Performance effects of the corporatisation of Port of Rotterdam Authority

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Abstract

Port of Rotterdam Authority is a publicly owned but corporatized port development company. In 2004, this organisation was transformed from a municipal department to an independently operating company. The corporatisation intended to improve the overall performance of the port of Rotterdam. Relevant performance indicators to evaluate the effect of this corporatisation include market share, turnover, operating costs, profits, and investments. These indicators are evaluated for two periods, one prior to the corporatisation (1997-2003) and the other afterwards (2005-2011). The comparison of these two periods shows that corporatisation has led to significant performance improvements. This finding is relevant for the ongoing discussion on port governance models.

Keywords

1. Introduction

In the past decades, many governments devolved the responsibility for port development to a port authority. These organisations compete for attracting cargoes and investments and they are increasingly regarded as commercial organisations, for instance, in EU court cases. Verhoeven (2010) identifies pressure from three stakeholders as drivers behind port governance reform. First, market players like carriers, terminal operators, and logistics operators, voice their preference for port authorities that leave port operations to private firms and create favourable conditions for private initiative (Notteboom and Winkelmans, 2001). Second, governments increasingly question government spending in ports through (implicit) subsidies, implying that port authorities should become self-sustaining. Third, NGO's and community groups hold port authorities responsible for negative externalities generated by the port, such as congestion and environmental damage. Effectively dealing with such stakeholders often requires changing prevailing port governance practices. These pressures establish the need for reform and ask attention for developing an appropriate governance structure for port authorities.

In this paper, we analyse the effects of corporatisation of the Port of Rotterdam Authority (written henceforth as PoR), which was realized in 2004. Three main arguments were brought forward to argue that corporatisation would improve the performance of PoR. The first argument followed the general trend in the 1990s to reduce public involvement in economic activities, leading to the liberalization of services like public transport and energy provision, generally with positive results for users (Boardman and Vining, 1989). The second argument was to improve supply chain integration and international transport networks, as municipal organisations often focus more on local economic development than on the broader supply chain perspective. The third argument was that municipal administrations have limited capabilities for commercial activities, whereas port development requires an active approach of customers and business case driven investments (see Xiao et al, 2012, for examples of overcapacity due to public investments in port infrastructure not driven by a business case). The municipal organisation constrains commercial operation, partly because the municipal labour conditions make it difficult to hire commercially skilled employees.

The PoR case considered in this paper sheds light on performance effects of corporatisation. The considered performance indicators include market share, turnover, operating costs,

profits, and investments. The results for this case are relevant for the ongoing discussion on port governance, see, among others, Goss (1990), Baird (2002), Brooks and Cullinane (2007), Ng and Pallis (2010), and Verhoeven and Vanoutrive (2012).

The paper is organized as follows. Section 2 summarizes previous (case) studies on port governance reform, and Section 3 introduces the PoR case. Section 4 describes the set of relevant performance indicators for PoR, and Section 5 provides tests for the comparison of these indicators before and after corporatisation. Section 6 concludes.

2. Previous case studies on port governance

The common approach to the question which governance model is effective in which situation, is to identify public interests defined in a strict economic sense (Samuelson, 1948; Baumol, 1964) and assess appropriate mechanisms to secure these public interests. Public ownership is one mechanism to secure public interests, whereas regulation of a fully private industry is an alternative option. The appropriate option differs for different types of ports and depends, amongst others, on the diversity of the port (Cullinane and Song, 2002) and the relevance of land-use conflicts between port and urban functions (Pellegram, 2001). For general overviews of port governance and public interests we refer to Cullinane and Song (2002) and Brooks and Pallis (2011); for the case of the UK, the only country with a fully private port industry, see Asteris and Collins (2010).

Various case studies on port governance reform suggest convergence of the institutional position of port authorities, with persistent regional differences (Hall, 2003). Everett (2007) discusses the case of Australia, one of the countries that implemented port reform relatively early. Here the transfer of government-owned monopolies to privately owned monopolies has gone hand-in-hand with the introduction of a regulatory regime that protects the interests of users but constrains pricing policies and reinvestment strategies of port operators. Everett argues for an integrated regulatory approach for the entire supply chain instead of for the ports only. Indeed, regulations have later been loosened, based partly on such a supply chain perspective.

Lacoste and Douet (2012) describe port reform in France, which introduced a separation between the role of a landlord and the role of a terminal operator. Equipment and staff are no

longer owned respectively hired by the landlord but by the operator. The French reform increased autonomy of the landlord port authority, and specified the composition of the supervisory council of the port authority. Political, institutional (e.g. chamber of commerce), and labour representatives form the majority of the supervisory council. For Portugal, Marques and Fonseca (2010) discuss how the need for private funding led to a shift towards the landlord model. They describe how port reform led to a three-tired structure of regulators, port authorities, and port operators. The port authorities no longer have a regulatory role. The authors stress the important issue of monitoring potential abuse of market power by port authorities in ports with mainly captive hinterlands. Castillo-Manzano and Asencio-Flores (2012) describe port reform in Spain, where greater autonomy has been given to landlord port authorities. The authors warn for potential risks of more autonomous port authorities, especially if they are still governed by politically appointed boards. In particular, they may be liable to take large financial risks, such as borrowing and investing more than would seem economically justified or lowering tariffs to attract additional cargoes.

Chen (2009) discusses port reform in Taiwan and questions the port authority's dual role as a regulator and as an operator. Instead, Chen recommends restructuring Taiwanese port authorities through port corporatization. In 2012, the Taiwanese government did indeed decide to set up the Taiwan International Ports Corporation Ltd that manages all four main ports of Taiwan and no longer has a regulatory role.

From the above cases, we can draw some broad conclusions. First, port reform is an ongoing process that is implemented stepwise, as an effort to re-establish a fit between the port's operating environment and the strategy and structure of the port (Baltazar and Brooks, 2007; World Bank, 2007; Verhoeven, 2010). Second, port reform processes are time and place dependent (Jacobs, 2007; Ng and Pallis, 2010; Notteboom et al, 2012). Third, notwithstanding the diversity of port governance models and the need to account for differences in political culture (Ng and Pallis, 2010), most reform trajectories share a common direction towards a port industry where a landlord port authority is regarded as a commercial undertaking and where the appropriate regulatory framework is in place. Ng and Gujar (2009) discuss potential dangers of implementing `Western solutions' in developing economies, but the evidence in many developing countries supports this broadly defined common direction (Van Niekerk, 2005).

The above findings show the relevance of analyzing the effects of port reform in countries that have landlord port authorities that are regarded as a commercial undertaking. Such countries include Australia, Canada, Denmark, and the Netherlands. Up to now, an analysis of the performance of the port authority after reform is still largely lacking. Various studies have addressed the effects of port reform on the efficiency of terminals (see Cullinane et al, 2002; Tongzon and Heng, 2005; and Cheon et al, 2010). The contribution of this paper is to provide an empirical analysis of the effects of corporatisation on the performance of a port authority, more specifically, the Port of Rotterdam Authority.

3. Port of Rotterdam Authority

The port of Rotterdam is the largest port of Europe for liquid bulk, dry bulk, and containers. The port is developed and managed by the Port of Rotterdam Authority (PoR, in Dutch: 'Havenbedrijf Rotterdam'). PoR was corporatized to become a limited company in 2004. The mission and role of PoR remained the same, that is, 'to strengthen the position of the Rotterdam port and industrial complex at the European level, now and in the long term'. PoR still is a not-for-profit organisation that aims to generate sufficient return to be able to continue to invest in a vital port complex. PoR does not aim to maximise profits, but it is financially self-sustaining and provides dividend to its shareholders. The desired return on invested capital is roughly equal to the weighted average capital costs of around 7-9 percent.

Prior to 2004, PoR was a department of the city administration. PoR could operate rather autonomously, although it was controlled by the city council. Reasons for autonomy were the need to sign confidential agreements, which should not be discussed in public in the city council, and the need to act quickly and settle deals in negotiations. PoR had substantial freedom to participate in new ventures. The municipal monitoring and control of PoR was limited, partly because of the granted autonomy and partly because of the limited power of the municipal administration. The lack of monitoring had adverse effects and led to some risky and questionable participations and transactions of PoR.

In January 2004, the institutional position of PoR changed from a municipal department to a public corporation. The municipality of Rotterdam remains the majority shareholder of PoR, and the national government acquired a minority share of roughly 30%. Instead of providing state subsidies to port development, a common practice in the port industry, the Dutch state

provided around € 700 million equity to PoR, which allowed PoR to invest in a major expansion project.

The main institutional change of the corporatisation was a new corporate governance structure with more autonomy from the municipality of Rotterdam. The supervisory board monitors the organization, approves major decisions, and appoints and monitors the executive board (De Langen and Van der Lugt, 2006). The members of the supervisory board were hired from outside and all have substantial private sector experience in managing (public) corporations, transport and energy industries, and stakeholder management[1]. The shareholders have a formal influence at the annual shareholders' meeting, and quarterly shareholder committee meetings keep them informed about major issues. The shareholders appoint new members of the supervisory board.

The PoR organisation changed considerably after corporatisation. The executive board was expanded with a CFO, whereas prior to corporatisation the highest financial officer was not an executive board member. PoR also needed to attract capital directly from the capital market, instead of through the municipality of Rotterdam. Furthermore, the two commercial departments were considerably expanded, and for each department a new commercial director was appointed with a strong industry track record. The vast majority of newly appointed senior managers since corporatisation have private sector experience and were hired externally, as opposed to internal promotions. Other major changes included the development of a risk management team and outsourcing of most operational ICT activities. The organisational chart after the corporate restructuring process is shown in Figure A in the Appendix.

4. Performance indicators

Following Kaplan and Norton (1992), an evaluation of the performance of PoR needs to be balanced, and not solely focused on a single indicator like profitability. Our assessment of the effects of corporatisation includes a set of eight indicators that will be described in this section: market share, turnover, turnover per employee, operating costs, EBITDA (earnings

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[1] The background of the members of the supervisory board of PoR can be found at http://www.portofrotterdam.com/en/Port-authority/organisation/Pages/supervisory-board.aspx.

before interest, taxes, depreciation, and amortization), net profit (earnings after interest, taxes and depreciation), profit per employee, and investments. We acknowledge that these performance indicators are interrelated. For instance, EDITBA is mainly driven by turnover and operating costs, and market share influences turnover. Such interrelations are widely acknowledged in strategy research (Bryant et al, 2004). Various scholars have developed one aggregated performance construct based on a number of indicators. However, Richard et al (2009) show that such constructs may not always be valid. Thus, we use various performance indicators. The benefit of using multiple performance measures has been shown (Chen and Dodd, 1997). Richard et al (2009) also suggest the use of various performance indicators to allow for triangulation.

Table 1 contains information on these indicators and on some other variables related to PoR. The table shows the development of these variables over two seven-year periods: pre-corporatisation (1997-2003) and post-corporatisation (2005-2011). Such a time frame is sufficiently long to overcome random variation (Richard et al, 2009; Kirby, 2005). In our analysis, we omit the transition year 2004, because in that year a large provision made for potential losses was included in the profit and loss account. If 2004 were chosen as starting point of the post-corporatisation period, this would overestimate the corporatisation benefits. With the exception of market share, all other performance indicators are expressed in real terms (in prices of 2011, after correction for the Dutch inflation relevant for PoR)[2].

<< Table 1 to be included about here. >>

Market share is a key indicator of competitiveness that is widely used in performance evaluation (Rust and Zahorik, 1993), also specifically for ports (Notteboom, 2006; Haezendonck et al, 2006). The market share of Rotterdam in the Hamburg Le Havre range declined from 38.6% in 1997 to 35.1% in 2003, and after corporatisation, it increased from 35.4% in 2005 to 37.0% in 2011. Rotterdam has a large share of crude oil and dry bulk throughput, and both market segments are mature with low growth rates. Competing ports like Hamburg and Antwerp are more specialised in container trade, the fastest growing market segment. For this reason, the rise in the Rotterdam overall market share was relatively modest up to 2008, but it improved in a declining market since the economic crisis in 2009

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[2]   Data on Dutch inflation were obtained from the Dutch Statistical Agency (CBS, 2012).

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when Rotterdam suffered relatively less than most other ports in the Hamburg Le Havre range. Specifically for containers, Rotterdam's market share declined sharply in the period 1997-2003 and remained stable in the period 2005-2011.

Productivity, expressed as turnover per employee, is an indicator of the efficiency of company processes. Productivity is often used as performance indicator in data envelopment analysis (DEA) studies, for example, with application to airports in Gillen and Lall (1997) and to terminals in Bichou (2011). Turnover of PoR was rather stable prior to corporatisation, but it has increased considerably afterwards. Employment and operating costs rose prior to corporatisation and declined afterwards, partly owing to outsourcing that resulted in efficiency gains. Employee productivity, measured as turnover per employee, deteriorated prior to corporatisation, but it improved substantially afterwards. Mayston (1985) suggests operating costs as a performance indicator for not-for-profit organisations, and Rao and Holt (2005) use this indicator for supply chains. Lower operational costs lead to higher profits and enable more investments, which enhance the competitiveness of the port.

Although PoR still is a not-for-profit organisation, corporatisation has led to an increasingly commercial approach to port development. Profitability is therefore a relevant performance indicator (Venkatraman and Ramanujam, 1986). Prior to corporatisation, EBITDA declined and net profit remained stable, whereas both indicators improved substantially after corporatisation. Over the period from 2005 to 2011, EBITDA rose by 50% and net profit by 140%. As employment declined over this period, the profit per employee rose even more. Investments are another relevant performance indicator (Kaplan and Norton, 2001), as investments of the port authority are its main instrument for port development. In the years prior to corporatisation, investments actually declined. From 1997 to 2003, the organisation grew in terms of staff but declined in terms of investments made in the port. This trend has been reverted after corporatisation, as investments have grown very rapidly from about 150 million euro in 2005 to nearly 500 million euro in 2011. This rise is largely due to the PoR expansion project 'Maasvlakte 2'. The corporatisation and the equity provided by the Dutch state were specifically designed to enhance the investment capacity of PoR. Thus, the growth in investments is largely due to corporatisation. However, this cannot be regarded as evidence for a better 'post corporatisation performance', as another arrangement enabling the Dutch state to invest in 'Maasvlakte 2' (e.g., a subsidy to PoR) would also have led to a huge growth of investments.

Apart from information on performance indicators, Table 1 also provides some contextual information. The volume of leased land shows an ongoing process of attracting new customers. The number of ship visits is relevant for the operational costs of the harbour master activities, where about half the PoR staff is employed. The throughput growth rate in the Rotterdam harbour did not catch up with competing harbours prior to corporatisation, but it outperformed the competitors afterwards. The overall market share of the port of Rotterdam declined prior to corporatisation and recovered afterwards. Port dues and land rents are the two principal revenue streams, and both increased considerably after corporatisation.[3]

5. Evaluation of corporatisation effects

In the previous section, we discussed the development of eight performance indicators (market share, turnover, turnover per employee, operating costs, EBITDA, net profit, profit per employee, and investments) over two seven-year periods: pre-corporatisation (1997-2003) and post-corporatisation (2005-2011). Figure 1 shows the yearly growth percentages of these indicators. With the exception of market share, all other indicators are expressed in real terms (in prices of 2011, after correction for local inflation relevant for PoR). Figure 2 is similar to Figure 1, but all yearly growth rates (except for market share) are now corrected for the yearly growth in world GDP (21.6% in 1997-2003 and 9.7% in 2005-2011).[4]

<< Figures 1 and 2 to be included about here. >>

The results in Table 1 indicate substantial improvements of all performance indicators since corporatisation, but Figures 1 and 2 show that these indicators contain a considerable amount of variation over time. We therefore test for the significance of these improvements by means of statistical tests for the comparison of two groups, where one group is period 1997-2003 and the other group is 2005-2011. We apply two common and popular tests for the comparison of two groups (both are described in any statistical textbook, see for example

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[3]   Another performance indicator of interest is customer satisfaction, which improved from 7.0 in 2004 to 7.2 in 2009 (Port of Rotterdam, 2010). This indicator is not collected annually, and it is therefore not included in Table 1.

[4]   World GDP growth data were obtained from the World Economic Outlook Database of the International Monetary Fund (IMF, 2012).

Moore et al, 2011). The first test is the conventional (parametric) t-test for the comparison of the mean growth rates of the indicator in the two periods (for non-paired observations, with or without pooled variance depending on whether the variances in both periods differ significantly or not). The number of observations in each group is seven, which is quite small, and validity of the t-test requires that the indicator scores are reasonably normally distributed in each group. As normality may be doubtful, we perform also the (non-parametric) Wilcoxon rank sum test for non-paired observations. This test is based on rank scores and does not require any distributional assumptions of the indicator scores. The Wilcoxon test is insensitive to extreme values of the growth rates, at the expense of loss of power to distinguish between the two periods.

<< Table 2 to be included about here. >>

Table 2 summarizes the results of the two statistical tests for the difference of the real growth rates of each indicator in the pre- and post-corporatisation periods, both with and without correction for GDP growth. The main outcomes are as follows. After corporatisation, the growth rates of the following performance indicators have improved significantly (at the 5% level): market share, turnover per employee, operating costs, and EBITDA. As the sample size in each group is small (seven yearly growth rates before and after corporatisation), it is also of interest to consider which indicators have improved significantly at the 10% level: profit per employee and investments. Finally, turnover and net profit have increased at a significance level of 10% if evaluated by the mean, but not significantly if evaluated in terms of rank scores.

6. Conclusions

The performance of the port of Rotterdam Authority (PoR) has improved considerably since corporatisation in 2004. This improvement is found for all eight considered performance indicators: market share, turnover, turnover per employee, operating costs, EBITDA, net profit, profit per employee, and investments. Statistical tests show that, in terms of the yearly growth rates before and after corporatisation, the improvements are most significant for market share, turnover per employee, operating costs, and EBITDA.

The results for the specific PoR case of this paper do not allow for empirical generalisation but only for analytical generalisation (Yin, 2008). Thus one cannot conclude that corporatisation of port authorities always leads to a better performance (empirical generalisation). The results of the case do allow the development of theories and hypotheses (analytical generalisation). We argue that three insights from the PoR case are of special relevance for port authorities.

First, the PoR case suggests that local politicians may have insufficient capabilities and incentives to monitor port authorities appropriately. Even though the operating environment of port authorities is very distinct from most public activities, most port authorities are governed mainly by politicians or public sector professionals (Brooks and Pallis, 2011). More research is needed on the board composition (Dalton et al, 1998) of port authorities and its impact on performance.

Second, in the absence of effective monitoring, port authorities run the risk of becoming effectively self-governing organisations at the expense of effective cost control. The PoR case shows that, prior to corporatisation, PoR could afford to grow in employment size and operational costs while investments declined. If this trend would have continued, operational costs in 2011 would have been roughly 30 million higher than they actually are. Thus, further research on the control of operational costs of port authorities is relevant. In this respect it is relevant to mention that operational costs for PoR (around €0.50 per ton throughput) are substantially lower than those for landlord port authorities like Antwerp (around €1.30), Hamburg (around €1.30), Barcelona (around €1.70), and Amsterdam (around €0.80). These cost figures are based on publicly available data from the annual reports of these ports. This does not provide evidence that PoR is better in operating cost control. It may simply reflect differences in the scope between port authorities (e.g. the port authority in Antwerp also offers towage services). Further research on operational costs, with larger samples including several ports over longer observation periods, may yield relevant insights on the relation between port governance structures and operating cost control.

Third, the PoR case suggests that a corporatized setting may lead to an inflow of senior managers with a commercial background. This may lead to a stronger market orientation after corporatisation, with potential effects on the performance of the port authority. This research issue could be expanded, for instance by applying insights from strategy research on

market orientation (Narver and Slater, 1990) to the case of port authorities. Research on user satisfaction of port authorities (Brooks and Pallis, 2008) is another avenue that can build on the insights of this case study. Many port customers have frequent interactions with the port authority and directly experience the impact of port authority investments and policies. Such users are likely to have an informed opinion on the performance of port authorities. Analysing whether differences in port user satisfaction are related to port governance models may provide useful additional insights for port governance.

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Appendix: Port of Rotterdam organisation chart in 2012
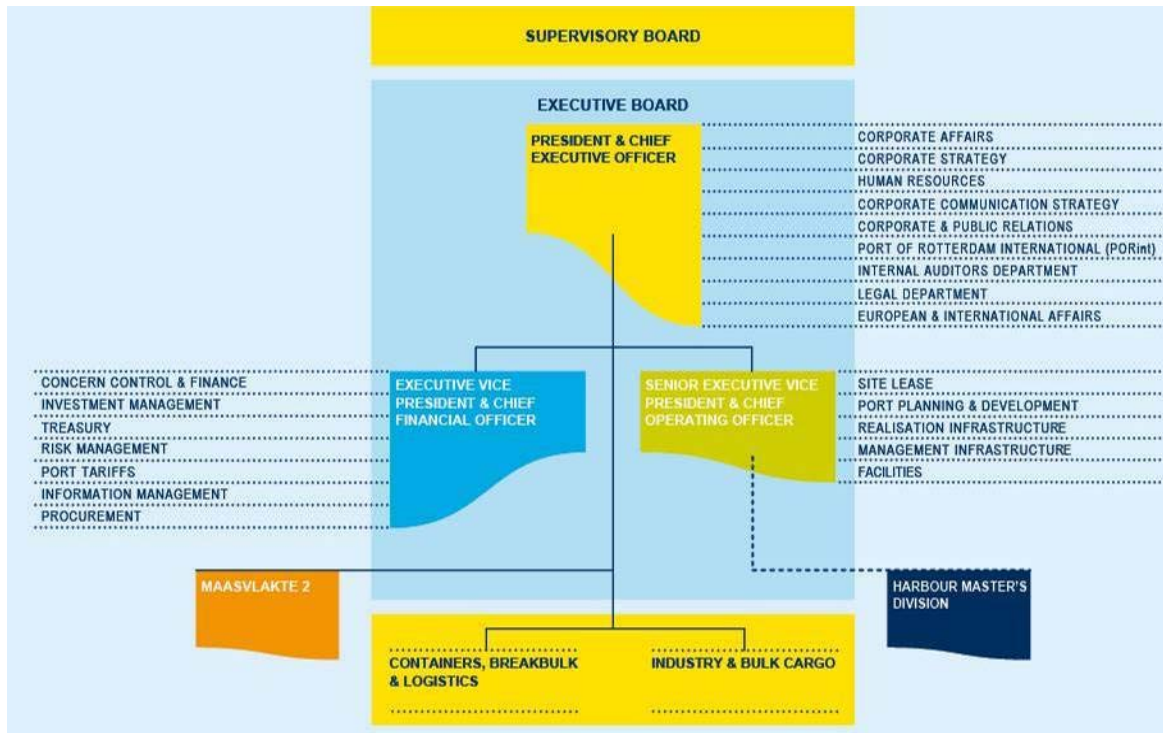
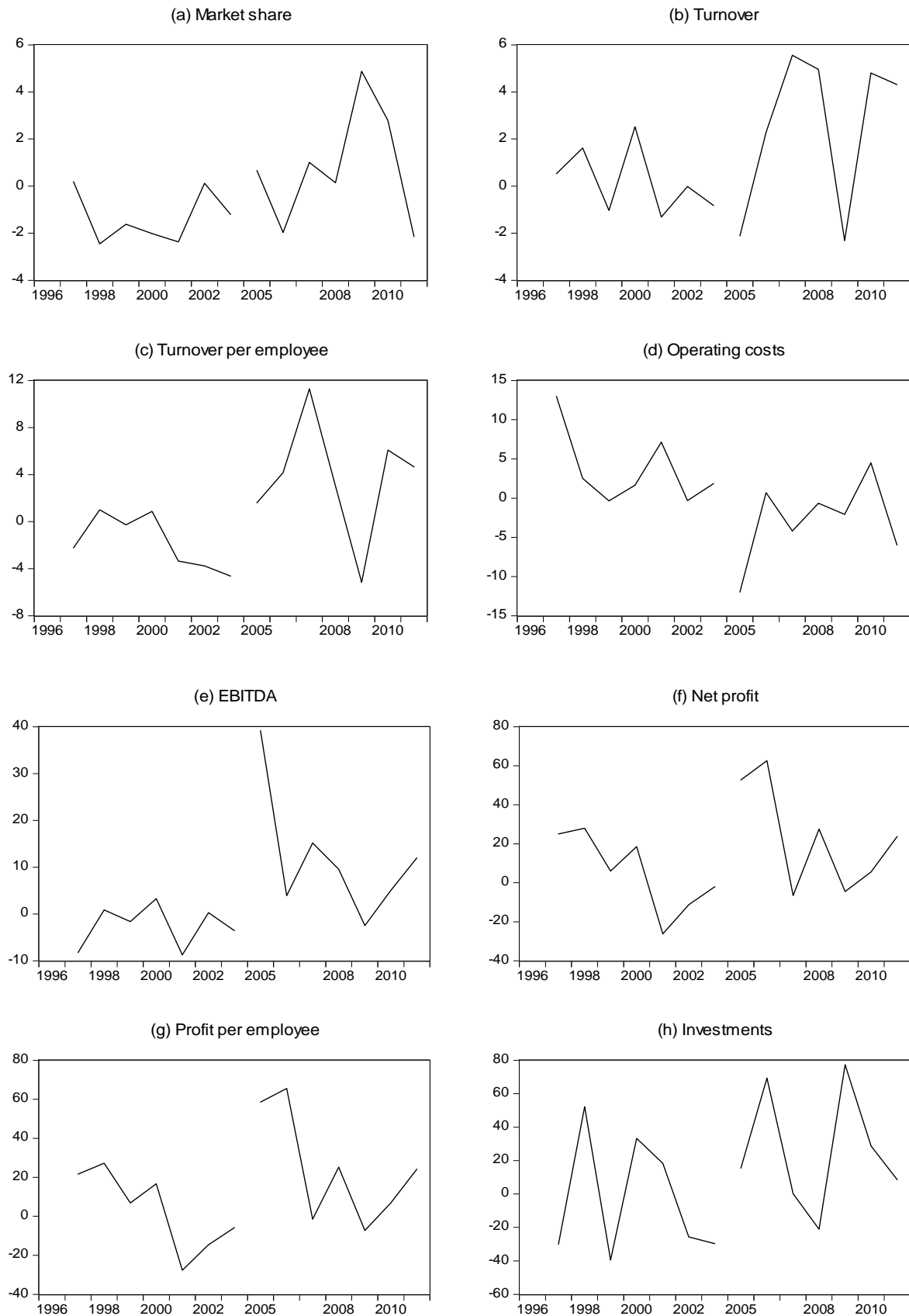**Figure 1: Yearly growth percentages of performance indicators (1997-2003, 2005-2011)**

Figure 2: Yearly growth percentages of performance indicators, after correction for the growth in world GDP (1997-2003, 2005-2011)
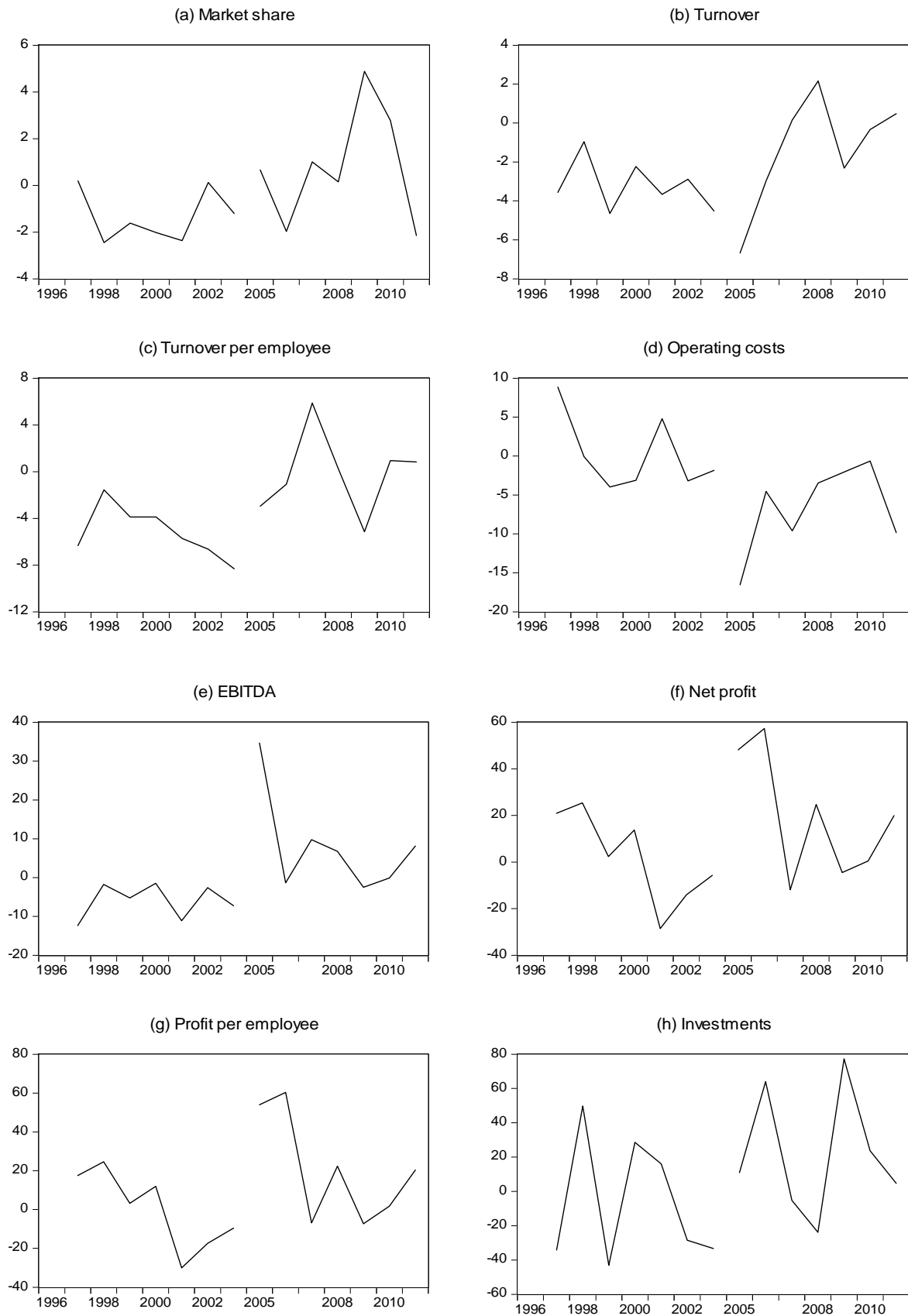
Table 1: Descriptive statistics of Port of Rotterdam and Port of Rotterdam Authority

Port of Rotterdam

Variable	Units	1997	2003	2005	2011
Voluime of leased plots	hectar	4055	4330	4378	4752
Ship visits	N	33601	33524	34984	33,352
Throughput Rotterdam	Gt	311	328	370	435
Throughput HLH range	Gt	798	935	1,047	1,175
Market share (all)	%	38.6	35.1	35.4	37.0
Market share containers	%	35.6	28.4	29.6	29.5

Port of Rotterdam Authority

Variable	Units	1997	2003	2005	2011
Total revenue	M€	453	457.0	486.0	588
Port dues	M€	246	228	253	291
Land rents	M€	153	197.0	203.0	267
Employees	N	1,165	1304	1268	1,220
Turnover per employee	M€	0.389	0.350	0.383	0.482
Operating costs	M€	210	238	245	226
EBITDA	M€	242	219	241	362
Net profit	M€	62	64	81	195
Profit per employee	M€	0.053	0.049	0.064	0.160
Investments	M€	167	127	149	494

Table notes

* Data sources: Port of Rotterdam Authority annual reports for 1997, 2003, 2005 and 2011

* The units are as follows: a hectare is 10.000 m2, % is percent, N is number, Gt is gigaton, and M€ is millions of euros.

* The values of variables in M€ are corrected for local inflation and expressed in the price level of 2011.

* The market share is the share in the Hamburg - Le Havre range.

* Ship visits exclude barge traffic; throughput HLH is total throughput of the ports in the Hamburg - Le Havre range.

Table 2: Overview of test results

Variable	Improve	Test statistic	Real growth percentage				Corrected for GDP growth			
			Period (1)	Period (2)	Period (2) - (1)	Significant	Period (1)	Period (2)	Period (2) - (1)	Significant
Market Share	up	Mean	-1.33	0.76	2.10	++				
		Mean Rank	5.43	9.57	4.14	++				
Turnover	up	Mean	0.21	2.50	2.29	+	-3.21	-1.36	1.85	+
		Mean Rank	6.14	8.86	2.71	no	5.71	9.29	3.57	+
Turnover per Employee	up	Mean	-1.77	3.67	5.43	++	-5.19	-0.19	5.00	++
		Mean Rank	5.00	10.00	5.00	++	4.57	10.43	5.86	++
Operating Costs	down	Mean	3.63	-2.81	-6.45	++	0.21	-6.67	-6.88	++
		Mean Rank	10.00	5.00	-5.00	++	9.86	5.14	-4.71	++
EBITDA	up	Mean	-2.53	11.77	14.30	++	-5.95	7.91	13.87	++
		Mean Rank	4.57	10.43	5.86	++	4.29	10.71	6.43	++
Net Profit	up	Mean	5.45	23.03	17.58	+	2.03	19.17	17.14	+
		Mean Rank	6.43	8.57	2.14	no	6.29	8.71	2.43	no
Profit per Employee	up	Mean	3.47	24.52	21.05	+	0.04	20.66	20.62	+
		Mean Rank	6.00	9.00	3.00	+	6.00	9.00	3.00	+
Investments	up	Mean	-3.00	25.48	28.48	+	-6.42	21.63	28.04	+
		Mean Rank	6.00	9.00	3.00	+	6.00	9.00	3.00	+

Table notes

* Data sources: Port of Rotterdam Authority annual reports. The annual report for the year 2003 provides the data for the period 1997-2003, and the data for 2005-2011 are obtained fom the annual reports in this period.

* The table shows the means and the mean rank scores for two periods for a set of eight performance indicators; period 1 is 1996-2003 (8 years, with 7 yearly growth rates), and period 2 is 2005-2011 (7 years, with 7 yearly growth rates).

* A ++ (or +) indicates a significant improvement of the second period as compared to the first period at the 5% (or 10%) level.

* Market share is a yearly growth percentage; all other variables are real yearly growth percentages (after correction for local inflation).

* In the last four columns, all real growth percentages are corrected by subtracting the yearly growth percentage in world real GDP.