the petrochemical sector (55% of the total port area).²⁷⁰

Table 102 shows that about two thirds of the liquid bulk throughput but only 15% of the number of calls in that sector are generated by crude oil. This reflects the size of the ships. On average oil tankers have a throughput of some 79,000 tons per call, oil products 20,000 and liquid chemicals 17,000 tons per call.

Table 102: Liquid bulk throughput and calls in Rotterdam in 2003

	Number of total calls	Share of calls	Cargo throughput in tons	Share of throughput
Crude oil	1,266	14%	99,825,848	65%
Oil products	1,365	15%	27,448,529	18%
Liquid chemicals	6,365	71%	25,235,432	17%
Total	8,996	100%	152,509,809	100%

*Totals may not add up to 100 due to rounding.
Source: HbR documents received on 22 July 2004*

10.1.1 CRUDE OIL

Rotterdam is by far the largest crude oil port in the HLH range, accounting for 55% of the incoming crude oil. The next largest crude oil ports are Le Havre, with 20% and Wilhelmshaven, with 15% share in total crude oil throughput in the HLH. Antwerp and Dunkerque follow with 4% each.

²⁶⁹ Note that total lease related income also contains €35m revenues from industries and service providers not allocated to a particular cargo type. Thus, it is to be expected that the share in lease revenue is lower.

²⁷⁰ This is not always seen as an advantage. Given that the leases involved mostly storage companies relocating from other parts of the port to Maasvlakte I and Europoort, it is sometimes felt that the contracts did not add any significant value to the port. Today, "the port is loaded with oil companies" and there is not enough free space to accommodate the container business adequately (Interview with HbR on 5 July 2004).

The market shares can be explained by the location of the refineries. About half of the 100 million tons crude oil coming into Rotterdam in 2003 is consumed by the refineries located at or near the port. About a third is pumped through a pipeline to refineries based in Antwerp. Another 16% is pumped through the Rotterdam-Rhine pipeline to refineries in Venlo, Wesel, Gelsenkirchen, Godorf and Wesseling. Two of the German refineries are also linked with a pipeline to Wilhelmshaven. Both ports, Rotterdam and Wilhelmshaven therefore share customers, namely the two refineries in Germany, Shell and Ruhröl.

Le Havre is also connected to a pipeline but does not share any customers linked to the pipeline with Rotterdam. This, together with the differences in inland waterways, puts it in a different geographical market in liquid bulk.

The choice of Wilhelmshaven, Le Havre and Rotterdam as locations for pipelines can be explained by the fact that these are deep-sea ports. The larger vessels that ship crude oil from the Middle East require depths of up to 25 metres, which only these ports can handle (see Section 7.10 for a discussion of the tidal constraints).

The pipeline from Wilhelmshaven to the German refineries operates close to capacity. At the same time harbour dues in Wilhelmshaven are significantly lower than those in Rotterdam. Rotterdam is also reported to charge ten times higher harbour dues than Antwerp, which does not provide comparable sea-side access.²⁷¹

This evidence suggests that with regard to port users in the crude oil segment, the port of Rotterdam constitutes the relevant geographic market.

This conclusion is confirmed by the survey responses, which suggest that crude oil is the most captive cargo type handled in the port. A number of survey respondents also pointed to the ongoing competition case against HbR, which is backed by the large oil refineries. In this case, several dry bulk agencies claimed that the port of Rotterdam charges excessive and discriminatory harbour dues to oil tankers. In a preliminary ruling, the Rotterdam District Court found that for oil tankers, the geographic market for port services is the port of Rotterdam. According to the Court, the fact that the majority of refineries are located in Rotterdam means that – at least in the short and medium term – other ports do not represent a reasonable alternative to Rotterdam. In order to supply the refineries, tankers must call at Rotterdam. Pipelines do not represent a feasible alternative, due to their limited capacity.²⁷²

The perception of the port users is exemplified by the reasons given for the higher harbour dues at Rotterdam. One respondent pointed to the “monopoly position of Rotterdam” another complained that “oil tankers are cash cows” for the port.

²⁷¹ Interview with [confidential] on 8 July 2004.

²⁷² Rechtbank Rotterdam court decision of 28 November 2002, reference 106848/98-3016/HA ZA. Note that the Court did not decide whether HbR’s prices were discriminatory or not, but deferred the decision until more and clearer information about HbR’s accounts would be available. The case is still pending.

10.1.2 MINERAL OIL PRODUCTS AND OTHER LIQUID BULK

Mineral oil products and other liquid bulk (chemicals as well as oils and liquid fats) are also to a large extent considered as captive cargo. The large petrochemical cluster at the port requires chemicals and oil products as input and produces them as output. A similar structure prevails for oils and liquid fats. Rotterdam is also used for shipments to the hinterland.

Rotterdam offers the largest petrochemical cluster in the HLH range and has a strong position regarding oils and liquid fats. Rotterdam handles 60% of “other liquid bulk” and the next largest port in this segment, Antwerp handles only 17% followed by Gent, Hamburg and Amsterdam with 5% each.

A similar ranking, albeit with more evenly distributed shares, emerges for mineral oil products. Rotterdam has the highest share in the HLH with 29%, followed by Antwerp with 22%. Amsterdam has a share of 12%, followed by Wilhelmshaven with 9%, Le Havre with 8%, and Zeebrugge and Dunkerque with 6% each.

Mineral oil products are also to a large extent pumped to the hinterland. About 50 percent of the mineral oil products destined for the hinterland are shipped via pipelines, the remainder via waterways. Other liquid bulk is mainly shipped via inland waterways, of which about 75% by barge. The high share of barging puts the ports in the ARA range in a strong position as they are best positioned to service clients in the petrochemical industry along the river Rhine.

Our hinterland analysis is confirmed by the survey responses. The only other port that was mentioned as a potential substitute to Rotterdam was Antwerp, suggesting an upper bound on the relevant market that includes Antwerp.

We were unable to obtain benchmarks for harbour dues of mineral oil products or chemical products. None of the respondents could present evidence of switching in response to an increase in harbour dues. Based on the hinterland transport analysis, the exclusive mentioning of Antwerp as the only potential substitute port and the strong role of the existing industry located at the port, we conclude that the upper bound on the relevant geographic market is Rotterdam and Antwerp. Given the dependence of the industry on industry located near or in the port, we conclude that Rotterdam has substantial pricing power.

10.1.3 MARKET DEFINITIONS AND MARKET POWER

Based on the available evidence, we find the following geographic market definitions:

- Crude oil: Rotterdam is the relevant geographic market;
- Mineral oil products: Rotterdam as a lower bound and Rotterdam and Antwerp as an upper bound; and

- Other liquid bulk: Rotterdam as a lower bound and Rotterdam and Antwerp as an upper bound.

Table 103: Throughput and market shares for mineral oil products and other liquid bulk in the market Rotterdam-Antwerp in 2003

	Mineral oil products		Other liquid bulk	
	Throughput in 2003 in million tons	Market share in 2003	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	27.5	56%	25.2	78%
Antwerp	21.2	44%	7.1	22%
Total	48.7	100%	32.3	100%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on HbR Port Statistics 2003.

Table 103 shows the market shares of Rotterdam and Antwerp. Rotterdam is by far larger with respect to “other liquid bulk”. This is more a reflection of the strong position of Rotterdam in chemicals and oil and fats than of Antwerp being a small player. In fact Antwerp is considered as an important specialty chemicals market. With regards to mineral oil products the throughput difference is much less significant. This reflects not least that Antwerp also hosts a number of large refineries. Based on our analysis we find that Rotterdam has market power in all for all types of liquid bulk cargo.

10.2 Port users

Rotterdam has a significant petrochemical sector in the port. This sector builds on a cluster of crude oil storage facilities, refineries, and petrochemical industry. Different types of crude oil are supplied by ship to the tank parks on the Maasvlakte and in Europoort, where they are stored and then piped on to the refineries for processing. Crude oil is refined and turned into fuels (e.g. gasoline, diesel or jet fuel), naphta and/or aromatics. These products, in turn, are processed further in order to eventually become plastics, elastomers, fibres, resins, or coatings.

There are four oil refineries, which located at the port in the period 1948 to 1965:

- Nerefco (Netherlands Refining Company) is a joint venture of BP (69%) and Texaco (31%). It has a capacity of about 18m tons per year. First operations at Pernis were established in 1948. The Europoort location was built 1965. At Pernis the process units were closed down in 1997, but there is still a tank truck loading rack and 3 jetties for barge loading. The production site is Europoort with a size of 350 hectares with the process units and oil movement activities. Nerefco processes different types of crude out of 57 countries. The output is LPG, benzine, naphta (direct via pipeline to

Germany), kerosine (direct pipeline to Schiphol airport and German airports), diesel, ultra low sulphur diesel.²⁷³

- Shell (Shell Nederland Raffinaderij) operates refineries at Pernis and petrochemical plants at Pernis and Moerdijk. The refineries have a capacity of about 20m tons. The tentant contracts for the large sites were concluded in 1948 and 1959. Some of the refined products (mostly based on crude oil) are used as input for the chemical plants, which in turn may be inputs for other chemical plants or lead to plastics cosmetics and other products. Moerdijk and Pernis are linked by pipeline, which in turn is linked to Schiphol and customers in Germany.²⁷⁴
- Kuwait Petroleum Europoort is a refinery and an international distribution centre for Q8 lubricants and fuels. The refinery has a capacity of about 2m tons. As the other refineries, Kuwait Petroleum Europoort uses the terminal facilities offered, for example, by the Maasvlakte Olie Terminal.
- Esso (Esso Opslag Maatschappij) operates a refinery with a capacity of about 10m tons at Botlek. The refineries produce or handle a range of products including LPG, gas, naphtha, kerosene, diesel, oil, domestic fuel oil, sulfur, petroleum cokes and various raw materials for the chemical sector.

There is also a gas condensate splitter by Koch (Koch Industries Inc.) based in Europoort. Up until now, the installation used gas condensates but increasing use of crude oil as feedstock is planned. The refinery produces mainly naphtha and kerosene and gas oil out of natural gas condensates. The naphtha is a feedstock for the chemical industry and is transported by inland barge to, for example, Antwerp, Vlissingen and Geleen. The kerosene is pumped by pipeline to Schiphol Amsterdam Airport. The storage and logistics of products and feedstock is done by the neighboring terminal Vopak Europoort.²⁷⁵

Altogether there are 44 petrochemical companies, 3 producers of industrial gases, 13 tank storage and distribution companies, 5 utilities centres, specialised warehousing, tank cleaning companies, waste incineration and disposal.²⁷⁶ The companies are linked to a petrochemical cluster. The firms in the port of Rotterdam are linked by an extensive 1,500km intercompany-wide pipeline network, which allows the transfer of liquid bulk between plants. The products produced at the port are then shipped to other ports or into the hinterland.

It is interesting to note that the majority of the main chemical producers in Rotterdam are of American origin, with headquarters in the United States. In contrast, Antwerp has attracted more of the chemical industry originating from Germany.

²⁷³ <http://www.nerefco.nl/pages/english/nerefcoenglish.htm>.

²⁷⁴ <http://www.shell.com>.

²⁷⁵ http://www.portofrotterdam.com/news/UK/Pressreleases/Pressreleases/HBR_10092004_01.asp?ComponentID=58034&SourcePageID=0

²⁷⁶ Documents received from HbR 12 July 2004.

Table 104 shows the throughput and HbR average revenue per ton and per square metre of four refineries located at the port. Note that the data on Shell and Nerefco includes the terminals that belong to these companies, whereas the data on Esso and Kuwait excludes terminals as they have shareholdings in terminals, which are listed separately in Table 105. This explains why Shell and Nerefco alone account for €46 million of annual revenue for the port and why the data on these two refineries shows more revenue per square meter but less per ton.

Table 104: Throughput of and HbR revenues from the refineries²⁷⁷ (2003)

	Shell (incl. Terminal)	Nerefco (incl. Terminal)	Esso	Kuwait	Weighted Average Esso and Kuwait	Share²⁷⁸ Esso and Kuwait
Location	Pernis/ Europoort	Pernis/ Europoort	Botlek	Europoort		
Total throughput (m tons)	22	15	3	1		
Lease payment per ton (€/ton)	0.45	0.40	1.17	2.10	1.40	62%
Harbour dues per ton (€/t)	0.82	0.82	0.57	0.62	0.60	27%
Total revenues per ton (€/ton)	1.27	1.22	1.73	2.72	2.25	100%
Total revenues per sqm	5.12	5.71	2.69	2.51	2.58	

Source: Documents provided by HbR on 22 July 2004 and CRA calculations.

On average, for the two refineries where the data excludes terminal operations lease payments account for 62% of the revenues per ton. As shown in the next table, the share of lease payments is reduced for terminals that are mainly engaged in storage. Here 90% of the revenue stems from harbour dues. As the oil terminals are usually the point of call for incoming crude oil they are more important in terms of revenue generated. They accounted for €67 million revenue in 2003. Clearly, this revenue is also derived from the fact that the refineries that own and use the terminals are located at the port.

²⁷⁷ Shell (Shell Nederland Raffinaderij), Nerefco (Netherlands Refining Company), Esso (Esso Opslag Maatschappij), Kuwait (Kuwait Petroleum Europoort).

²⁷⁸ Share of revenue type per ton in total revenues per ton.

Table 105: Throughput of and HbR revenues from large oil terminals²⁷⁹ (2003)

	MOT	MET	TEAM	Average	Share²⁸⁰
Total throughput (m tons)	30	17	22		
Lease payment per ton (€/ton)	0.11	0.09	0.08	0.09	10%
Harbour dues per ton (€/t)	0.87	0.87	0.83	0.85	90%
Total revenues per ton (€/ton)	0.97	0.96	0.91	0.95	100%
Total revenues per sqm	24.19	24.88	28.58	25.88	

Source: Documents provided by HbR on 22 July 2004 and CRA calculations.

Other liquid bulk comprises, apart from chemical products, oils and fats. About half of the ten million tons other liquid bulk throughput at Rotterdam stems from edible oils, a third of the EU's total imports. For palm oil the market share of Rotterdam is about 50%.

Tropical oils, like palm and coconut oil, as well as soya, rape and sunflower oil are partly trans-shipped directly board-to-board into inland vessels and partly stored by Vopak Vlaardingen, Koole Pernis, Maastank and Maassilo. Moreover, some 3 million tons of oil seeds are coming into the port to be processed, by five crushers and a number of refineries, into crude and refined vegetable oil, with meal and shot as by-products. Europoort hosts the largest European crushing plant with an annual capacity of 2,3 million tons. Rotterdam also offers intermediate storage that is indispensable for companies that import and export large quantities of oil.²⁸¹ Rotterdam has four independent and specialised tank storage companies, with a total storage capacity of over 800,000 m³. There will soon be four refineries in the port and its immediate vicinity: KOG, IOI/Loders Croklaan, Cargill and Golden Hope/Unimills, with a total annual capacity of 2 million tonnes. Some major processors of edible oils operate alongside (e.g. Unilever Bestfoods, Lever Faberge, ICI Uniqema, ADM Europoort), as well as many service providers, such as inspectors and laboratories.²⁸²

10.3 Structure of harbour dues and other relevant prices

Rotterdam has a specific tariff for crude oil tankers (whether or not in liner service). There are two tariffs for sea-going mineral oil tankers, depending on whether less or more than 173.1% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the weight of

²⁷⁹ MOT (Maasvlakte Olieterminal, joint venture of several oil companies and oil terminal operators), MET (Maatschappij Europoort Terminal), TEAM (Terminal owned by Texaco, Esso and Aramco)

²⁸⁰ Share of revenue type per ton in total revenues per ton.

²⁸¹

http://www.portofrotterdam.com/news/UK/Pressreleases/Pressreleases/HBR_15012004_04.asp?ComponentID=57192&SourcePageID=0

²⁸²

http://www.portofrotterdam.com/news/UK/Pressreleases/Pressreleases/HBR_15042004_01.asp?ComponentID=56407&SourcePageID=0

oil moved in Rotterdam is equal or higher than 173.1% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of weight moved in Rotterdam is lower than 173.1% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

Table 106: Rotterdam tariff for crude oil tankers (Tariff TT)²⁸³

Share of the GT ²⁸⁴ of the vessel that is loaded and/or discharged	Tariff structure
173.1% or more	€1.456 per GT of vessel
Less than 173.1%	€0.653 per GT of vessel + €0.464 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

Table 107 shows that Wilhelmshaven has a similar fee structure, albeit generally on a lower level and with an additional discounts if the shipper or carrier calls often at the port.

Table 107: Wilhelmshaven tariff for crude oil tankers coming from outside Europe

Number of calls per year of carrier or shipper's vessels	Tariff structure (harbour dues and quay dues)
less than 6	€0.32 per GT of vessel + €0.32 per metric ton loaded and/or discharged
6 to 10	€0.256 per GT of vessel (20% discount) + €0.32 per metric ton loaded and/or discharged
11 to 15	€0.192 per GT of vessel (40% discount) + €0.32 per metric ton loaded and/or discharged
More than 15	€0.16 per GT of vessel (50% discount) + €0.32 per metric ton loaded and/or discharged

Source: Tarif für den Hafen Wilhelmshaven 3. März 2004 in der Fassung 17. Juni 2004.

For vessels from Europe, the harbour dues are €0.17 per GT. The same discount structure applies. The fees per metric ton loaded and/or discharged remain €0.32.

In Rotterdam, all other liquid bulk is usually charged according to the general tramp vessel tariff. Tramp vessels are vessels that are chartered on a case-by-case basis and do not follow a

²⁸³ Tankers that are exclusively loading crude oil are charged a lower tariff of 0.527 per GT of the vessel. The share of crude oil loaded in total throughput is negligible (below 0.1 percent). (Information provided by HbR 16 September 2004.

²⁸⁴ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

specified schedule of calls. In Rotterdam, there are two tariffs for sea-going tramp vessels, depending on whether less or more than 133.2% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the quantity of cargo moved in Rotterdam is equal or higher than 133.2% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 133.2% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

Table 108: Tariff for tramp vessels (Tariffs TS1 and TS2)

Share of the GT ²⁸⁵ of the vessel that is loaded and/or discharged	Tariff structure
133.2% or more	€0.858 per GT of vessel
Less than 133.2%	€0.271 per GT of vessel + €0.441 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

Should a sea-going wet bulk vessel operate in liner service, a different tariff is applicable. Again, there are two tariffs for non-container liner vessels, depending on whether less or more than 62.1% of the GT of the vessel are loaded and/or discharged in Rotterdam. If the quantity of cargo moved in Rotterdam is equal to, or higher than 62.1% of the vessel's GT, the applicable tariff is a fixed fee per GT of the vessel. If the share of quantity moved in Rotterdam is lower than 62.1% of the vessel's GT, an additional fee per metric ton of moved cargo is levied.

Table 109: Tariff for liner vessels (Tariffs LS1 and LS2)

Share of the GT ²⁸⁶ of the vessel that is loaded and/or discharged	Tariff structure
62.1% or more	€0.518 per GT of vessel
Less than 62.1%	€0.260 per GT of vessel + €0.416 per metric ton loaded and/or discharged

Source: Port of Rotterdam Tariffs 2004

²⁸⁵ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

²⁸⁶ Note that the Gross Tonnage (GT) is a measure of the total capacity of a ship, i.e. it includes all spaces below the upper deck and permanently closed-in spaces on the deck (the exact definition of the space included may differ by port). One GT represents 100 cubic feet. It is a historically agreed measure for the average space required by a metric ton of general merchandise. Metric ton is a measure of weight, one metric ton equals 1000kg.

10.4 Throughput and capacity of liquid bulk ports in North Europe

Table 110 provides an indication of market shares for relevant liquid bulk ports in the HLH range for three types of liquid bulk: crude oil, mineral oil products and petcoke (a variety of oil products) and other liquid bulk goods, which are mainly liquid chemicals.

Table 110: Throughput and market shares for liquid bulk in the HLH range in 2003

	Crude oil		Mineral oil products		Other liquid bulk	
	Throughput in 2003 in million tons	Market share in 2003	Throughput in 2003 in million tons	Market share in 2003	Throughput in 2003 in million tons	Market share in 2003
Rotterdam	99.8	55%	27.5	29%	25.2	60%
Antwerp	6.9	4%	21.2	22%	7.1	17%
Amsterdam	0	0%	11.6	12%	2	5%
Wilhelmshaven	27.9	15%	8.6	9%	0.3	1%
Le Havre	35.2	19%	7.7	8%	1.7	4%
Dunkerque	6.8	4%	5.5	6%	0.9	2%
Hamburg	4.1	2%	5.3	6%	2.2	5%
Zeebrugge	0	0%	4.7	5%	0.2	0%
Bremen	0	0%	1.9	2%	0	0%
Gent	0	0%	0.8	1%	2.2	5%
Total	180.7	100%	94.8	100%	41.8	100%

Totals may not add up to 100 due to rounding.

Source: CRA calculations based on HbR Port Statistics 2003.

Capacities of the ports are determined by the capacities of the hinterland pipelines and other hinterland transportation, as well as by the capacities of the industry at the port. Another relevant restriction for crude oil and mineral oil tankers is the depth of the access channels.

Moreover, different ports specialise on different storage facilities. Rotterdam is more specialised on large scale storage, Antwerp has more storage for specific products.²⁸⁷

Larger crude oil tankers (200,000 to 235,000 GT) have a maximum draught of 22 to 25 metres. The only ports in the HLH that can accommodate these vessels are Rotterdam, Wilhelmshaven and Le Havre. Smaller crude oil tankers (such as 60 thousand GT) still require a draught of about 15 metres.²⁸⁸ The average size of crude oil tankers calling at Rotterdam has recently decreased from 86,000 GT in 2001 to 60,000 GT in January to August 2004, reflecting the greater share of crude oil imported on smaller vessels from the

²⁸⁷ Information provided by HbR on 26 October 2004.

²⁸⁸ Information provided by HbR on 16 September 2004.

North Sea.²⁸⁹ The remaining crude oil stems mainly from the Middle East and is shipped on larger vessels.

Rotterdam, Wilhelmshaven and Le Havre are the only ports that can accommodate the large crude oil tankers. Le Havre does not serve the same hinterland and the pipeline from Wilhelmshaven is close to capacity.

The largest-ever vessel to call at the Maasvlakte Oil Terminals (MOT) called in 1977 and was the Batillus, which could carry more than 550,000 tons.²⁹⁰ Currently, vessels calling at the MOT have an average weight of 175,000 tons and are up to 440,000 tons large. Smaller vessels that carry crude oil from the north sea can be as small as 90,000 tons.²⁹¹

The vessels used for mineral oil products or petcoke are the same vessels as those that are used for crude oil products, so that similar draught restrictions apply to the larger of these vessels. However, on average vessels are smaller than for crude oil transportation, the average capacity of vessels for this cargo type is 30,000 GT, half of the average capacity of the crude oil ships.

Vessels for other liquid bulk (mainly chemicals, but also oils and fats) like chemicals are generally much smaller. The largest ship in Rotterdam (62,000 GT) had a maximum draught of 12 metres and the average size is only 12,000 GT.²⁹²

10.5 Liquid bulk origin and destination

Crude oil is almost exclusively shipped into the ports in the HLH range. About 36 percent of each, the mineral oil products and the other liquid bulk throughput in the HLH range is outgoing. Around 64 percent incoming cargo.

For liquid bulk, the main trading routes are Norway-Rotterdam, Houston-Rotterdam, Egypt-Rotterdam, Primorsk-Rotterdam and Far East-Rotterdam.²⁹³ The destination and the hinterland transportation of incoming cargo depend on the type of liquid bulk. We discuss each type in turn below.

10.5.1 CRUDE OIL

Virtually all of the crude oil throughput in the port of Rotterdam is incoming cargo, which is the result of continental Europe's dependence on oil imports for the production of fuel and

²⁸⁹ Information provided by HbR on 16 September 2004.

²⁹⁰ www.mot.nl

²⁹¹ Information provided by HbR on 1 November 2004.

²⁹² Information provided by HbR on 16 September 2004.

²⁹³ Information provided by HbR on 16 September 2004.

energy.²⁹⁴ Table 111 shows the arrival of the crude oil in the HLH range and some indication where it is consumed.

Table 111: Crude oil import in the HLH range, local capacity and pipelines (million tons)

	Throughput	Capacity of refinery at port	Throughput through pipeline	Capacity of pipeline	Destination of pipeline
Rotterdam	100	56	30 6 16	30 10 22	Antwerp Vlissingen Gelsenk. Köln
Le Havre	35	36	4		
Wilhelmshaven	28	10	4 14	8 15	Hamburg Gelsenk. Köln
Duinkerque	7	7			
Zeebrugge	7	7			
Hamburg	4	10			
Brunsbüttel	3	0			
Vlissingen	1	7			

Source: Information provided by HbR on 22 July 2004

In 2003, the largest share of total crude oil coming to Northern Europe (total 184m tons) was shipped to Rotterdam (100m tons), with Le Havre (35m tons) and Wilhelmshaven (28m tons) in second and third place. Rotterdam and Wilhelmshaven are both connected to a pipeline to the German hinterland. Both ports therefore share some customers (two refineries in Germany, Shell and Ruhröl). Le Havre is also connected to a pipeline but does not share any customers linked to the pipeline with Rotterdam. This, together with the differences in inland waterways, puts it in a different geographical market in liquid bulk.

About half of the 100 million tons crude oil coming into Rotterdam in 2003 is consumed by the refineries located at or near the port. The other half is usually transported via pipelines to the hinterland through the Rotterdam-Rhine pipeline to Venlo, Wesel, Gelsenkirchen, Godorf and Wesseling (16m tons²⁹⁵), to Antwerp (30m tons²⁹⁶) through the Rotterdam-Antwerp pipeline and to Vlissingen (6m tons) through the Total pipeline.²⁹⁷

Table 111 also provides capacity figures for the North-West Pipeline, which services BP in Lingen, Ruhr Öl in Gelsenkirchen and Shell in Köln-Wesseling. The data suggests that while

²⁹⁴ Port Statistics 2003 and information provided by HbR on 16 September 2004.

²⁹⁵ About 10m tons go to Shell in Cologne and 6m tons to BP in Gelsenkirchen.

²⁹⁶ To refineries of Total, EM, BRC and Petroplus.

²⁹⁷ Information provided by HbR on 16 September 2004.

the NWO pipeline is close to capacity (14m tons out of 15m tons), the pipelines from Rotterdam still have considerable excess capacity.

10.5.2 MINERAL OIL PRODUCTS/PETCOKES AND OTHER LIQUID BULK

The incoming cargo of mineral oil products is stimulated by the Russian exports of High Fuel Oils (HFO) for the bunkering market and transports to the Far East.²⁹⁸ After Singapore, Rotterdam is the most important bunker port in the world. In 2003 ships bunkered 11.4 million tons.

The shipment of mineral oil products and chemical products are to a significant extent derived from the demand and supply generated by the petrochemical industry located at or near the ports.

Liquid bulk companies use pipelines for large-scale point-to-point transport, linking companies in the port with companies in the hinterland (in particular the Netherlands, Belgium and Germany). Each year, some 60 million tons of various oil and chemical products pass through the pipeline network. The main products being so transported are crude oil and (semi) finished products such as naphtha, kerosene, liquefied petroleum gas and ethylene.²⁹⁹ For example, Rotterdam is linked to the only north-west Europe pipeline network for ethylene. The only other port linked to this pipeline is Terneuzen. HbR is actively engaged in some of these pipeline initiatives and holds shares in existing pipeline projects.

The main destinations in the hinterland for mineral oil products shipped to Rotterdam are Germany, which received circa 16 million tons in 2002, 50% via inland waterway and 50% via pipeline, and Belgium, with 7 million tons via inland waterway in 2002. In 2002, Switzerland was supplied via inland waterway with 1 million tons.³⁰⁰

The main hinterland destinations for other liquid bulk are Belgium and Germany, which received in total around 7 million tons in 2002. About 75% of this is transported via inland waterway.

Rotterdam and the other ports in the ARA range, in particular Antwerp and Amsterdam, service the “Rhine corridor”, which is the most important inland waterway.³⁰¹ Hamburg on the other hand is located on the Elbe, with access to the East-West corridor that links to Hamburg to important hinterland destinations like Berlin, Dresden or Prague. The nautical conditions on the river Elbe are significantly worse than those on the river Rhine, which

²⁹⁸ Information provided by HbR on 16 September 2004.

²⁹⁹ <http://www.portofrotterdam.com/Business/UK/Transportlogistics/Transport/Pipelines/Index.asp>

³⁰⁰ Information provided by HbR on 16 September 2004.

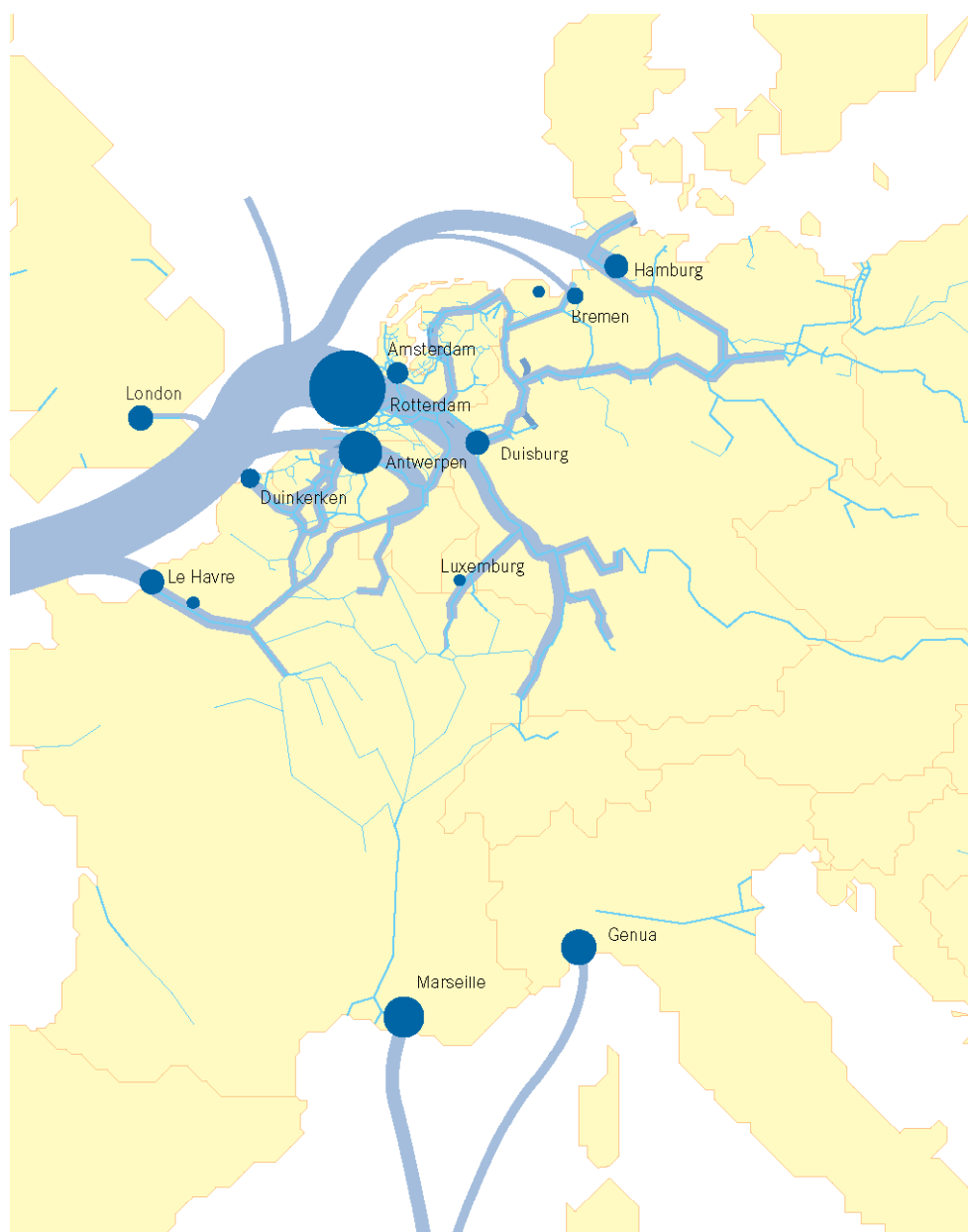
³⁰¹ PINE: “Prospects for Inland Navigation within the Enlarged Europe” Final Report 2004, p. 154.

explains the much higher share of barge transport in the ARA range ports compared to Hamburg.³⁰²

Many barge operators that specialise on liquid bulk provide integrated logistical services that connect the ARA range ports with the Rhine area. For example, Vopak, a large provider of liquid bulk barges, offers integrated transport services for chemicals, vegetable oils and fats – all departing from ARA range ports. Their services in Hamburg are restricted to the North German area.³⁰³

³⁰² PINE: “Prospects for Inland Navigation within the Enlarged Europe” Final Report 2004, p. 162.
³⁰³ www.vopak.com

Figure 21: Cargo flow inland waterways



Source: Waardevol Transport, www.inlandshipping.com, p. 13

The analysis of the hinterland transport shows that the ports in the ARA range offer the best access to the Rhine corridor. Taking further into account the existence of petrochemical clusters discussed in the previous section, Antwerp is the most relevant alternative port to Rotterdam. This is confirmed by our survey, which shows that the only port considered as a viable potential alternative to Rotterdam for mineral oil products and “other liquid bulk” is Antwerp.

10.6 Benchmarking

10.6.1 HARBOUR DUES

Table 112 compares the harbour dues for two different sized oil tanker. The results show that Wilhelmshaven is significantly less expensive than Rotterdam, even though we abstracted from discounts (see Section 10.3 for a description of the pricing structure).

Table 112: Harbour dues for crude oil tankers of different size

	100000DWT oil tanker Discharging 100000 tons	Difference to Rotterdam	360000DWT oil tanker Discharging 275000 tons	Difference to Rotterdam
Rotterdam	0.84		0.98	
Wilhelmshaven	0.51	-40%	0.54	-45%
Le Havre	0.95	13%	1.16	18%

Source: CRA calculations based on information provided by HbR on 16 September 2004 and "Tarif für den Hafen Wilhelmshaven 3. März 2004 in der Fassung 17. Juni 2004". Smaller vessel: 58,928GT, larger vessel 188,728GT.

Moreover, harbour dues for large oil tankers are ten times higher in Rotterdam than they are in Antwerp, reflecting the access restrictions in Antwerp.³⁰⁴ In the HLH range, large oil tankers can only ship to Rotterdam due to draught restrictions.

10.6.2 SHARE OF HARBOUR DUES IN TOTAL COST

Contrary to other cargo types, harbour dues are a significant part of total call costs for larger mineral oil vessels. For the 100,000 DWT vessel harbour dues are 80 percent and for the 360,000 DWT vessel harbour dues are 87 percent of total call costs. The higher percentage reflects that other costs are not as much related to ship size and tons discharged as the harbour dues. For smaller vessels, harbour dues become relatively less important.

10.7 Evidence of switching

None of the 15 respondents to our questionnaire, which all operate in the liquid bulk sector, reported evidence switching in response to an increase in harbour dues. As reported in

³⁰⁴ Interview with [confidential]. Note that HbR commented that it is not possible to be cheaper on a service that is not being provided (information provided by HbR 1 November 2004). However, even under HbR's interpretation it makes the point that HbR's pricing for these vessels is not constrained by the port of Antwerp.

Section 3, the summary statistics clearly show that liquid bulk is seen as the most captive cargo category.

The survey results suggest a ranking within the liquid bulk products with crude oil being the most and other liquid bulk being the least captive cargo type.

Table 113 reports which ports are considered as substitute ports for crude oil. The two respondents stated that they would switch volume to Antwerp and Wilhelmshaven. None of the ports is seen as a good substitute for Rotterdam.

Table 113: Substitute ports for crude oil respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Le Havre	1	-1.0	0
Dunkerque	0		0
Gent	0		0
Zeebrugge	0		0
Antwerp	3	-1.3	75
Vlissingen	1	-1.0	0
Amsterdam	2	-1.0	0
Wilhelmshaven	2	-0.5	25
Bremen/Bremerhaven	0		0
Hamburg	0		0
Felixstowe	0		0
Other port	0		0
<i>Total # of respondents</i>	<i>4</i>	<i>4</i>	<i>2</i>

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

In the mineral oil products segment all three respondents for that question would exclusively switch to Antwerp. Antwerp is seen as providing reasonable quality as a substitute, as is Zeebrugge.

Table 114: Substitute ports for mineral oil products respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Le Havre	3	-1.0	0
Dunkerque	2	-1.0	0
Gent	0		0
Zeebrugge	2	1.0	0
Antwerp	4	0.5	100
Vlissingen	1	-1.0	0
Amsterdam	2	-1.0	0
Wilhelmshaven	1	-1.0	0
Bremen/Bremerhaven	0		0
Hamburg	2	0.0	0
Felixstowe	0		0
Other port	0		0
<i>Total # of respondents</i>	<i>7</i>	<i>7</i>	<i>3</i>

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

For "other liquid bulk" a similar picture emerges. The five respondents that answered the question would almost exclusively shift volume to Antwerp, which is also seen as providing good quality as a substitute.

Table 115: Substitute ports for other liquid bulk respondents

	Number of respondents seeing port as possible alternative for Rotterdam	Average quality of the port as a substitute for Rotterdam (not weighted, -2=very poor, +2=very good)	Average share of total volume shifted away from Rotterdam moved to this port
Le Havre	3	0.0	1
Dunkerque	2	-1.0	0
Gent	1	-1.0	0
Zeebrugge	4	0.7	1
Antwerp	5	1.6	96
Vlissingen	2	0.5	0
Amsterdam	1	-1.0	0
Wilhelmshaven	0		0
Bremen/Bremerhaven	1	1.0	0
Hamburg	3	0.3	1
Felixstowe	1	-1.0	1
Other port	0		0
<i>Total # of respondents</i>	6	6	5

Source: CRA questionnaire. Note that averages are not weighted. The question for columns 2 and 3 was: "Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the best alternative. For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam by circling a number between "-2" and "2". A circle around "-2" means that the port is a "very poor" substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute." The question for column 4 was: "Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam to other ports you would expect to route or to be routed to each of the following ports." In the previous question, respondents had been asked whether they expected, in case of a hypothetical permanent increase of total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) by 10%, to shift volume to other ports.

The survey responses also suggest that mineral oil is one of the most captive cargo types handled in the port. A number of survey respondents also pointed to the court case against HbR, which is backed by the large oil refineries. The perception of the customers is exemplified by the reasons given for the higher prices at Rotterdam. One respondent pointed to the monopoly position of Rotterdam" another complained that "oil tankers are cash cows".

10.8 Trends and expansion plans

There are discussions to lengthen existing crude oil pipelines from Russia to west Germany (e.g. the Shell refinery linked to the existing pipelines from Rotterdam and Wilhelmshaven). This would make the existing throughput at Rotterdam much less captive.³⁰⁵

Although the average vessel size for crude oil shipments has gone down in recent years due to a shift in emphasis towards oil imports from the North Sea, this trend is unlikely to continue and may be reversed depending on the international political environment. Overseas shipping of liquid bulk through the port of Rotterdam remains the method of choice for access to the European hinterland.

Apart from these there were no major trends brought to our attention, either by HbR, its competitors or respondents to our questionnaire that would significantly affect the market position of the port of Rotterdam.

³⁰⁵ Information provided by HbR 26 October 2004.

11 Further considerations

Our analysis has focused on the issue of market definition and market power on the part of HbR. We generally conclude that HbR has pricing power relative to its rival ports and find relevant markets to be confined to the ARA range ports or smaller.

Three important comments are to be made here:

- In our analysis, we focused primarily on short-run pricing competition. However, ports also consider the long-run effects of their pricing decisions. Thus, while it may be possible for a port to exploit a dominant position over the course of several years, such a strategy may deter investors later on, when it comes to filling newly available space. The other way around, an expanding port like the port of Rotterdam may also consider the long-run effect of its pricing decisions. These issues have been brought to the fore by the management of HbR.
- Taking a dynamic perspective may also change the welfare assessment of higher pricing of a port like Rotterdam. Most of the pricing power of the port of Rotterdam is derived from its strategic location and good seaside access. From a welfare perspective, it is clear that society prefers investments in Rotterdam to investments at other, less well-situated ports. Given that current pricing reflects the payback on initial investments, higher prices at beneficial locations help allocating investment to where it should go from a the point of view of total welfare. When added to these are the network effects and synergies that follow from the future Betuwe line, for example, a large single port may be socially preferable to several smaller ones from the perspective of productive efficiency. Allocative efficiency issues – which relate to competition – remain a potential concern then, in particular when HbR's pricing power is not kept in regulatory check.
- Finally, the competitive environment in the port industry is significantly influenced by the different financing of ports. A more detailed assessment of welfare and competition would have to take into account the levels of subsidies/state aid that different ports may receive. State aid issues in relation to essential facilities such as ports are an area of great interest in the European Union, as well as its Member States. However, we agreed with the NMa that such an analysis is beyond the scope of our present study.

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[illegible]

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Annex III: Main alternative ports – other studies

Table 116: Most important cargo for ports in the HLH range

	Oil and oil products	Iron ore	Coal	Agribulk	Roll-on/roll-off	Food	Break bulk	Container
Rotterdam	X	X	X					X
Amsterdam		X	X	X				
Vlissingen	X		X					
Hamburg	X					X		X
Wilhelmshaven	X							X
Bremerhaven							X	X
Bremen							X	X
Zeebrugge					X			X
Antwerp	X	X	X					X
Le Havre	X							X
Dunkerque							X	

Source: Based on KPMG: "Analyse Nederlandse Havens in Internationaal Perspectief", p. 7 (study for the Ministerie van Verkeer en Waterstaat).

- Dry bulk ports: Amsterdam, Gent and Duinkerken.
- Wet bulk ports: Wilhelmshaven, Duinkerken and Le Havre.
- Containers: Zeebrugge and Le Havre.³⁰⁶

³⁰⁶ KPMG: "Analyse Nederlandse Havens in Internationaal Perspectief", p. 7 (study for the Ministerie van Verkeer en Waterstaat).

Annex IV: Preliminary study of the NMa

The NMa conducted a preliminary study that determined the economic activities of HbR and formulated an analytical framework that guides the definition of the relevant markets. It then commissioned CRA to undertake a study to provide the information necessary to define the relevant markets in which HbR operates and to assess potential market power of HbR.

In the preliminary study, the NMa identified that HbR is engaged in two main types of economic activities:

1. Distribution of parcels of land – HbR owns the land in the Rotterdam port area and rents or leases parcels of land.
2. The supply of port infrastructure – HbR owns and operates the port infrastructure.

In order to identify market power it is helpful to determine the position of HbR in the relevant markets in which it offers its services. The NMa conducted a preliminary on market definition.

Relevant findings related to the distribution of parcels of land:

- For certain types of activities it is unlikely that locations other than those owned by HbR are adequate alternatives.
- Switching of customers to other locations will depend on the amount of investment that is specific to the current location.
- Nautical and port service providers are likely limited to certain (types of) ports.
- Geographical market definition depends on the ultimate destination of the freight.

Relevant findings related to the supply of port infrastructure:

- Whether shippers could switch to other modes of transport or to other ports depends on the route and the cargo.
- Ship-owners usually purchase a “package” of port infrastructure services and they have to make use of these services when using the port. It therefore seems likely that these services can be seen as one relevant product. With regard to the geographic market the relevant question is whether ship-owners can switch to another port. This will depend on the type of ships that are used, the type of cargo, and the route.

In this project we provide further information and analysis in order to put the NMa in a position to determine the relevant markets and the position of HbR in these markets.

Annex V: Selected dimensions of port capacity

The capacity of maritime ports depends on a number of dimensions, including quayside length, container or bulk cargo storage facilities, and hinterland connections. There are also a number of physical restrictions that limit the choice of maritime ports for certain customers. Below we list some selected empirical evidence regarding different capacity dimensions.

For example, the competitiveness of the Ports of Bremen and Bremerhaven is restricted by the fact that they can only be accessed by ships with less than 14m and 10.5m of draught respectively.

With respect to storage facilities, Antwerp has the largest warehousing space of all European ports, 4.8 ha (Rotterdam 1.9 ha, Hamburg 0.9 ha, Amsterdam 0.6 ha, Bremen 0.5 ha).³⁰⁷ Covered storage capacity at the Port of Rotterdam was 3 million m² of sheds, 382,800 m² of sheds for storage of chemicals and 3 million m³ of coldstorage warehouses in 2001.³⁰⁸

Antwerp also is the largest European port in terms of total quayside and total surface (which gives an indication of a port's physical possibilities for expansion). While the Port of Rotterdam has a total surface of 10,500 ha, the Port of Antwerp has a total size of 13,455 ha, much larger than the ports of Le Havre (7,000 ha) and Hamburg (8,700 ha). Total quayside in Rotterdam is 80 km compared to 130 km in Antwerp, 5.25 km in Le Havre and 46 km in Hamburg.³⁰⁹ Given its larger size, the Port of Antwerp might use capacities to compete more vigorously with the Port of Rotterdam.

Due to the increase in container cargo shipments, many ports have invested in increasing their container cargo processing capacity. The Port of Antwerp expects to finish the first terminal of its new container dock with an area of 80 ha (quay length of 1,250 m) in 2005. When it is fully operational, more than 5.5 million TEU can be handled in the new container dock. In 1995, the Port of Antwerp also started work on a new dock for non-containerised cargo. The total quay length will be 5 km, of which 3.1 km are already available.³¹⁰

The Port of Bremen also invests in increasing its container cargo capacity. Currently a quay length of 3,300m provides 13 anchorages. In 2003, another anchorage with a quay length of 340m was added and a new container terminal is planned that will add another 4 anchorages.³¹¹

³⁰⁷ Antwerp Port Authority, http://www.portofantwerp.be/html/00_home/main_set_PB.html

³⁰⁸ http://www.portofrotterdam.com/Images/16_51396.pdf?lng=UK

³⁰⁹ RALFH (Rotterdam, Antwerp, Le Havre, Felixstowe, Hamburg) Comparison of Ports, p. 12, available at http://europa.eu.int/comm/taxation_customs/customs/information_notes/c2002/documents/ralfh/ralfh_comp_port.pdf.

³¹⁰ http://www.portofantwerp.be/html/02_PORTHANDBOOK/set_PH_05.html

³¹¹ <http://www.bremen-ports.de/evopage/index.php?id=555&languageid=1>

Annex VI: Acronyms and technical terms

Agribulk; Grain, Cattle-fodder and oilseeds.

Anglo-Continental routes; All routes between England and the Continent, comprising Short Sea routes, Western Channel routes and North Sea routes.

Backhaul; To haul a shipment back over part of a route that it has already travelled; return movement of cargo, usually opposite from the direction of its primary cargo destination.

Ballast keel; A heavy keel fitted to sailing vessels to lower the centre of gravity and improve stability.

Ballast tanks; Compartments at the bottom of a ship that are filled with liquids for stability and to make the ship seaworthy.

Beam; The width of a ship.

Belgian Straits; The sea crossing between ports in east Kent (for example, Dover, Ramsgate) and the Belgian ports of Ostend and Zeebrugge.

Belt line; A switching railroad operating within a port or other commercial area.

Berth term; Shipped under a rate that does not include the cost of loading or unloading.

Berth; A place in which a vessel is moored or secured; place alongside a quay where a ship loads or discharges cargo.

Berthage; Charges for the use of a berth.

Bill of lading; A document that establishes the terms of contract between a shipper and a transportation company. It serves as a document of title, a contract of carriage, and a receipt for goods.

Bogie; A set of wheels built specifically as rear wheels under a sea container.

Bond port; Port of a vessel's initial customs entry to any country; also known as first port of call.

Bonded warehouse; A warehouse authorized by customs authorities for storage of goods on which payment of duties is deferred until the goods are removed.

Break bulk; Loose, non-containerised cargo stowed directly into a ship's hold; to unload and distribute a portion or all of the contents of a container.

Broker; A person who arranges for transportation of loads for a percentage of the revenue from the load.

Build-operate-transfer (BOT); A form of concession wherein a private party or consortium agrees to finance, construct, operate, and maintain a facility for a specified period and then transfer the facility to a government or other public authority. The concessionaire bears the commercial risk of operating the facility.

Build-own-operate (BOO); A form of project wherein a private party or consortium agrees to finance, construct, operate, and maintain a facility previously owned and/or operated by a public authority. The concessionaire retains ownership of the facility. The concessionaire bears the commercial risk of operating the facility.

Bulk vessel; All vessels designed to carry bulk cargo such as grain, fertilizers, ore, and oil.

Bulkhead; A structure to resist water; a partition separating one part of a ship from another part.

Bunkers; Fuel used aboard ships.

Cabotage; Shipments between ports of a single nation, frequently reserved to national flag vessels of that nation.

Carfloat; A barge equipped with tracks on which railroad cars are moved by water.

Cargo tonnage; Ocean freight is frequently billed on the basis of weight or measurement tons. Weight tons can be expressed in terms of short tons of 2,000 pounds, long tons of 2,240 pounds, or metric tons of 1,000 kilograms (2,204.62 pounds). Measurement tons are usually expressed as cargo measurement of 40 cubic feet (1.12 cubic meters) or cubic meters (35.3 cubic feet).

Cargo-only goods; Hazardous goods that, under the International Maritime Dangerous Goods (IMDG) Code, must not be carried by a multi-purpose vessel.

Carrier; Any person or entity who, in a contract of carriage, undertakes to perform or to procure the performance of carriage by sea, inland waterway, rail, road, air, or by a combination of such modes. Also used as a synonym for "vessel" (e.g. bulk carrier).

Cartage; Intra-port or local hauling of cargo by drays or trucks; also referred to as drayage.

Central Corridor; international crossings between the ports of Holyhead and Liverpool in Great Britain and Dublin and Dun Laoghaire in the Republic of Ireland.

Chassis; A frame with wheels and container locking devices to secure the container for movement.

Classification yard; A railroad yard with many tracks used for assembling freight trains.

Cleaning in transit; The stopping of articles (such as farm products) for cleaning at a point between the point of origin and destination.

Clearance; The size beyond which vessels, cars, or loads cannot pass through, under, or over bridges, tunnels, highways, etc.

Cleat; A device secured on the floor of a container to provide additional support or strength to a cargo-restraining device, or a device attached to a wharf to secure mooring lines.

Common carrier; A transportation company that provides service to the general public at published rates.

Concession; An arrangement whereby a private party (concessionaire) leases assets from a public authority for an extended period and has responsibility for financing specified new fixed investments during the period and for providing specified services associated with the assets; in return, the concessionaire receives specified revenues from the operation of the assets; the assets revert to the public sector at expiration of the contract.

Conservancy; In some countries, this fee is levied to retain upkeep of the approaches to waterways and canals.

Consolidation; Cargo containing shipments of two or more shippers or suppliers. Container load shipments may be consolidated for one or more consignees.

Container freight station (CFS); A shipping dock where cargo is loaded ("stuffed") into or unloaded ("stripped") from containers. Container reloading to/from sea containers to rail and motor carrier equipment is an activity typically performed in a container freight station.

Container pool; An agreement between parties that allows the efficient use and supply of containers; a common supply of containers available to the shipper as required.

Container terminal; An area designated for the stowage of cargo in containers, usually accessible by truck, railroad, and marine transportation, where containers are picked up, dropped off, maintained, and housed.

Container yard; A materials handling/storage facility used for completely unitised loads in containers and/or empty containers.

Container; A truck trailer body that can be detached from the chassis for loading onto a vessel, a rail car, or stacked in a container depot. Containers may be ventilated, insulated, refrigerated, flat rack, vehicle rack, open top, bulk liquid, dry bulk, or other special configurations. Typical containers may be 20 feet, 40 feet, 45 feet, 48 feet, or 53 feet in length, 8 feet or 8.5 feet in width, and 8.5 feet or 9.5 feet in height.

Containership; Ship equipped with cells into which containers can be stacked; containerships may be full or partial, depending on whether all or only some of its compartments are fitted with container cells.

Contraband; Cargo that is prohibited.

Contract carrier; Any person not a common carrier who, under special and individual contracts or agreements, transports passengers or cargo for compensation.

Controlled atmosphere; Sophisticated, computer controlled systems that manage the mixture of gases within a container throughout an intermodal journey, thereby reducing decay.

Crossing; A single journey by ferry, for example Dover-Calais.

Customhouse; A government office where duties are paid, documents filed, etc., on foreign shipments.

Customs broker; A person or firm, licensed by the customs authority of their country when required, engaged in entering and clearing goods through customs for a client (importer).

Cut-off time (Closing Time); The latest time a container may be delivered to a terminal for loading to a scheduled vessel, train, or truck.

Daily running cost; Cost per day of operating a ship.

Dead weight tonnage (DWT); The total weight of cargo, loading equipment, bunker supplies, water and spare parts which a fully loaded ship can carry.

Deconsolidation point; Place where loose or other non-containerised cargo is ungrouped for delivery.

Demurrage; The delay of a vessel or detention of a shipment beyond the stipulated time allowed for loading or unloading; the resulting payment to the owner for such delay or detention.

Dock; For ships, a cargo handling area parallel to the shoreline.

Draft; The depth of a loaded vessel in the water, taken from the level of the waterline, to the lowest point of the hull of the vessel; depth of water, or distance between the bottom of the ship and the water line. Also referred to as draught.

Dredging; Removal of sediment to deepen access channels, provide turning basins for ships, and adequate water depth along waterside facilities.

Driver-accompanied freight vehicle; Typically an articulated lorry and trailer, but also rigid lorries and vans of varying size.

Dry Bulk; Low density cargo, such as agri-food products, fertilizers and ores, scrap, coal and other dry bulk that are transported in bulk carriers.

Dunnage; Material used in stowing cargo either for separation or the prevention of damage

Eminent domain; The sovereign power to take property for a necessary public use, with reasonable compensation.

Fast craft; A generic term including hydrofoils, hovercraft, jetfoils, catamarans, monohulls and HSS vessels. All are capable of operating at speeds of more than 30 knots.

Feeder service; Transport service whereby loaded or empty containers in a regional area are transferred to a “mother ship” for a long-haul ocean voyage.

Ferry; Includes multi-purpose vessels, freight-only vessels, passenger-only vessels, hovercraft and fast monohulls and catamarans.

Fixed costs; Costs that do not vary with the level of activity. Some fixed costs continue even if no cargo is carried; for example, terminal leases, rent, and property taxes.

Force majeure; The title of a common clause in contracts, exempting the parties for non-fulfillment of their obligations as a result of conditions beyond their control, such as earthquakes, floods, or war.

Foreign trade zone; A free port in a country divorced from customs authority but under government control. Merchandise, except contraband, may be stored in the zone without being subject to import duty regulations.

Forty-foot equivalent units (FEUs); Unit of measurement equivalent to one fortyfoot container. Two twenty-foot containers (TEUs) equal one FEU. Container vessel capacity and port throughput capacity are frequently referred to in FEUs or TEUs.

Free trade zone; A zone, often within a port (but not always so located), designated by the government of a country for duty-free entry of any non-prohibited goods. Merchandise may be stored, displayed, used for manufacturing, etc., with the zone and re-exported without duties being applied. Also referred to as free port.

Freight forwarder; Person or company who arranges for the carriage of goods and associated formalities on behalf of a shipper. The duties of a forwarder include booking space on a ship, providing all the necessary documentation and arranging Customs clearance.

Freight payable at destination; Method of paying the freight often used for shipment of bulk cargo whose weight is established on discharge from the ship.

Freight unit; A measure of volume. One freight unit equates to a 40-foot trailer, a standard-sized container or a rigid lorry of equivalent size. A freight unit is typically expressed as five passenger car units-see PCU.

Freight, demurrage and defence; Class of insurance provided by a protection and indemnity club that covers legal costs incurred by a ship owner in connection with claims arising from the operation of his ship.

Gantry Crane; A crane or hoisting machine moored on a frame or structure spanning an intervening space, and designed to hoist containers into and out of a ship.

Gateway; A point at which freight moving from one territory to another is interchanged between transportation lines.

GNP; Gross National Product

Gross tonnage (GT); The total volume of ship and superstructures in tons

Gross weight; Weight of goods, including packaging (such as bottles and crates) and the weight of the transport equipment, for example containers and trucks

Grounding; Deliberate contact by a ship with the bottom while the ship is moored or anchored as a result of the water level dropping or when approaching the coast as a result of a navigational error.

Groupage; The grouping together of several compatible consignments into a full container load. Also referred to as consolidation.

GRP; Gross Regional Product

Hamburg-Le Havre range; Ports located between Hamburg and Le Havre.

Harbour dues; Port charges to a vessel for each harbour entry, usually on a per gross registered ton basis for commercial vessels.

Harbour master; An officer who attends to berthing ships in a harbour.

Heavy lift charge; A charge made for lifting articles too heavy to be lifted by a ship's tackle.

Hold; A ship's interior storage compartment.

HSS vessel; High Speed Sea-Service vessel. A type of fast craft, designed to run at a speed of about 40 knots in normal service.

In bond; Cargo moving under customs control where duty has not yet been paid.

Incoming; Goods discharged in a port.

Inducement; Placing a port on a vessel's itinerary because the volume of cargo offered by that port justifies the cost of routing the vessel.

Inland carrier; A transportation company that hauls export or import traffic between ports and inland points.

Interlining; An agreement between two or more ferry companies to accept each other's tickets for travel on their vessels. This allows a passenger to travel outwards with one company and back with another.

Intermodal rail freight operator; A transport company that offers a door-to-door service for freight combining road and rail transport and operates direct rail services through the Channel Tunnel.

Intermodal; Movement of cargo containers interchangeably between transport modes where the equipment is compatible within the multiple systems.

Irish Sea routes; Sea crossings between ports on the west coast of Great Britain and ports on the east coast of the island of Ireland:

Jetty; Structure projecting out to sea, designed to protect a port from the force of the waves but also used to berth ships.

Joint scheduling; A co-ordinated sailing schedule agreed between two or more ferry operators on one or more routes.

Jumboising; Conversion of a ship to increase cargo-carrying capacity by dividing and adding a new section.

Keel; A flat steel plate running along the centre line of a vessel.

Keelage; Dues paid by a ship making use of certain British ports.

Knot; Measure of speed of a ship, equal to one nautical mile (1,852 meters) per hour.

Laden draught; Depth of water to which a ship is immersed when fully loaded.

Landlord Port; An institutional structure whereby the port authority or other relevant public agency retains ownership of the land, as well as responsibility for maintaining approach channels and navigation aids; under this model, the port does not engage in any operational activities.

Le Shuttle; The train service operated by Eurotunnel through the Channel Tunnel. There are two types of service: Le Shuttle-Tourist and Le Shuttle-Freight, each with its own specially designed trains for the transport of, respectively, passenger vehicles and freight vehicles between the terminals.

Lease-develop-operate (LDO); A form of concession wherein, under a longterm lease, a private company upgrades and expands an existing facility and manages its cash flows. The public authority holds title to the facility throughout the concession period and receives lease payments on the assets.

Lift tank; Standardized portable tank for liquids or gases.

Lighter Aboard Ship (LASH); A specially constructed vessel equipped with an overhead crane for lifting specially designed barges and stowing them into cellular slots on the vessel.

Lighter; An open or covered barge towed by a tugboat and used primarily in harbours and inland waterways to carry cargo to/from alongside a vessel.

Limited recourse financing; Project financing in which sponsors or governments agree to provide contingent financial support to give lenders extra comfort; typically provided during the construction and start-up period of a project, which is generally the riskiest time in the life of an infrastructure project.

Line haul; The movement of freight over the tracks of a transportation line from one city to another.

Liner; A vessel sailing between specified ports on a regular basis.

Linkspan; A gangway between shore and ship suitable for vehicles. A double linkspan takes traffic at two levels simultaneously.

Liquid bulk; Crude oil, Mineral oil products/petcoke, and other liquid bulk oil fats.

Lloyds' Registry; An organization maintained for the surveying and classing of ships so that insurance underwriters and others may know the quality and condition of the vessels involved.

Lo-Lo (Lift on/Lift off); A type of vessel that allows cargo to be loaded or unloaded by either ship or shore cranes.

Longshoreman; Individual employed locally in a port to load and unload ships.

Malacca-max; Maximum size ships (containerships and bulkers) which can cross the Malacca Straits. The Malacca-max reference is believed to be today the absolute maximum possible size for container vessels.

Metric tons; 1,000 kilograms.

Mezzanine financing; A mix of financing instruments, including equity, subordinated debt, completion guarantees, and bridge financing, the balance of which changes as the risk profile of a project changes; i.e., as a project moves beyond construction into operation.

Mixed cargo; Two or more products carried on board one ship.

Mobile crane; General purpose crane capable of being moved from one part of a port to another.

Modal split; Mode of transport (barge-, rail-, and road)

Moor; To attach a ship to the shore by ropes.

Multi-purpose vessel; A ship that is able to accommodate passenger and freight traffic simultaneously.

Neo-bulk cargo; Uniformly packaged goods, such as wood pulp bales, paper, wood, cellulose, which store as solidly as bulk, but that are handled as general cargo.

Net weight; Weight of goods (in kilograms), excluding all packaging

Non-recourse financing; Project financing for which no loan guarantees or financial support is provided by the sponsors or governments to lenders for the project.

Non-vessel operating common carrier (NVOCC); A cargo consolidator in ocean trades who buys space from a carrier and re-sells it to smaller shippers. The NVOCC issues bills of

lading, publishes tariffs, and otherwise conducts itself as an ocean common carrier, except that it does not provide the actual ocean or intermodal service.

North Sea routes; Sea crossings on the North Sea and Belgian Straits from ports on the east coast of England (for example, Newcastle. Hull. Felixstowe, Harwich, Sheerness, Ramsgate and Dover) to ports in Holland (Hook of Holland and Rotterdam), Belgium (Ostend and Zeebrugge), Germany (Hamburg) and Denmark (Esbjerg).

Northern Corridor; domestic crossings between the ports of Ardrossan and Fleetwood in Great Britain and Larne and Warrenpoint in Northern Ireland.

On-carrier; Person or company who contracts to transport cargo from the port or place of discharge of a sea-going or ocean-going ship to another destination by a different means of transport, such as truck, train or barge.

On-deck-only goods; Hazardous goods that, under the IMDG Code, must be stowed on open deck if they are carried by a multi-purpose vessel.

Optional cargo; Cargo that is destined for one of the ship's discharge ports, the exact one not being known when the goods are loaded.

Other dry bulk; Sand, gravel, clay, sulphur, cement, fertilizers and other raw materials

Other general cargo; Sacks and bales 40-70 kg, big bags 180 kg and over, chets and crates, pallets and neo bulk

Other liquid bulk; Chemical base products and oil fats.

Outgoing; Goods loaded in a port.

Overcarriage; The carriage of cargo beyond the port for which it was intended.

Pallet; A flat tray, generally made of wood but occasionally steel or other materials, on which goods can be stacked. There are two principal sizes: the ISO pallet, which measures 1 x 1.2 meters and the europallet at 0.8 x 1.2 meters.

Panamax; Maximum-size bulk carriers whose dimensions enable the ship to transit the Panama Canal when lock width is the limiting factor.

Passenger vehicles; Cars, coaches, caravans, campervans, whether used for tourism or business travel.

PCU; Passenger car unit. A standardized measure of volume. One PCU is equivalent to a standard-sized car. The volumes of other types of vehicle are expressed as PCU equivalents.

Permanent dunnage; Strips of timber fixed to the frames of a ship to keep cargo away from the sides of the ship in order to avoid damage and condensation.

Pier; The structure perpendicular to the shoreline to which a vessel is secured for the purpose of loading and unloading cargo.

Piggy packer; A mobile container-handling crane used to load/unload containers to/from railcars.

Pilferage; Petty theft.

Pilotage dues; Fee payable by the owner or operator of a ship for the services of a pilot; the fee is normally based on the ship's registered tonnage.

Pilotage; The act of assisting the master of a ship in navigation when entering or leaving a port or in confined water.

Platform flat; A shipping container without sides, ends or a roof. Normally 20 x 40 feet long, it is used for awkwardly shaped cargo that cannot fit on or in any other type of container.

Plimsoll mark/load lines; A series of horizontal lines painted on the outside of a ship marking the level that must remain above the surface of the water for the vessel's stability.

Pontoon; Flat-bottomed vessel with a shallow draught

Pooling; Sharing of cargo or the profit or loss from freight by member lines of a liner conference.

Port dues; Charges levied against a ship owner or ship operator by a port authority for the use of a port (see also "harbour dues").

Port of refuge; Port, not on a ship's itinerary, which she calls at due to some unforeseen hazard at sea and where she may undergo repairs, refuel or rescue cargo.

Port of registry; Place where a ship is registered with the authorities, thereby establishing its nationality.

Port transit charge; The variable cost element of the dues paid by a ferry operator to a point for access to the infrastructure. The charge is calculated on the basis of the actual volume of traffic (passengers and passenger and freight vehicles) which passes through the port in question.

Portable unloader; Type of ship unloader that is wheeled and capable of being moved around a port wherever needed. It is typically used in ports where there is no dedicated terminal with its own fixed equipment.

Pre-entry; Presentation to the customs authorities of export or import declarations prior to the clearance of goods.

Project financing; Financing wherein the lender looks to a project's cash flows to repay the principal and interest on debt, and to a project's assets for security; also known as "structured financing" because it requires structuring the debt and equity such that a project's cash flows are adequate to service the debt.

Reefer; Refrigerated container.

Relay; To transfer containers from one sea-going vessel to another.

RMPM; Rotterdam Municipal Port Management

Ro/Ro; A shortening of the term "Roll on/Roll off". A method of ocean cargo service using a vessel with ramps that allow wheeled vehicles to be loaded and discharged without cranes.

Sailing; A single ferry departure.

Ship chandler; An individual or company selling equipment and supplies for ships.

Ship's tackle; All rigging, etc., used on a ship to load or unload cargo.

Short French Sea routes; The shortest distance links between ports in Kent (Dover, Folkestone and Ramsgate) and East Sussex (Newhaven) and ports on the north-east coast of France (Calais, Boulogne, Dieppe and Dunkirk). Also includes the Channel Tunnel (Folkestone to Frethun/Coquelles).

Short Sea routes; The totality of routes on the Short French Sea and the Belgian Straits.

Side loader; A lift truck fitted with lifting attachments operating to one side for handling containers.

Southern Corridor; international crossings between the ports of Fishguard and Swansea in Great Britain and Rosslare and Cork in the Republic of Ireland.

Spotting; Placing a container where required to be loaded or unloaded.

Spreader; A piece of equipment designed to lift containers by their corner castings.

Stack car; An articulated multiple platform rail car that allows containers to be double stacked.

Stacktrain; A rail service whereby rail cars carry containers stacked two high on specially operated unit trains.

Stevedore; Individual or firm that employs longshoremen to load and unload vessels.

Stevedoring charges; Fees for loading and stowing or unloading a ship.

Sto-ro; A vessel with capacity for break-bulk cargo as well as vehicles or trailer borne cargo.

Stowage factor; The average cubic space occupied by one tonne weight of cargo as stowed aboard a ship.

Straddle carrier; Mobile truck equipment with the capacity for lifting a container within its own framework.

Sturdons; Port workers engaged in the stowage of cargo in the holds of a ship.

Supply chain; A logistics management system that integrates the sequence of activities from delivery of raw materials to the manufacturer through to delivery of the finished product to the customer into measurable components.

Tare weight; The weight of wrapping or packing; added to the net weight of cargo to determine its gross weight.

Terminal charge; A charge made for a service performed in a carrier's terminal area.

Terminal; An assigned area in which containers are prepared for loading into a vessel, train, truck, or airplane, or are stacked immediately after discharge from the vessel, train, truck, or airplane. Terminals can also be operated for other cargo types, e.g. dry bulk terminals, liquid bulk terminals etc.

Throughput charge; The charge for moving a container through a container yard off or onto a ship.

Throughput; Incoming and outgoing goods in a port.

Top off; To fill a ship that is already partly loaded with cargo. Typically occurs where there is a draught restriction at the first load port – the ship loads a quantity of cargo corresponding to the permissive draught, then fills up at the second port where there is no restriction.

Top stow cargo; Goods that are stowed on top of all others in a ship's hold because of their relatively low density and the probability that they would be damaged if overstowed.

Toplift; Attachment to a fork-lift truck that is designed to lift a shipping container.

Towage; Charges for the services of tugs assisting a ship or other vessels in ports.

Tramp line; An ocean carrier company operating vessels on other than regular routes and schedules.

Transshipment port; A port where cargo is transferred from one carrier to another or from one vessel of a carrier to another vessel of the same carrier without the cargo leaving the port.

Transshipment; A distribution method whereby containers are moved between large mother ships and small feeder vessels, or between equally large ships plying north-south (Europe-Africa) and east-west (Asia-Europe) routes. Transshipment can also mean the transfer of cargo from one vessel to another, e.g. from sea-going bulk vessels to inland barges or vice versa.

Turnaround; The time it takes between the arrival of a vessel and its departure from port; frequently used as a measure of port efficiency.

Twenty-foot equivalent units (TEUs); Container size standard of twenty feet. Two twenty-foot containers (TEUs) equal one FEU. Container vessel capacity and port throughput capacity are frequently referred to in FEUs or TEUs.

Unaccompanied freight; Freight carried on unaccompanied trailers.

Unaccompanied trailer; The trailer of an articulated lorry without the tractor unit.

Unitisation; The consolidation of a quantity of individual items into one large shipping unit for easier handling.

Unitized freight; Freight stored in one of a variety of standardized modes for the purpose of transportation. The principal modes are driver-accompanied vehicles, unaccompanied trailers, containers, flats and lift tanks.

Unloader; Port apparatus employed to unload ships carrying dry bulk cargo.

Unmoor; To remove the ropes that attach a ship to the shore.

Unstuff; To unload a shipping container.

Variable cost; Costs that vary directly with the level of activity within a short time. Examples include costs of moving cargo inland on trains or trucks, stevedoring in some ports, and short-term equipment leases.

Vessel manifest; Declarations made by international ocean carriers relating to the ship's crew and contents at both the port of departure and arrival. All Bills of Lading are registered on the manifest.

Warehouse; A place for the reception, delivery, consolidation, distribution, and storage of goods and cargo.

Waybill; Document, issued by a shipping line to a shipper, which serves as a receipt for the goods and evidence of the contract of carriage.

Western Channel routes; Sea crossings between ports on the south coast of England (for example, Portsmouth, Southampton, Poole, Plymouth) and ports on the north coast of France (for example, Le Havre, Cherbourg, St Malo, Roscoff). Also includes crossings from the above-mentioned English ports to ports in northern Spain (Bilbao and Santander),

Wharf; Structure built alongside the water or perpendicular to the shore where ships berth for loading or discharging goods.

Wharfage; Charge assessed by a pier or dock owner against freight handled over the pier or dock or against a steamship company using the pier or dock.

Main sources:

1. Dictionary of Shipping Terms, Third Edition, Peter Brodie (1997)
2. The Main Encyclopedic Dictionary, Fifth Edition, Eric Sullivan (1996)

Annex VII: Tenant and user questionnaire

Questionnaire for tenants of the Port of Rotterdam

Preliminary remarks

The Netherlands Competition Authority (NMa) is conducting an important study to which your contribution would be extremely valuable (*De Nederlandse Mededingingsautoriteit (NMa) verricht een onderzoek waaraan uw bijdrage buitengewoon waardevol zou zijn*). The NMa is analysing the market position of the Port of Rotterdam (*Havenbedrijf Rotterdam*), in particular concerning the supply of port infrastructure to port users (*terbeschikkingstelling van haveninfrastructuur*) and the renting out of land on the port territory to tenants (*de verhuur en uitgifte in erfpacht van bedrijfsterreinen en -panden in het havengebied*). The background to this study is the recent corporatisation (*verzelfstandiging*) of the port authority. The NMa would like to collect information from port users (*havengebruikers*) through the attached survey and has commissioned (*ingeschakeld*) Charles River Associates to support it during this project. HbR is well aware of the study and has agreed to fully co-operate with the NMa and CRA.

Thank you for taking your time to fill out the questionnaire. If possible, the questionnaire should be completed at the level of management (or by the person who is responsible for decisions regarding the location of your company). You may not have the necessary information to answer all questions, but we would be grateful if you could fill in those questions for which you have information. Please note that all information that you provide will be used only for this study. Only statistical summaries of the information provided by tenants will be used in the report and the response of any specific tenant will not be identifiable. (*Ik wijs er met klem op dat de informatie die u verstrekt, alleen gebruikt wordt voor deze studie en in de rapportage niet herleidbaar zal zijn tot individuele bedrijven. In de rapportage zullen alleen statistische overzichten worden opgenomen.*)

The questionnaire is drafted in English – and if deemed necessary – a Dutch translation is added. You are free to answer the open questions in either Dutch or English. If you have questions about this form or need help in completing it, please contact the project manager at CRA, Rainer Nitsche, or Julia Thielert at NMaStudy@crai.com or Tel. +32 2 627 1400.

Please return the completed form in the enclosed envelope (no postage needed) **until 15 September 2004**. You may also fax the completed questionnaire to the NMa at +31 70 330 33 70. Should you prefer to receive an electronic version of this document, please send an email to NMaStudy@crai.com.

Information about the responding entity (only in case we need to contact you to clarify your response)

Name of company: _____

Name and job title of the person responding: _____

Contact phone number: _____

Contact email address: _____

DEFINITIONS

lease contract	:	huurcontract of erfpachtcontract
lease price	:	huurprijs of erfpachtcanon (de termen terreinconcessie en kadegeld worden in de praktijk ook gebruikt)
harbour dues	:	zeehavengeld
Rotterdam port authority	:	Havenbedrijf Rotterdam (HbR)
tenants	:	huurders of erfpachters van bedrijfsterreinen en/of –panden van HbR

QUANTITATIVE SURVEY

Please specify which type of company you represent.

Type of company:

- ☐ Forwarding and shipping company

Please specify, e.g. freight forwarding shipping companies, shipbrokers, liner agents, inland shipping, shortsea/feeder shipping:

- ☐ Cargo handling

Please specify, e.g. stevedores, terminals, warehousing, distribution, container depots, cargo superintendents, cargo classification, cargo surveyors:

- ☐ Transport company

Please specify transport mode: _____

- ☐ Supplies-associated industries

Please specify, e.g. general industry, containers (sale, rental, lease & repair), bunkering, towage and salvage, equipment/materials/shipstores, shipbuilding & repair, other service providers:

- ☐ Finance and consultancy

Please specify the service you provide: _____

- ☐ Other

Please specify: _____

If you deal with cargo, please specify type of cargo:

Please specify which cargo type your company focuses on. **Please select only one of the following cargo types! If you deal with more than one cargo type or group of cargo types** (i.e. liquid bulk, dry bulk, containers, roll-on/roll-off or other general cargo), we would highly appreciate if you could **copy this questionnaire and fill in one form per cargo type for the most important types of cargo**. Thank you in advance.

- ☐ Crude oil
☐ Mineral oil products
☐ Other liquid bulk (please specify):

- ☐ Iron ore & scrap
☐ Coal
☐ Agribulk

- ☐ Other dry bulk (please specify):

- ☐ Containers
☐ Roll-on/roll-off
☐ Other general cargo (please specify):

CHOICE OF LOCATION

If you deal with cargo: please answer the following questions for the cargo type for which you fill out this form.

- The following table lists other ports in the Hamburg-Le Havre range and non-port locations (e.g. in the hinterland) that could represent an alternative for the port of Rotterdam with regard to the location of your company. Please indicate which of the following locations you would consider as possible substitutes for the port of Rotterdam for your company, even if they may not be the *best* alternative (*Geeft u a.u.b. aan welke locaties u beschouwt als mogelijke substituten voor de Rotterdamse haven voor uw bedrijf, zelfs als ze misschien niet het beste alternatief zijn*). For each location that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam (*Beoordeelt u de mate waarin de betreffende haven een goed of slecht alternatief is voor Rotterdam*) by circling a number between "-2" and "2". A circle around "-2" means that the location is a "very poor" (*"erg slecht"*) substitute for Rotterdam, a circle around "2" means that it is a "very good" substitute.

	Possible substitute?		Quality as substitute for Rotterdam				
	Yes	No	Very poor			Very good	
Other ports							
France							
Le Havre	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Dunkerque	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Belgium							
Gent	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Zeebrugge	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Antwerp	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
The Netherlands							
Vlissingen	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Amsterdam	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Germany							
Wilhelmshaven	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Bremen/Bremerhaven	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Hamburg	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
UK							
Felixstowe	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2

Locations outside ports (locaties buiten de havens) (please specify)		Very poor Very good				
		-2	-1	0	1	2
	<input type="checkbox"/> <input type="checkbox"/>					
	<input type="checkbox"/> <input type="checkbox"/>					
	<input type="checkbox"/> <input type="checkbox"/>					
	<input type="checkbox"/> <input type="checkbox"/>					

2. We would like to learn more about how you think the quality of the port of Rotterdam compares with the quality of the location that you would consider as the next best alternative location for your company today (e.g. one of the ports or non-port locations mentioned in the previous question). In the table below, please assess the relative quality of the port of Rotterdam (*beoordeelt u de kwaliteit van de Rotterdamse haven vergeleken met de beste alternatieve locatie voor uw bedrijf*) by *circling* a number between “-2” and “2”. A circle around “-2” means that quality in the port of Rotterdam with regard to this specific factor is “very poor” (*“erg slecht”*) compared to the next best alternative location for your company, a circle around “2” means that quality in Rotterdam is “very good” compared to quality at the next best alternative location for your company.

	Quality in Rotterdam compared to the next best alternative location for your company				
	Very poor				Very good
a. Lease conditions (e.g. price) (<i>huur- of erfpachtvoorwaarden, bv. prijs</i>)	-2	-1	0	1	2
b. Provision of suitable infrastructure (<i>leveren van geschikte infrastructuur</i>)	-2	-1	0	1	2
c. Sea access	-2	-1	0	1	2
d. Proximity to your customers (<i>afstand tot uw klanten</i>)	-2	-1	0	1	2
e. Synergies with other companies located in the port (<i>synergie met andere bedrijven in de haven</i>)	-2	-1	0	1	2
f. Quality of labour (<i>kwaliteit van arbeidskrachten</i>)	-2	-1	0	1	2
g. Other factor(s) (please specify):	-2	-1	0	1	2

3. Please consider the situation of your company today. Do you feel that your company is “locked in” in the port of Rotterdam, i.e. do you think that it could not easily relocate even after termination of the lease contract? (*Is uw bedrijf ‘opgesloten’ in de Rotterdamse haven, d.w.z. kan uw bedrijf niet eenvoudig verhuizen naar een andere locatie zelfs na beëindiging van het huur-/erfpachtscontract?*)

Yes ☐ No ☐

If yes, why do you feel that your company is locked in? (*Zo ja, waarom is uw bedrijf ‘opgesloten’?*) Please look at the following reasons that others have mentioned, add any reasons that are important in your case and then indicate the relative importance of each of the reasons by distributing a total of 100 points to them.

(Geef u a.u.b. een indicatie van het belang van elke reden door per reden een aantal punten te geven, waarbij het totaal aantal punten op 100 uitkomt). Please check that the points add to exactly 100.

Reason	Points
a. Specific investments made in facilities at or near the port.	
b. Long-term contracts with port-bound (<i>havengebonden</i>) customers, e.g. ship owners.	
c. Long-term contracts with other port tenants, e.g. terminal operators or storage companies.	
d. No other location offers the infrastructure necessary for our business.	
e. Other reason(s) (please specify):	
Sum of points:	100

4. Suppose that the port of Rotterdam were to increase its lease prices for existing contracts permanently by 10% while the lease prices for all other locations stayed at their current levels. Do you think that your company would re-locate if the lease contract could be terminated easily and without penalty payments? (*Veronderstel dat de kosten voor het gebruik van de grond (huurprijs/erfpachtscanon/terreinconcessie/kadegeld) in de Rotterdamse haven permanent met 10% worden verhoogd, terwijl de kosten voor grondgebruik op andere locaties op hetzelfde niveau blijven. Denkt u dat uw bedrijf dan naar een andere locatie zou verhuizen, indien het huur-/erfpachtscontract gemakkelijk en zonder boetes e.d. kon worden beëindigd?*)

Yes ☐ No ☐

INFORMATION ABOUT YOUR LEASE RELATIONSHIP WITH THE PORT

If you deal with cargo: please answer the following question for the cargo type for which you fill out this form.

5. Please provide information about the lease relationship of your company with the port authority of Rotterdam in 2003 (if you have several lease contracts, please provide the information on an extra sheet and attach it to the questionnaire). If you do not have exact information, please provide an estimate.

- a. What was the total area leased (*huur/erfpacht*) by you in the port of Rotterdam in 2003? _____ m²
- b. Please specify the total area you had options/reservations for in 2003. _____ m²
- c. In which year was your lease contract originally concluded? _____
- d. In which year does your current lease contract end? _____

6. If applicable, please indicate the total volume of cargo volume shipped through Rotterdam in 2003 that your company was involved in (e.g. through shipping, (un-) loading, storing etc.):

_____ ☐ (tons) ☐ (TEUs)

Not applicable ☐ (*please move to question 9*)

7. What proportion of this volume would you consider as "captive volume", i.e. volume that could not be switched to other ports within a year even if e.g. harbour dues (*zeehavengeld*) in Rotterdam were increased permanently by 10%? (*Welk deel van het totale volume dat u bij de vorige vraag heeft vermeld, beschouwt u als 'captive volume', d.w.z. volume dat u niet naar andere havens kunt/zult verplaatsen binnen een jaar zelfs indien bv. het zeehavengeld in Rotterdam permanent met 10% zou worden verhoogd?*)

_____ %

I do not think there is any "captive" volume ☐

If you think that there is "captive" volume, why do you consider it as "captive"? Please look at the following reasons that others have mentioned, add any reasons that you consider as important and then indicate the relative importance of each of the reasons by distributing a total of 100 points to them (*geeft u a.u.b. een indicatie van het belang van elke reden door per reden een aantal punten te geven, waarbij het totaal aantal punten op 100 uitkomt*). Please check that the points add to exactly 100.

Reason	Points
a. Specific investments made in facilities at or near the port (e.g. by cargo owners or shipping lines).	
b. Long-term contracts with service providers, like terminal operators or storage companies, in the port.	
c. Generalised route costs (i.e. total transport chain costs per ton or TEU) for the cargo volume are significantly lower (<i>aanzienlijk lager</i>) for the port of Rotterdam than for alternative ports.	
d. Other reason(s) (please specify):	
Sum of points:	100

8. *For transport, cargo handling, and forwarding & shipping companies:* What is your company's capacity for cargo handling/shipping in the port of Rotterdam per year?

_____ ☐ (tons) ☐ (TEUs)

LEASE PRICES

If you deal with cargo: please answer this question for the cargo type for which you fill out this form.

9. In the lease contract that your company signed with the port authority of Rotterdam, did your company negotiate a discount on the official lease prices published by the port, or did the port authority offer additional costless services to your company? (*Heeft uw bedrijf een korting op de officiële huurprijs/erfpachtscanon uitonderhandeld of heeft het Havenbedrijf gratis extra diensten aan uw bedrijf aangeboden?*)

No, my company did not receive any discount on the official lease price (*geen korting gekregen*). ☐

Yes, my company received a discount on the official lease price (*korting gekregen*). ☐

Amount (*hoogte van de korting*): _____ %

No, my company did not receive any costless services from the port (*geen gratis extra diensten*). ☐

Yes, my company received costless services from the port (*gratis extra diensten*). ☐

I do not know. ☐

10. If the port authority offered additional costless services to your company (instead of or in addition to a discount on the official lease price), what did those services include? (*Wat waren de eventuele gratis extra diensten?*)

11. If you have knowledge about lease prices at other locations, are lease prices in the port of Rotterdam higher than they would be at the location you consider to be the next best alternative for your company today? (*Is de huurprijs/erfpachtcanon in de Rotterdamse haven hoger dan op de locatie die u als het beste alternatief voor uw bedrijf beschouwt?*)

Yes ☐ No ☐ I do not have any knowledge about lease prices at other locations. ☐

12. If your answer to the previous question was yes, what do you believe are the reasons for this price differential (*Indien uw antwoord op de vorige vraag 'Yes' was: wat denkt u dat de redenen zijn voor deze prijsverschillen?*)? Please consider the following arguments that others have mentioned and, if applicable, add any arguments that are important in your case.

Reason	Yes	No
a. Better infrastructure at Rotterdam?	<input type="checkbox"/>	<input type="checkbox"/>
b. Better services at Rotterdam (incl. labour supply)? (<i>Betere diensten in Rotterdam, incl. aanbod van arbeid?</i>)	<input type="checkbox"/>	<input type="checkbox"/>
c. Better sea access in Rotterdam?	<input type="checkbox"/>	<input type="checkbox"/>
d. Better hinterland connections (<i>achterlandverbindingen?</i>)	<input type="checkbox"/>	<input type="checkbox"/>
e. Better synergies with other companies in Rotterdam (clusters)?	<input type="checkbox"/>	<input type="checkbox"/>
f. Other reason(s) (please specify):	<input type="checkbox"/>	<input type="checkbox"/>

13. Are you aware of any examples of landlords attempting to lure companies of your type away from their current location to other locations? (*Zijn er voorbeelden van grondaanbieders die proberen bedrijven weg te lokken van hun huidige locatie naar een andere locatie?*)

Yes ☐ No ☐

If yes, please specify: _____

IMPACT OF CAPACITY EXPANSION

If you deal with cargo: please answer this question for the cargo type for which you fill out this form.

14. Has your company ever expressed an interest in leasing more land in the port of Rotterdam and was rejected by the port authority? (*Heeft uw bedrijf ooit interesse getoond om meer grond te huren/pachten in de Rotterdamse haven en is (het verzoek van) uw bedrijf afgewezen?*) (*If no, please move to question 17.*)

Yes ☐ No ☐ I do not know ☐

15. If yes, what was the reason for the rejection? (*Zo ja, wat was de reden voor de afwijzing?*)

- a. There was no suitable land available (*geen geschikte grond beschikbaar*). ☐
- b. There was suitable land available, but it was given to another applicant.
(*Geschikte grond was al aan een andere kandidaat gegeven.*) ☐
- c. Other (please specify): ☐

16. There are plans to expand (*uitbreiden*) the capacity of the port of Rotterdam through the development (*ontwikkeling*) of Maasvlakte II. Do you think this envisaged expansion (*beoogde uitbreiding*) will lead to any of the changes listed in the table below?

Do you think the development of Maasvlakte II will lead to...	Yes	No
a. Lower lease prices in Rotterdam?	<input type="checkbox"/>	<input type="checkbox"/>
b. Higher investments in infrastructure in Rotterdam by HbR?	<input type="checkbox"/>	<input type="checkbox"/>
c. Higher investments in infrastructure in Rotterdam by third parties?	<input type="checkbox"/>	<input type="checkbox"/>
d. Other changes (please specify):	<input type="checkbox"/>	<input type="checkbox"/>

Please explain your reasoning:

17. Do you have any knowledge about plans for capacity expansions at other ports in the Hamburg-Le Havre range? If yes, please specify. (*Bent u op de hoogte van plannen voor capaciteitsuitbreiding van andere havens in het Hamburg-Le Havre gebied?*)

PERFORMANCE AND COMPETITIVENESS

If you deal with cargo: please answer this question for the cargo type for which you fill out this form.

18. Please consider the following table. Indicate which changes, compared to the situation today, you would expect as a result of the corporatisation of the Rotterdam port authority and which changes you would expect if – hypothetically – the port authority was to be fully privatised (i.e. full private ownership). (*Welke veranderingen, vergeleken met de huidige situatie, verwacht u als resultaat van de verzelfstandiging van het Rotterdamse havenbedrijf en welke veranderingen verwacht u indien – hypothetisch – het Havenbedrijf volledig zou worden geprivatiseerd (d.w.z. indien de eigendom volledig in privéhanden zou komen).*)

Do you expect an effect on...	Corporatisation of the port authority			Full privatization of the port authority		
	No	Yes, I expect an increase	Yes, I expect a reduction	No	Yes, I expect an increase	Yes, I expect a reduction
a. Pricing of land?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Pricing of harbour dues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>(havigeld)?</i>						
c. Investment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Service quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Have you ever had any negative experience with the port authority or one of its daughter companies (e.g. terminal operators) that you would consider as "anti-competitive", i.e. not normal competitive practice and possibly an attempt of HbR to abuse potential market power? Please explain. *(Heeft u negatieve ervaringen met het Havenbedrijf of een van haar dochterbedrijven (bv. terminal operators) die u als concurrentiebeperkend zou beschouwen, d.w.z. die in het normale commerciële verkeer niet gangbaar zijn en misschien een poging van HbR zijn om potentiële marktmacht te misbruiken? Gelieve uw antwoord toe te lichten.)*

Qualitative survey

If you deal with cargo: please answer this question for the cargo type for which you fill out this form.

It would be very helpful for our study if you could provide information on the following questions. If you need more space than is provided here, we would appreciate if you would answer the questions on an extra sheet and attach it to the questionnaire (if you do so, please indicate the question to which your response relates).

20. Please describe the nature of specific investments in port infrastructure and suprastructure that you have made. Describe the contractual relationships with the port (length of time etc.). Would you be able to move the facilities to another port? *(Beschrijft u a.u.b. de aard van specifieke investeringen die u hebt gemaakt in haveninfrastructuur en gebouwen en machines. Omschrijft u a.u.b. de contractuele relaties met het Havenbedrijf (tijdsduur etc.). Is het mogelijk de faciliteiten te verplaatsen naar een andere haven?)*

21. What do you see as the main strengths and weaknesses of the port of Rotterdam as a landlord? *(Wat beschouwt u als de belangrijkste sterke en zwakke punten van de Rotterdamse haven als verhuurder/erfverpachter?)*

22. Are there any concerns regarding the competitiveness between ports or between service providers within ports that you wish to bring to our attention? *(Heeft u zorgen over de mate van concurrentie tussen havens of tussen dienstenaanbieders in havens, die u onder onze aandacht wilt brengen?)*

23. Suppose you would start your company tomorrow. In which port would you locate your company?

- a. Which port-characteristics are essential for this choice?

- b. Do other ports constitute real alternatives for the port of first choice? If they do: which ports are these? If they do not: why are other ports not suitable?

Questionnaire for users of the Port of Rotterdam

Preliminary remarks

The Netherlands Competition Authority (NMa) is conducting an important study to which your contribution would be extremely valuable (*De Nederlandse Mededingingsautoriteit (NMa) verricht een onderzoek waaraan uw bijdrage buitengewoon waardevol zou zijn*). The NMa is analysing the market position of the Port of Rotterdam (*Havenbedrijf Rotterdam - HbR*), in particular concerning the supply of port infrastructure (*terbeschikkingstelling van haveninfrastructuur*) and the renting out of land on the port territory (*de verhuur en uitgifte in erfpacht van bedrijfsterreinen en -panden in het havengebied*). The background to this study is the recent corporatisation (*verzelfstandiging*) of the port authority. The NMa would like to collect information from port users (*havengebruikers*) through the attached survey and has commissioned (*ingeschakeld*) Charles River Associates (CRA) to support it during this project. HbR is well aware of the study and has agreed to fully co-operate with the NMa and CRA.

Thank you for taking your time to fill out the questionnaire. If possible, the questionnaire should be completed at the level of management (or by the person who is responsible for decisions regarding the routing of cargo flows). You may not have the necessary information to answer all questions, but we would be grateful if you could fill in those questions for which you have information. Please note that all information that you provide will be used only for this study. Only statistical summaries of the information provided by tenants will be used in the report and the response of any specific tenant will not be identifiable. (*Ik wijs er met klem op dat de informatie die u verstrekt, alleen gebruikt wordt voor deze studie en in de rapportage niet herleidbaar zal zijn tot individuele bedrijven. In de rapportage zullen alleen statistische overzichten worden opgenomen.*)

The questionnaire is drafted in English – and if deemed necessary – a Dutch translation is added. You are free to answer the open questions in either Dutch or English. If you have questions about this form or need help in completing it, please contact the project manager at CRA, Rainer Nitsche, or Julia Thielert at NMaStudy@crai.com or Tel. +32 2 627 1400.

Please return the completed form in the enclosed envelope (no postage needed) **until 15 September 2004**. You may also fax the completed questionnaire to the NMa at + 31 70 330 33 70. Should you prefer to receive an electronic version of this document, please send an email to NMaStudy@crai.com.

Information about the responding entity (only in case we need to contact you to clarify your response)

Name of company: _____

Name and job title of the person responding: _____

Contact phone number: _____

Contact email address: _____

DEFINITIONS

harbour dues	:	zeehavengeld
hinterland	:	achterland
Rotterdam port authority	:	Havenbedrijf Rotterdam (HbR)

QUANTITATIVE SURVEY

Please specify which type of company you represent.

Type of company:

- ☐ Forwarding and shipping company

Please specify, e.g. freight forwarding, shipping companies, shipbrokers, liner agents, inland shipping, shortsea/feeder shipping:

- ☐ Cargo handling

Please specify, e.g. stevedores, terminals, warehousing, distribution, container depots, cargo superintendents, cargo classification, cargo surveyors:

- ☐ Transport company

Please specify transport mode: _____

- ☐ Supplies-associated industries

Please specify, e.g. general industry, containers (sale, rental, lease & repair), bunkering, towage and salvage, equipment/materials/shipstores, shipbuilding & repair, other service providers:

- ☐ Other

Please specify: _____

Type of cargo:

Please specify which cargo type your company ships or handles. **Please select only one of the following cargo types!** **If you deal with more than one cargo type or group of cargo types** (i.e. liquid bulk, dry bulk, containers, roll-on/roll-off or other general cargo), we would highly appreciate if you could **copy this questionnaire** and **fill in one form per cargo type for the most important types of cargo**. Thank you in advance.

- ☐ Crude oil
☐ Mineral oil products
☐ Other liquid bulk (please specify): _____

- ☐ Iron ore & scrap
☐ Coal
☐ Agribulk

- ☐ Other dry bulk (please specify): _____

- ☐ Containers
☐ Roll-on/roll-off
☐ Other general cargo (please specify): _____

CHOICE OF PORT

1. Are you or your company responsible for deciding about the routing of cargo, i.e. do you make the actual decision which port to use for a specific shipment? Yes ☐ No ☐

Even if your answer to this question is no, we will sometimes ask you in this questionnaire to assume that you have the power to decide about the routing of cargo flows. This will allow us to benefit from your industry expertise (e.g. regarding the quality at certain ports), even if in reality you may not be able to influence which port is used. (Indien uw antwoord op de vorige vraag 'No' was, gelieve dan bij het invullen van de vragen te doen alsof u wel de beslissingen neemt over de routing van cargo. Dit stelt ons in staat om een beroep te doen op uw kennis en expertise (bijvoorbeeld inzake de kwaliteit van bepaalde havens), ook als u in de praktijk uw havenkeuze vast staat).

2. Please indicate the total volume of shipments through Rotterdam in 2003 that your company was involved in (as shipowner, shipping agency, cargo owner etc.) (only the cargo type for which you fill out this form):

_____ ☐ (tons) ☐ (TEUs)

For containers: Please specify which share of this volume is transshipment volume: _____ %

3. What proportion of the total volume that you specified in the previous question would you consider as "captive volume", i.e. volume that could/would not be switched to other ports within a year even if e.g. harbour dues (*zeehavengeld*) in Rotterdam were increased permanently by 10% while harbour dues in all other ports stayed at their current levels? (Welk deel van het totale volume dat u bij de vorige vraag heeft vermeld, beschouwt u als 'captive volume', d.w.z. volume dat u niet naar andere havens kunt/zult verplaatsen binnen een jaar zelfs indien bv. het zeehavengeld in Rotterdam permanent met 10% zou worden verhoogd terwijl het zeehavengeld in andere havens op hetzelfde niveau blijft?)

_____ %

I do not think there is any "captive" volume ☐

4. If you think that there is "captive" volume (only the cargo type for which you fill out this form), why do you consider it as "captive"? Please look at the following reasons that others have mentioned, add any reasons that you consider as important and then indicate the relative importance of each of the reasons by distributing a total of 100 points to them (geeft u a.u.b. een indicatie van het belang van elke reden door per reden een aantal punten te geven, waarbij het totaal aantal punten op 100 uitkomt). Please check that the points add to exactly 100.

Reason	Points
a. Specific investments made in facilities at or near the port (e.g. by cargo owners or shipping lines).	
b. Long-term contracts with service providers, like terminal operators or storage companies, in the port.	
c. Generalised route costs (i.e. total transport chain costs per ton or TEU) for the cargo volume are significantly lower (<i>aanzienlijk lager</i>) for the port of Rotterdam than for alternative ports.	
d. Other reason(s) (please specify):	
Sum of points:	100

5. Through which of the following ports did you ship cargo in 2003 (only the cargo type for which you fill out this form)? For each of the ports, please indicate the share of your total shipments going through this port in 2003 (*gelieve voor elke haven te vermelden hoeveel procent van uw totale 'shipments' in 2003 via die haven liep*).

	Did you ship cargo through this port?		Share of volume shipped through this port
	Yes	No	
France			
Le Havre	<input type="checkbox"/>	<input type="checkbox"/>	%
Dunkerque	<input type="checkbox"/>	<input type="checkbox"/>	%
Belgium			
Gent	<input type="checkbox"/>	<input type="checkbox"/>	%
Zeebrugge	<input type="checkbox"/>	<input type="checkbox"/>	%
Antwerp	<input type="checkbox"/>	<input type="checkbox"/>	%

The Netherlands			
Vlissingen	<input type="checkbox"/>	<input type="checkbox"/>	%
Rotterdam	<input type="checkbox"/>	<input type="checkbox"/>	%
Amsterdam	<input type="checkbox"/>	<input type="checkbox"/>	%
Germany			
Wilhelmshaven	<input type="checkbox"/>	<input type="checkbox"/>	%
Bremen/Bremerhaven	<input type="checkbox"/>	<input type="checkbox"/>	%
Hamburg	<input type="checkbox"/>	<input type="checkbox"/>	%
UK			
Felixstowe	<input type="checkbox"/>	<input type="checkbox"/>	%
Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	%
Total			Σ100%

6. Let us assume you can decide on the routing of cargo flows, even if you cannot in reality (*we nemen aan dat u kan beslissen over de routing van de cargo flows, zelfs indien u dat in werkelijkheid niet kunt*). Please indicate which of the following ports you would consider as possible substitutes for the port of Rotterdam for the cargo type for which you fill out this form, even if they may not be the *best* alternative (*geeft u a.u.b. aan welke havens u beschouwt als mogelijke substituten voor de Rotterdamse haven voor uw type cargo, zelfs als ze misschien niet het beste alternatief zijn*). For each port that you would consider as a possible alternative, please assess the quality as a substitute for Rotterdam (*beoordeelt u de kwaliteit als een alternatief voor Rotterdam*) by *circling* a number between “-2” and “2”. A circle around “-2” means that the port is a “very poor” (*“erg slecht”*) substitute for Rotterdam, a circle around “2” means that it is a “very good” substitute.

	Possible substitute?		Quality as substitute for Rotterdam				
	Yes	No	Very poor			Very good	
France							
Le Havre	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Dunkerque	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Belgium							
Gent	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Zeebrugge	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Antwerp	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
The Netherlands							
Vlissingen	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Amsterdam	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Germany							
Wilhelmshaven	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Bremen/Bremerhaven	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Hamburg	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
UK							
Felixstowe	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2
Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	-2	-1	0	1	2

7. This question goes into more detail with regard to the quality of the port of Rotterdam relative to other ports. In the table below, please assess the quality and costs of a) Rotterdam versus Antwerp, and b) Rotterdam versus the next best alternative port for the cargo type for which you fill out this form (please fill in the name of the port).

	Quality in Rotterdam compared to Antwerp					Quality in Rotterdam compared to (please specify):				
	Very poor				Very good	Very poor				Very good
a. Proximity (<i>nabijheid</i>) to origin and destination in terms of sailing time and nautical access (<i>toegang</i>).	-2	-1	0	1	2	-2	-1	0	1	2

b. Cost and time of hinterland connection to origin or ultimate destination.	-2	-1	0	1	2	-2	-1	0	1	2
c. Frequency of hinterland connections.	-2	-1	0	1	2	-2	-1	0	1	2
d. Quality/facilities of terminal operator.	-2	-1	0	1	2	-2	-1	0	1	2
e. Quality of facilities for further processing or storage at or near the port (<i>kwaliteit van faciliteiten voor verdere afhandeling of opslag in of bij de haven</i>).	-2	-1	0	1	2	-2	-1	0	1	2
f. Draft restrictions (<i>beperkingen i.v.m. het getijde</i>).	-2	-1	0	1	2	-2	-1	0	1	2
g. Harbour dues (<i>zeehavengeld</i>).	-2	-1	0	1	2	-2	-1	0	1	2
h. Stevedoring dues.	-2	-1	0	1	2	-2	-1	0	1	2
i. Benefits of bundling cargo at one port (network effects).	-2	-1	0	1	2	-2	-1	0	1	2
j. Benefits of splitting cargo between ports.	-2	-1	0	1	-2	-2	-1	0	1	-2
k. Other factor(s) (please specify):	-2	-1	0	1	-2	-2	-1	0	1	-2

8. Let us assume that you can decide on the choice of ports for a specific shipment (even if in reality you cannot). Please consider the following table, which lists hinterland origins and destinations as well as ports in the Hamburg-Le Havre range. Please indicate the port you would choose for cargo to be shipped to and from each origin and destination in the hinterland. If you feel that relevant origins and/or destinations are missing, please add them. *Please ignore this question if it is not relevant to the cargo type for which you fill out this form.*

For cargo shipped from the following hinterland ORIGIN...	I would choose the following port:													
	France		Belgium			The Netherlands			Germany			UK		
	Le Havre	Dunkerque	Gent	Zeebrugge	Antwerp	Vlissingen	Rotterdam	Amsterdam	Wilhelmshaven	Bremen/ Bremerhaven	Hamburg	Felixstowe	Other*	Do not know
Paris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strasbourg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hannover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bochum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frankfurt/Main	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stuttgart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Munich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prague	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other relevant origin(s) (please specify):*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* If you ticked "other", please specify the port: _____

For cargo shipped to the following hinterland DESTINATION...	I would choose the following port:													
	France		Belgium		The Netherlands			Germany		UK				
	Le Havre	Dunkerque	Gent	Zeebrugge	Antwerp	Vlissingen	Rotterdam	Amsterdam	Wilhelmshaven	Bremen/ Bremerhaven	Hamburg	Felixstowe	Other**	Do not know
Paris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strasbourg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hannover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bochum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frankfurt/Main	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stuttgart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Munich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prague	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other relevant destination(s) (please specify):**	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

** If you ticked "other", please specify the port: _____

SWITCHING

9. Did you ever reduce volume at a port for one of the reasons listed in the table below (*heeft u ooit volume vermindert in een haven wegens een van de redenen in de onderstaande tabel*)? If you are not responsible for deciding about the routing of cargo, have you ever heard of incidents where cargo volume was reduced at a port for one of the reasons listed in the table below?

Did you ever reduce volume / have you heard of incidents where volume was reduced at a port because of...	Yes	No	If yes, please indicate:		
			When?	At which port was volume reduced?	To which other port was the volume shifted (<i>verplaatst</i>)?
a. An increase in harbour dues?	<input type="checkbox"/>	<input type="checkbox"/>			
b. An increase in total call costs?	<input type="checkbox"/>	<input type="checkbox"/>			
c. A capacity expansion (<i>capaciteitsuitbreiding</i>) at other ports?	<input type="checkbox"/>	<input type="checkbox"/>			
d. Other reason(s) (please specify):	<input type="checkbox"/>	<input type="checkbox"/>			

10. The previous questions dealt with actual switching behaviour in the past. Suppose now that the port of Rotterdam were to increase its harbour dues permanently by 10% while harbour dues in all other ports stayed at their current levels (*veronderstel dat het zeehavengeld in Rotterdam permanent met 10% wordt verhoogd, terwijl het zeehavengeld in andere havens op hetzelfde niveau blijft*). Would your company shift (*verplaatsen*) any cargo volume that is currently shipped through Rotterdam to other ports? If you do not have power (*beslissingsmacht*) over the routing of cargo flows, do you expect that those who decide about cargo flows would shift volume away from Rotterdam in such a case?

Yes ☐ No ☐

11. Suppose next that the total costs of shipping cargo through Rotterdam (i.e. total port call costs and cargo handling costs) were to increase permanently by 10% while the costs of calling at all other ports stayed at their current levels (*Veronderstel dat de totale kosten voor shipping via Rotterdam permanent met 10% worden verhoogd, terwijl de kosten in andere havens op hetzelfde niveau blijven*).

- a. Would you shift volume to other ports or would you expect that those who have power over the routing of cargo flows would shift volume from Rotterdam to other ports (only the cargo type for which you fill out this form)?

Yes ☐ No ☐

- b. If yes, please provide an estimate of the proportion of volume currently shipped through Rotterdam Rotterdam (of the cargo type for which you fill out this form) that you would shift or expect to be shifted to other ports (*Geeft u a.u.b. een schatting: hoeveel procent van het volume dat nu via Rotterdam loopt, zal uw bedrijf via andere havens laten lopen als de totale kosten voor Rotterdam permanent met 10% zouden stijgen, terwijl de kosten voor andere havens gelijk zouden blijven*):

_____ %

- c. Please indicate what proportion of the total volume (of the cargo type for which you fill out this form) shifted away from Rotterdam Rotterdam to other ports you would expect to route or to be routed to each of the following ports (see table below).

	Share of shifted "Rotterdam" volume you would expect to move to this port
France	
Le Havre	%
Dunkerque	%
Belgium	
Gent	%
Zeebrugge	%
Antwerp	%
The Netherlands	
Vlissingen	%
Amsterdam	%
Germany	
Wilhelmshaven	%
Bremen/Bremerhaven	%
Hamburg	%
UK	
Felixstowe	%
Other (please specify):	%
Total	Σ100%

IMPACT OF CAPACITY EXPANSION

12. There are plans to expand (*uitbreiden*) the general capacity of the port of Wilhelmshaven and the capacity of the port of Rotterdam (through Maasvlakte II) and to expand the capacity of the port of Antwerp for containers (through the gradual (*geleidelijke*) opening of the Deurganck dock, which will eventually (*uiteindelijk*) add 5.5 million TEU of container capacity per year). Please indicate whether you expect these envisaged expansions (*beoogde uitbreidingen*) to lead to any of the changes listed in the table below.

Do you think that the envisaged port expansion will lead to...	Expansion of Wilhelmshaven		Expansion of Rotterdam		Expansion of Antwerp (for containers only)	
	Yes	No	Yes	No	Yes	No
a. Lower harbour dues in Rotterdam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Lower terminal dues in Rotterdam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Better quality of services in Rotterdam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- | Reason for not moving business to Amsterdam | Points |
|---|------------|
| a. Level of connections to the hinterland | |
| b. Distance to hinterland locations | |
| c. Seaside access | |
| d. Other reason(s) (please specify): | |
| Sum of points: | 100 |

14. If you are involved in paying harbour dues to the port of Rotterdam, do you negotiate harbour dues with the port authority (*onderhandelt u over het zeehavengeld met het Havenbedrijf Rotterdam*)?

Yes ☐ No ☐

15. We understand that the port authority of Rotterdam has yearly consultation rounds with port user representatives before proposing new harbour dues. Do you believe that these rounds influence the ultimate pricing decision (*Gelooft u dat de jaarlijkse consultatierondes de uiteindelijke beslissing over de hoogte van het zeehavengeld beïnvloeden*)?

Yes ☐ No ☐

16. If you have knowledge about harbour dues in Rotterdam and at other ports, please specify in the table below – for your cargo/ship type – at which ports in the Hamburg-Le Havre range harbour dues are generally lower than at the port of Rotterdam.

	Harbour dues are... (<i>zeehavengeld is ...</i>)		
	Higher in Rotterdam (<i>hoger in Rotterdam</i>)	Equal or lower in Rotterdam (<i>gelijk of lager in Rotterdam</i>)	Do not know
France			
Le Havre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dunkerque	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Belgium			
Gent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zeebrugge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antwerp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Netherlands			
Vlissingen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amsterdam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Germany			
Wilhelmshaven	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bremen/Bremerhaven	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamburg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UK			
Felixstowe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. If applicable, what do you believe are the reasons for these price differentials (*Indien van toepassing: wat denkt u dat de redenen zijn voor deze prijsverschillen*)? Please look at the following arguments that others have mentioned and, if relevant, add any arguments that are important.

Reason	Yes	No
a. Better services at Rotterdam	<input type="checkbox"/>	<input type="checkbox"/>
b. Better access to Rotterdam	<input type="checkbox"/>	<input type="checkbox"/>
c. Better hinterland connections in Rotterdam	<input type="checkbox"/>	<input type="checkbox"/>
d. Other reason(s) (please specify):	<input type="checkbox"/>	<input type="checkbox"/>

18. Do you perceive that there is a traditional sequencing in price setting of harbour dues (one port starts, others follow)? (*Ervaart u dat er een traditionele volgorde is bij het vaststellen van de hoogte van het zeehavengeld (één haven begint, anderen volgen)?*)

Yes ☐ No ☐

If yes, which port would usually go first (*Zo ja, welke haven gaat meestal eerst*)? _____

19. Are differences between harbour dues of different ports relatively stable (*Zijn de verschillen in zeehavengeld relatief stabiel*)?

Yes ☐ No ☐

20. Are there examples of ports trying to lure customers and their cargo volume away from other ports (*Zijn er voorbeelden van havens die proberen klanten en hun cargo-volume weg te lokken van andere havens*)? Yes ☐ No ☐

If yes, please explain (which ports, which cargo type, when and how)?

PERFORMANCE AND COMPETITIVENESS

21. Please consider the following table. Indicate which changes, compared to the situation today, you would expect as a result of the corporatisation of the Rotterdam port authority and which changes you would expect if – hypothetically – the port authority was to be fully privatised (i.e. full private ownership). *(Welke veranderingen, vergeleken met de huidige situatie, verwacht u als resultaat van de verzelfstandiging van het Rotterdamse Havenbedrijf en welke veranderingen verwacht u indien – hypothetisch – het havenbedrijf volledig zou worden geprivatiseerd (d.w.z. indien de eigendom volledig in privéhanden zou komen).*

Do you expect an effect on...	Corporatisation of the port authority			Full privatization of the port authority		
	No	Yes, I expect an increase	Yes, I expect a reduction	No	Yes, I expect an increase	Yes, I expect a reduction
a. Pricing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Investment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Service quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Have you ever had any negative experience with the port authority or one of its daughter companies (e.g. terminal operators) that you would consider as “anti-competitive”, i.e. not normal competitive practice and possibly an attempt of HbR to abuse potential market power? Please explain. *(Heeft u negatieve ervaringen met het Havenbedrijf of een van haar dochterbedrijven (bv. terminal operators) die u als concurrentiebeperkend zou beschouwen, d.w.z. die in het normale commerciële verkeer niet gangbaar zijn en misschien een poging van HbR zijn om potentiële marktmacht te misbruiken? Gelieve uw antwoord toe te lichten.)*

Qualitative survey

It would be very helpful for our study if you could provide information on the following questions. If you need more space than is provided here, we would appreciate if you would answer the questions on an extra sheet and attach it to the questionnaire (if you do so, please indicate the question to which your response relates).

23. Please describe the nature of specific investments in port infrastructure and suprastructure by your company. Describe your contractual relationships with the port (length of time etc.). Would you be able to move the facilities to another port? *(Beschrijf u a.u.b. de aard van specifieke investeringen door uw bedrijf in haveninfrastructuur en gebouwen en machines. Omschrijf u a.u.b. uw contractuele relaties met de haven (tijdsduur etc.). Is het mogelijk de faciliteiten te verplaatsen naar een andere haven?)*

24. If available, please provide information on the total cost of calling at the port of Rotterdam (disbursement accounts, split into: Harbour dues, cargo handling, other) and at other ports in the Hamburg-Le Havre range. *(Geef u a.u.b. informatie over de totale kosten om gebruik te maken van de Rotterdamse haven (zeehavengeld, cargo-afhandelkosten, overige kosten) en van andere havens tussen Hamburg en Le Havre.)*

25. If you have detailed information on the hinterland transport of the cargo shipped by you (origin and destination, transport modes), please provide this information for the ports you call at. *(Geef u a.u.b. voor elke haven waarvan u gebruik maakt gedetailleerde informatie over het 'achterland-transport van de door u getransporteerde cargo (oorsprong en bestemming, wijzen van transport).)*

26. Please explain the decision-making process of at which ports to call, the sequencing of calls (if applicable, e.g. for liner business) and the key factors considered. How often do you revise these decisions? *(Beschrijf u a.u.b. het besluitvormingsproces m.b.t. van welke havens gebruik wordt gemaakt, de volgorde waarin havens worden aangedaan (indien van toepassing, bv. bij 'liner business') en de belangrijkste factoren die daarbij in aanmerking worden genomen. Hoe vaak worden deze beslissingen heroverwogen?)*

27. What do you see as the most important trends in your business that will affect the pricing and the service quality at the port of Rotterdam? *(Wat beschouwt u als de belangrijkste trends die de prijsvorming en servicekwaliteit van de Rotterdamse haven zullen beïnvloeden?)*

28. Are there any concerns regarding the competitiveness between ports or of service providers within ports that you wish to bring to our attention? *(Heeft u zorgen over de mate van concurrentie tussen havens of tussen dienstenaanbieders in havens die u onder onze aandacht wilt brengen?)*
