Original Article

A quantitative analysis of European port governance

Patrick Verhoeven[a,b] and Thomas Vanoutrive[a,c]

[a]Department of Transport and Regional Economics, University of Antwerp, Prinsstraat 13, B-2000, Antwerp, Belgium.
E-mail: patrick.verhoeven@espo.be; thomas.vanoutrive@ua.ac.be
[b]European Sea Ports Organisation, Treurenberg 6, B-1000, Brussels, Belgium.
[c]Department of Geography, Ghent University, Krijgslaan 281 S8, B-9000, Ghent, Belgium.

Abstract The ever-changing environment in which ports operate has put strong pressure on the role of port authorities. The evolution of port governance has so far mainly been analysed in qualitative terms, through expert knowledge and case studies. This article fills a research gap in providing a quantitative analysis of port governance in Europe, using data from a major survey, which the European Sea Ports Organisation carried out in 2010 to prepare a new edition of its 'Fact-Finding Report'. These reports have been monitoring port governance diversity since the 1970s. The 2010 survey was based on a new conceptual background, which takes into account the evolution of ports, as well as new perspectives on the role of port authorities. This article provides a quantitative assessment of the survey results, identifying elements that may explain the governance diversity of European seaports. This is done with the help of *factor analysis*. The results confirm the existence of different types of port governance models in Europe, which to some extent correspond to the hypothetical typology according to which port authorities can be conservators, facilitators or entrepreneurs. Differences are mainly geographically defined and the subdivision in Hanseatic, Latin, Anglo-Saxon and new Member State port authorities proves to be a valuable one. In addition to this geographical explanation of diversity, the analysis also detects different governance practices between small and large ports.

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Introduction

It is a well-known fact that ports in Europe are diverse. Governance is one of the key elements that determine this diversity. When using the term 'port governance', we can distinguish two levels: the governance of the port and the governance of the port authority. The former corresponds to the wide cluster of economic, societal and public policy stakeholders that relate to a port, whereas the latter concerns the internal firm level or 'corporate governance' of the port authority (Brooks and Cullinane, 2007; De Langen, 2007). The term 'port authority' implies a specific, that is, public, form of port management, but we use it here as the generic term for the body with statutory responsibilities that manages a port's water and land-side domain, regardless of its ownership or legal form (De Monie, 2004).

Port governance is a broad concept, which encompasses several dimensions. Seven distinct groups of parameters can be used when analysing governance practices: (i) devolution, (ii) corporate governance, (iii) operational profile, (iv) functional autonomy, (v) functional pro-activeness, (vi) investment responsibility and (vii) financial autonomy. Furthermore, governance practices are not stable in time and space. While in the past cargo-handling in European ports was traditionally carried out by locally based companies, horizontal and vertical integration of cargo-handling companies have resulted in a market dominated by global players. This evolution attracted the attention of both policymakers and researchers which often refer to the declining influence of port authorities, while global players gained bargaining power (Heaver *et al*, 2000; Heaver *et al*, 2001; Slack and Frémont, 2005; Olivier and Slack, 2006; Jacobs and Hall, 2007; Vanelslander, 2011). As a response to this evolution, several port authorities reposition themselves by adopting pro-active strategies and developing activities in other nodes in the logistic chain, outside the own port perimeter. In addition to the changes in port governance over time, differences across space exist. Suykens (1988; Suykens and Van de Voorde, 1998) identified three major port governance traditions in Europe: the 'Hanseatic' tradition of local, mostly municipal, governance, which is dominant in ports around the Baltic and North Sea; the 'Latin' tradition of central governance, which reigns in France and countries around the Mediterranean; and finally, the 'Anglo-Saxon' tradition of independent governance, which is characteristic of ports in the United Kingdom and Ireland. Finally, governance practices may differ for other organisational reasons such as the size of the port and the port authority (for example, number of employees).

Despite the extensive literature on port governance (for an overview see, for example, Verhoeven, 2010 and Pallis *et al*, 2010), studies generally describe general trends or limit themselves to case studies. To our knowledge, there

exists no study which analyses port governance practices of a large number of ports in a systematic way. In the present article, we analyse port governance in Europe, using a rich database containing variables that cover all aforementioned dimensions of port governance. This information was collected by the European Sea Ports Organisation (ESPO). This organisation, which represents the common interests of European port authorities, and its predecessor, the Community Port Working Group, have been monitoring the diversity in port (authority) governance in Europe since the 1970s through a series of 'Fact-Finding Reports'. Throughout this period, the environment in which ports operate has changed dramatically, putting strong and multiple pressures on the role of port authorities. The Fact-Finding Reports were mainly descriptive in nature and did not allow a profound quantitative analysis. In 2010, ESPO prepared a new edition of the report through a major survey among European port authorities. The survey was based on a new conceptual background that takes into account the evolution of ports, as well as new perspectives on the role of port authorities. Concretely, the survey enquired about the objectives and functions of port authorities, compared institutional frameworks, and analysed financial capabilities. This exercise yielded a rich database of observations and variables, suitable for in-depth quantitative analysis.

In this article, we do not describe the actual findings of the survey, these can be found in the Fact-Finding Report itself (Verhoeven, 2011). We focus instead on a quantitative assessment of the principal elements that may explain the governance diversity of European seaports. This is done with the help of factor analysis, a commonly applied tool to explore data sets with many variables, which are then summarised into a limited number of unobserved factors.

The first two sections of the article introduce the conceptual background of the survey and the survey data. In the following sections, we describe the research methodology for the quantitative assessment and present the results of the factor analysis. A concluding section discusses the main findings and sets out issues that require further research.

Conceptual Background

The 2010 edition of the ESPO Fact-Finding Report builds on the tradition of the original reports, but it is based on a new conceptual background. This was developed by Verhoeven (2010), taking into account the evolution of the port concept, as well as new perspectives on the role of port authorities. The latter are based on an extensive literature review, which revealed that, in recent times, a renewed interest in the role of port authorities has emerged. This role has come under severe and multiple pressures from stakeholders following important

socio-economic changes in the port landscape. Scholars have issued various recommendations for a 'renaissance' of port authorities, revisiting the traditional landlord, regulator and operator functions, and devising a community manager function that is intrinsically linked to the changing nature of port communities and stakeholders. In addition, scholars have also identified the scope of port authorities as one that ought to extend their activities beyond the local port perimeter, at regional or even at global level. Combining the functional profile and the geographical dimension in a matrix allows one to elaborate on the existential options of port authorities in a hypothetical typology consisting of three basic types: the 'conservator', the 'facilitator' and the 'entrepreneur'. The basic features of each type are illustrated in Table 1.

A 'conservator' port authority concentrates on being a good housekeeper and essentially sticks to a rather passive and mechanistic implementation of the three traditional port authority functions at local level. Because of this low-profile attitude, conservator port authorities may run the highest risk of becoming extinct in the future. A 'facilitator' port authority profiles itself as a mediator and matchmaker between economic and societal interests, hence the well-developed community manager function. Facilitator port authorities also look beyond the port perimeter and try to engage in strategic regional partnerships. It is the type of port authority, which so far seems to find most support in literature. The 'entrepreneur' port authority combines the main features of the facilitator with a more outspoken commercial attitude as investor, service provider and consultant on all three geographical levels (local, regional and global). Because of this ambitious profile, it is also the type that runs the highest risk of running into problems caused by conflicts between the various functional levels.

The conceptual framework is completed with the exploration of a number of governance-related elements that may influence the extent to which a port authority will be a mere conservator or will be able to take on facilitating and entrepreneurial responsibilities. Four essential elements can be identified: two formal and two informal ones. The two formal elements consist of the legal and statutory framework on the one hand and the financial capability (that is, financial autonomy and investment responsibility) on the other. The informal elements relate to the balance of power with government and the management culture that reigns within the port authority. It should be noted that these four elements are strongly interrelated. The power balance with government will influence the legal and statutory framework, whereas the financial capability of the port authority will determine the room its management has to make proactive and intelligent use of port governance tools within a given structural framework.

In the Introduction, we presented seven distinct governance dimensions: (i) devolution, (ii) corporate governance, (iii) operational profile, (iv) functional

Table 1: Hypothetical typology of port authorities

	Type		
Functional dimension	*Conservator*	*Facilitator*	*Entrepreneur*
Landlord	Passive real estate 'manager': ● continuity and maintenance ● development mainly left to others (government/private sector) ● financial revenue from real estate on 'tariff' basis	Active real estate 'broker': ● continuity, maintenance and improvement ● development broker and co-investor ● includes urban and environmental real estate brokerage ● financial revenue from real estate on commercial basis Mediator in commercial B2B relations between service providers and port customers Strategic partnerships with inland ports, dry ports and other seaports	Active real estate 'developer': ● continuity, maintenance and improvement ● direct investor ● includes urban and environmental real estate development ● financial revenue from real estate on commercial basis ● financial revenue from non-core activities Direct commercial B2B negotiations with port customers – active pursuit of market niches Direct investments in inland ports, dry ports and other seaports
Regulator	Passive application and enforcement of rules and regulations mainly set by other agencies Financial revenue from regulator role on 'tariff' basis	Active application and enforcement of rules and regulations through co-operation with local, regional and national regulatory agencies + setting of own rules and regulations Provide assistance to port community to comply with rules and regulations Financial revenue from regulator role on 'tariff' basis with differential charging options for sustainability	Idem facilitator + selling expertise and tools outside the port Financial revenue from regulator role on commercial basis

Operator	Mechanistic application of concession policy (license-issuing window)	Dynamic use of concession policy, in combination with real estate broker role 'Leader in dissatisfaction' as regards performance of private port services providers Provide services of general economic interest and specialised commercial services	Dynamic use of concession policy, in combination with real estate development role Shareholder in private port service providers Provide services of general economic interest and commercial services Provide services in other ports
Community manager	Not actively developed	Economic dimension: ● solve hinterland bottlenecks ● provide training and education ● provide IT services ● promotion and marketing ● lobbying Societal dimension: ● accommodate conflicting interests ● lobbying ● promote positive externalities	Idem facilitator type but economic dimension with more direct commercial involvement
Geographical dimension	*Local*	*Local + Regional*	*Local + Regional + Global*

Source: Verhoeven (2010).

autonomy, (v) functional pro-activeness, (vi) investment responsibility and (vii) financial autonomy. The meaning of these dimensions is explained below.

(i) The term 'devolution' is used here in the broad sense, to identify to which extent port management has been privatised, decentralised and/or corporatised.
(ii) There is a difference between being corporatised in form and actually following principles of corporate governance that are customary in private undertakings. On the basis of the survey, the latter can be assessed from various perspectives, including the economic and non-economic objectives port authorities have, their organisational structure (including the appointment of top management executives and the composition of supervisory bodies), transparency through the use of public selection procedures to contract out land to port operators, and corporate social responsibility (CSR) policies and the use of corporate accounting principles.
(iii) The customary way to classify port authorities in operational terms is to distinguish between 'landlord ports', 'tool ports' and 'service ports', depending on whether, respectively, port authorities are not involved in (cargo-handling) operations at all, operate superstructure and related services or provide full operations in an integrated manner.
(iv) Functional autonomy is analysed from the perspective of the landlord and regulator function. The landlord function can be considered as the principal function of contemporary port authorities. Important issues here are land ownership, as well as the ability and autonomy in contracting land out to third parties. The regulator function is to a large extent performed by the harbour master's office, which can be an integral part of the port authority structure or a separate entity.
(v) Functional pro-activeness can be assessed at the level of the port authority's own port(s) and beyond. The 'own port' dimension covers pro-active fulfilment of the traditional landlord and regulatory functions, as well as the community manager one, which is pro-active by nature. The 'external' dimension looks at how port authorities transpose their functions beyond their own borders, including investment in hinterland networks, investment in other ports, export of regulatory and other expertise and so on.
(vi) Investment responsibility concerns financial responsibility for the capital investment, administration, operation and maintenance of the capital assets that constitute a port, including maritime access, terminal-related infrastructure, transport infrastructure within the port area and transport infrastructure outside the port area. Also, sources of port authorities' operating income are covered here, such as general port dues, land lease, services and public funding.

(vii) Financial autonomy concerns first of all the legal nature, calculation basis and autonomy that apply to different categories of port authority income charges, in particular general port dues. Financial autonomy of port authorities is also analysed in terms of decision making regarding new investments in capital assets, setting of wages, terms and service conditions of its own personnel and the requirement to meet certain financial targets.

The ESPO Fact-Finding Survey

Survey design

The 2010 Fact-Finding Report of ESPO is the first to be based on a Web-based survey that was addressed directly to individual port authorities in Europe, rather than to national port organisations, as was the case with previous editions. National port organisations were, however, instrumental in encouraging their members to respond to the survey. The survey comprised 108 questions. Apart from a general section profiling the port(s) controlled by the port authority, it consisted of three main sections that were based on the conceptual framework described above: the first enquired about the objectives and functions of the port authority (landlord, regulator, operator, community manager); the second looked into the institutional framework of the port authority (ownership, legal status and form, organisational structure); and the final set of questions addressed the financial capability of the port authority (financial responsibility, financial autonomy).

Response rate

The survey was made available to all port authorities in the 22 maritime Member States of the European Union and port authorities in four neighbouring countries that are represented in ESPO: Iceland, Norway, Croatia and Israel. The survey was online from 1 April to 15 July 2010. One hundred and sixteen port authorities from the 26 countries represented in ESPO responded. Together, these 116 port authorities reported that they manage a total of 216 different ports. The total freight volume handled by these ports in 2008 amounted to 2 770 803.000 tonnes (Eurostat data completed with national statistics for Iceland and Israel).

Figure 1 illustrates the response rate per country, expressed in percentage of the total volume of cargo handled by all ports in each country.

The bottom line of the figure shows that the total sample of ports that responded to the survey handles 66.2 per cent of the volume of cargo handled

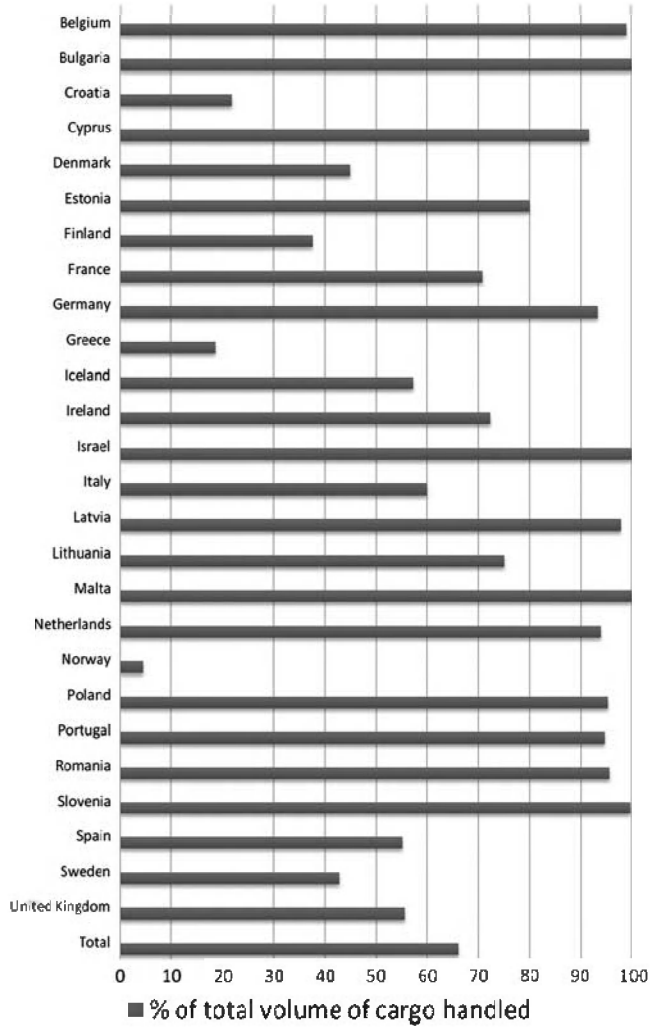

Figure 1: Survey response rates, expressed in percentage of the total volume of cargo handled.

by the total European population of ports in 2008. The response rate was very high (75–100 per cent) in Belgium, Bulgaria, Cyprus, Estonia, Germany, Israel, Latvia, Lithuania, Malta, the Netherlands, Poland, Portugal, Romania and Slovenia; it was medium to high (50–74 per cent) in France, Iceland, Ireland, Italy, Spain and the United Kingdom; it was low to medium (25–49 per cent) in Denmark, Finland and Sweden. The response rates of Greece and Norway

were very low (less than 25 per cent). It should be noted that in countries with lower response rates the ports that replied do form a representative sample of the governance diversity that exists in these countries.

Research Methodology

The research methodology we used to assess the survey results consists of two main steps. The first concerns the selection and clean-up of the data generated by the survey, whereas the second consists of the use of factor analysis, as data reduction technique, to help revealing the underlying factors that may explain port governance diversity in Europe. As an intermediate step, we introduced a series of dummy variables to test the hypothesis that regional characteristics may constitute an important factor that explains port governance diversity in Europe.

Survey data and selection of variables

As mentioned above, the Fact-Finding Survey contained 108 questions. These questions generated 269 individual variables. Most of these variables are of nominal, that is, categorical nature, containing several answer categories. First, we made a selection of variables to make the data set more manageable and, notably, to obtain a workable ratio between the number of variables and the number of observations. Factor analysis requires that there are more observations than variables. Variables that generated no or only few observations were deleted and the most pertinent variables were selected from different questions that were addressing similar issues. In addition, some variables were clustered into new ones.

This resulted in a data set of 67 variables classified according to the thematic groups that we described in the previous section: devolution, corporate governance, operational profile, functional autonomy, functional pro-activeness within the port authority's own port(s), functional pro-activeness beyond the port authority's own port(s), investment and financial autonomy. In addition, a 'size' group was created, which includes variables related to the volumes of total cargo, containers and passengers handled in the port(s) managed by the port authority, as well as the number of staff the port authority employs (SZ_CARGO, SZ_CONTR, SZ_PASSG, SZ_STAFF).

The 'devolution' (DV) variables measure to what extent responsibility for port management is transferred from central government, through privatisation (DV_PRIVA), decentralisation (DV_DECEN) and corporatisation (DG_CORPT). An additional variable measures whether governance reform took place in 2000

or later (DG_REFYR). The 'corporate governance' (CG) variables measure the existence and nature of the port authority's objectives and mission statement (CG_OBJEC, CG_PROFI, CG_VALUE and CG_MISSI), competences and composition of supervisory boards (CG_CEOAP, CG_BORPO, CG_BORSZ), use of public selection procedures to contract land out (CG_SELEC), existence of CSR policy (CG_CSRPO) and accounting practices (CG_ACSEP, CG_ACAUD, CG_ACPUB, CG_ACANL). The 'operational' (OP) variables identify whether the port authority directly or indirectly provides operational services, including technical-nautical services (OP_TECNA), ancillary services (OP_ANCIL), cargo-handling services (OP_CARHA), passenger-handling services (OP_PAXHA) and transport services (OP_TRANS). The 'functional autonomy' (FA) variables measure to what extent the port authority can autonomously take management decisions as regulator (FA_ENTIT, FA_HMAST and FA_POLIC) and landlord (FA_LANDO, FA_LANDP, FA_LANDD). The 'functional pro-activeness' variables are split between those that cover the port authority's own port(s) (PO) and those that go beyond its own port(s) (PB). The first group measures the degree in which the port authority assumes a facilitating or entrepreneurial attitude in its different functions within the area of the port(s) it has directly under its supervision. This relates to its function as landlord (PO_CLAUS, PO_URBAN) and regulator (PO_ENVIR, PO_RULES, PO_SUSTA), as well as the economic (PO_BOTTL, PO_IMPLE, PO_ITSYS, PO_PROMO, PO_TRAIN) and societal (PO_SOCIE) dimension of its community manager function. The second group measures to what extent the port authority is active beyond the port(s) it has directly under its supervision, in terms of relations with other ports (PB_STRAP, PB_DINVE), export of regulatory expertise (PB_REGEX), provision of operational services (PB_SERVI), investment in hinterland networks (PB_HINTE) and provision of training (PB_TRAIN). The 'investment' (IR) variables look at the extent to which the port authority bears investment responsibility for the main capital assets that constitute the port (IR_CAPAS) and looks at its main sources of income (IR_INCOM, IR_PDUES, IR_LEASE, IR_SERVI, IR_PUBFU). The last category seeks to measure the financial autonomy (FI) of port authorities through analysis of general port dues (FI_PRICE, FI_NEGOT, FI_PROMO, FI_CROSS, FI_LEVEL, FI_COLLE, FI_BENEF) and other variables (FI_WAGES, FI_RESUL, FI_TARGT).

Table 2 contains a full description of all variables, including the regional dummy variables that are explained in the following subsection.

Introduction of regional dummy variables

As an intermediate step, we added five dummy variables, in order to test the hypothesis that the region where the port authority is located determines the governance diversity of European port authorities. These dummy variables

Table 2: Port governance variables

Code	*Description*	*Category*	*Type*
SZ_CARGO	Total volume of goods handled by the ports managed by the port authority, in 2009, in tons	Size	Continuous
SZ_CONTR	Total volume of containers handled by the ports managed by the port authority, in 2009, in tons	Size	Continuous
SZ_PASSG	Total number of passengers handled by the ports managed by the port authority, in 2009	Size	Continuous
SZ_STAFF	Total staff employed by the port authority, in FTE	Size	Continuous
RG_HANSE	Port authority is located in the Hanse region	Region	Categorical
RG_NWHAN	Port authority is located in the New Hanse region	Region	Categorical
RG_ANGLO	Port authority is located in the Anglo-Saxon region	Region	Categorical
RG_LATIN	Port authority is located in the Latin region	Region	Categorical
RG_NWLAT	Port authority is located in the New Latin region	Region	Categorical
DV_PRIVA	Port authority is predominantly privately owned	Devolution	Categorical
DV_DECEN	Port authority is predominantly owned at local level	Devolution	Categorical
DV_CORPT	Port authority has corporatised form	Devolution	Categorical
DV_REFYR	Governance reform took place in 2000 or later	Devolution	Categorical
CG_OBJEC	Port authority has general formal objectives	Corporate governance	Categorical
CG_PROFI	Economic objective port authority is maximisation of own profit	Corporate governance	Categorical
CG_VALUE	Economic objective port authority is maximisation of added value	Corporate governance	Categorical
CG_MISSI	Port authority has a mission statement	Corporate governance	Categorical
CG_CEOAP	Supervisory body port authority has end responsibility to appoint CEO	Corporate governance	Categorical
CG_BORPO	Supervisory body port authority has significant number of elected politicians	Corporate governance	Categorical
CG_BORSZ	Number of members in the supervisory body of the port authority	Corporate governance	Continuous
CG_SELEC	Port authority uses public selection procedure to contract land out	Corporate governance	Categorical
CG_CSRPO	Port authority has a CSR policy	Corporate governance	Categorical
CG_ACSEP	Port authority maintains separate financial accounts	Corporate governance	Categorical
CG_ACAUD	Port authority has its financial accounts audited by an external auditor	Corporate governance	Categorical
CG_ACPUB	Port authority publishes its financial accounts	Corporate governance	Categorical
CG_ACANL	Port authority has an internal analytical accounting process	Corporate governance	Categorical
OP_TECNA	Port authority provides technical-nautical services	Operational profile	Categorical
OP_ANCIL	Port authority provides ancillary services	Operational profile	Categorical
OP_CARHA	Port authority provides cargo-handling services	Operational profile	Categorical
OP_PAXHA	Port authority provides passenger-handling services	Operational profile	Categorical
OP_TRANS	Port authority provides transport services	Operational profile	Categorical
FA_ENTIT	Port authority is the only entity with statutory responsibilities for the port(s) it manages	Functional autonomy	Categorical
FA_HMAST	Harbour master is fully integrated in the port authority	Functional autonomy	Categorical
FA_POLIC	Port authority employs its own police force	Functional autonomy	Categorical
FA_LANDO	Port authority is the main owner of port land	Functional autonomy	Categorical
FA_LANDS	Port authority is able to sell port land	Functional autonomy	Categorical

Table 2 *continued*

Code	*Description*	*Category*	*Type*
FA_LANDP	Contracting of port land to third parties is governed by private law	Functional autonomy	Categorical
FA_LANDD	Port authority is free to set durations of land use contracts	Functional autonomy	Categorical
PO_CLAUS	Port authority actively uses performance clauses in terminal agreements	Functional pro-activeness	Categorical
PO_URBAN	Port authority engages in urban real estate management	Functional pro-activeness	Categorical
PO_ENVIR	Port authority engages in environmental land management	Functional pro-activeness	Categorical
PO_RULES	Port authority sets own regulations that go beyond legal requirements	Functional pro-activeness	Categorical
PO_SUSTA	Port authority generally goes beyond legal requirements in actions to enhance sustainability	Functional pro-activeness	Categorical
PO_BOTTL	Port authority is leader in solving various types of bottlenecks	Functional pro-activeness	Categorical
PO_IMPLE	Port authority assists and facilitates port community with implementation of regulations	Functional pro-activeness	Categorical
PO_ITSYS	Port authority runs IT system for the entire port community	Functional pro-activeness	Categorical
PO_PROMO	Port authority leads the overall promotion and marketing of the port	Functional pro-activeness	Categorical
PO_TRAIN	Port authority provides training/educational programmes for the port community	Functional pro-activeness	Categorical
PO_SOCIE	Port authority is leader in various societal integration initiatives	Functional pro-activeness	Categorical
PB_STRAP	Port authority has strategic partnerships with other ports	F pro-act beyond own port	Categorical
PB_DINVE	Port authority has direct investments in other ports	F pro-act beyond own port	Categorical
PB_REGEX	Port authority exports regulatory expertise to other ports	F pro-act beyond own port	Categorical
PB_SERVI	Port authority provides operational services in other ports	F pro-act beyond own port	Categorical
PB_HINTE	Port authority invests in hinterland networks outside own port	F pro-act beyond own port	Categorical
PB_TRAIN	Port authority process training/educational programmes outside its own port	F pro-act beyond own port	Categorical
IR_CAPAS	Degree of investment responsibility port authority for the main capital assets that constitute the port	Investment	Continuous
IR_INCOM	Total operational income of the port authority, in 2009, in Euro	Investment	Continuous
IR_PDUES	General port dues form highest percentage of income	Investment	Categorical
IR_LEASE	Land lease forms highest percentage of income	Investment	Categorical
IR_SERVI	Services form highest percentage of income	Investment	Categorical
IR_PUBFU	Public funding forms highest percentage of income	Investment	Categorical
FI_PRICE	General port dues are commercial prices	Financial autonomy	Categorical
FI_NEGOT	General port dues are negotiable	Financial autonomy	Categorical
FI_PROMO	Port authority can give commercial promotions on general port dues	Financial autonomy	Categorical
FI_CROSS	Port authority can cross-subsidies between different sources of income	Financial autonomy	Categorical
FI_LEVEL	Port authority autonomously sets the level of general port dues	Financial autonomy	Categorical
FI_COLLE	Port authority autonomously collects general port dues	Financial autonomy	Categorical
FI_BENEF	Port authority is final beneficiary of general port dues	Financial autonomy	Categorical
FI_INVES	Port authority autonomously decides on port investments	Financial autonomy	Categorical
FI_WAGES	Port authority sets wages, terms and conditions of service of its own personnel	Financial autonomy	Categorical
FI_RESUL	Port authority decides autonomously how to allocate the annual financial result	Financial autonomy	Categorical
FI_TARGT	Port authority does not have to meet certain financial targets	Financial autonomy	Categorical

were based on the geographical typology that was developed by Suykens (Suykens, 1988; Suykens and Van de Voorde, 1998). His typology, however, does not take into account the fall of the iron curtain, which has brought a number of new ports around the Baltic Sea, the Mediterranean and the Black Sea in the competitive arena. These were under planned economy regimes for almost 50 years and underwent varied liberalisation processes after the political changeover. These ports can be brought together in two additional regions: 'New Hanse', consisting of countries around the Baltic Sea; and 'New Latin', consisting of countries in the East Mediterranean and the Black Sea.

In this way, we can classify the port authorities in five regional groups:

- Hanse (RG_HANSE): Belgium, Denmark, Finland, Germany, Iceland, the Netherlands, Norway and Sweden.
- New Hanse (RG_NWHAN): Estonia, Latvia, Lithuania and Poland.
- Anglo-Saxon (RG_ANGLO): Ireland and the United Kingdom.
- Latin (RG_LATIN): Cyprus, France, Greece, Israel, Italy, Malta, Portugal and Spain.
- New Latin (RG_NWLAT): Bulgaria, Croatia, Romania and Slovenia.

Most port authorities participating in the survey are either to be found in the Hanse (38 per cent) or Latin (35 per cent) region; third comes the Anglo-Saxon region (14 per cent). The two 'new' regions contain relatively few port authorities (New Hanse 7 per cent and New Latin 6 per cent).

Factor analysis

After cleaning up the results of the survey and adding the regional dummy variables, the database still contained 72 variables. Applying a data reduction technique may therefore help to reveal the relations between governance practices of port authorities in Europe and explain port governance diversity. Factor analysis is commonly applied to explore data sets with many variables, which are then summarised into a limited number of unobserved factors. Doing this, the analysis tries to keep the number of factors as low as possible while maintaining a maximum of the information, which is present in the original data. For each factor, the factor loadings indicate to which extent they are correlated with each variable. If the factor loadings of two variables show similarities, these variables are related. On the basis of the resulting pattern, factors are often labelled and accordingly, clusters of observations can be detected (Stevens, 2002).

Two problems remain when analysing the ESPO database. First, a considerable amount of observations has missing values for one or more variables. Second, most variables are categorical in nature. Classical factor analysis,

however, assumes continuous and normally distributed variables. Among others, Nisenbaum *et al* (2004) and Vanoutrive *et al* (2010) applied binary (categorical) factor analysis to get insight in questionnaires containing an extensive list of binary yes/no questions. The software employed in these studies, Mplus (Muthén and Muthén, 2006), allows one to carry out factor analyses with a mix of both continuous and categorical variables. Furthermore, this package can handle missing data without omitting valuable information, as is the case with standard list-wise or pair-wise deleting options in other software.

Although the chosen technique can handle missing data, we deleted 6 from the 116 observations because these six port authorities did not provide data on more than 40 per cent of the variables. Furthermore, the categorical variables were re-coded in binary variables as this did not bring along an important loss of information, that is, some rare categories would not positively contribute to an analysis of the main patterns present in the data. Finally, we attributed the label 'missing' for the cargo variable instead of a value of zero to ports, which do not handle any cargo at all. Given the limited number of ports with only passenger traffic, we do not expect that this affects the results in a major way.

We estimate two models, one with and one without the regional dummy variables. These variables have a value of one if the port belongs to the Hanse, New Hanse, Anglo-Saxon, Latin or New Latin region, respectively, and a value of zero if not. As these dummy variables are mutually exclusive, and to avoid that this pre-specified clustering influences the results and their interpretation, we will first look at the model without these regional variables and use the model with the regional variables to check our findings.

Results of the Factor Analysis

Number of factors and factor loadings

As in standard factor analysis, the eigenvalues are used to select the number of factors. Figure 2 pictures the scree plot which shows the eigenvalues. The twists in a scree plot indicate possible values for the number of factors.

The second criterion, taking the same number of factors as there are eigenvalues larger than one, could not be applied as this would imply a large number of factors. The scree plot suggests a model with four or five factors. After an examination of both models, we prefer a model with four factors as the results were easier to interpret than those of the five-factor model. The results (Varimax rotated) are given in Table 3. Factor loadings $\geqslant 0.4$ are shown in bold as these are considered meaningful. Note that values $\geqslant 0.3$ are also large enough to be important.

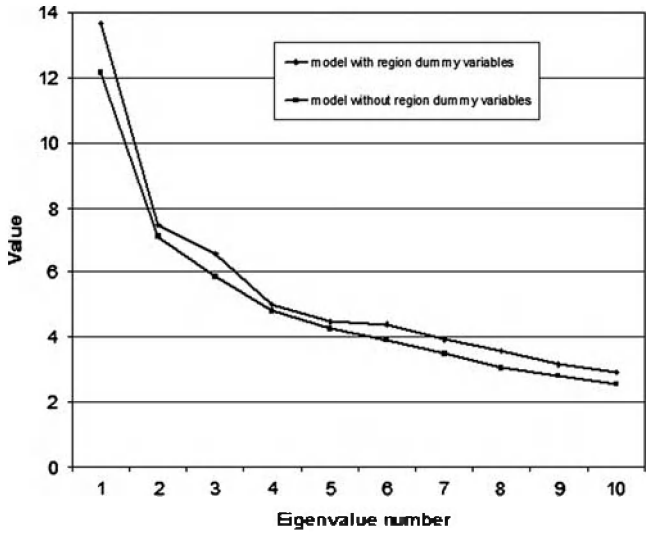

Figure 2: Scree plot of the models with and without regional dummy variables.

Note that the presence of missing and binary data and the relatively limited number of observations, together with a rather large number of variables, can explain the low values of test statistics indicated at the bottom of Table 3. In addition to the fact that the first 23 eigenvalues stay above 1, also the Root Mean Square Error of Approximation (RMSEA) stays above 0.1 even for a model with ten factors, while a moderately well-fitting model has an RMSEA <0.10 (Gilbert and Meijer, 2006) or even RMSEA <0.08 (Stevens, 2002, p. 433) (numbers for the model without regional dummy variables). Although fit statistics suggest that the model does not perform well, many factor loadings have values $\geqslant 0.4$ and we could detect patterns that correspond with the literature. As a consequence, we did not try to improve the model by omitting variables as this would imply a loss of information.

In general, the results of the models with and without region dummy variables are similar, which is a first indication that this clustering of ports in regions could also reflect differences in governance practices. This will be explored further in the next section, which discusses the results. Table 4 already marks the correspondence between the factors in both models.

Description of the factors

In this section, we describe the four factors individually, looking first at the factor in the model without region dummy variables and then comparing it with

Table 3: Factor loadings of the 4-factor models without region dummy variables (left) and with region dummy variables (right)

Variable	*Factor1*	*Factor2*	*Factor3*	*Factor4*	*Factor1*	*Factor2*	*Factor3*	*Factor4*
SZ_CARGO	0.14	**0.54**	0.21	0.13	0.11	−0.04	0.10	**0.53**
SZ_PASSG	−0.03	−0.01	0.15	−0.07	−0.01	0.14	0.04	0.05
SZ_STAFF	−0.04	**0.57**	0.11	**0.40**	0.06	0.10	−0.26	**0.65**
IR_CAPAS	0.12	0.02	−0.27	0.20	0.22	−0.12	−0.32	0.04
IR_INCOM	0.13	**0.80**	0.37	−0.12	0.08	−0.02	0.32	**0.80**
CG_BORSZ	**0.71**	−0.06	0.02	−0.20	**0.64**	−0.24	0.35	−0.13
RG_HANSE	—	—	—	—	**−0.82**	−0.10	**0.42**	−0.10
RG_NWHAN	—	—	—	—	−0.02	0.30	−0.16	0.00
RG_ANGLO	—	—	—	—	−0.18	−0.24	**−0.88**	−0.28
RG_LATIN	—	—	—	—	**0.95**	−0.14	0.21	0.15
RG_NWLAT	—	—	—	—	0.26	**0.67**	−0.15	0.03
DV_PRIVA	−0.23	−0.31	**−0.45**	**0.93**	0.00	0.01	**−0.92**	−0.27
DV_DECEN	**−0.71**	−0.07	−0.04	−0.23	**−0.84**	−0.13	0.17	−0.18
DV_CORPT	−0.39	0.21	−0.24	**0.42**	−0.27	0.08	**−0.56**	0.30
DV_REFYR	**−0.52**	0.04	0.38	0.01	**−0.54**	0.32	0.20	0.10
CG_OBJEC	**0.43**	0.21	**0.40**	−0.18	0.38	0.19	0.39	0.26
CG_PROFI	**−0.48**	−0.01	−0.26	0.41	−0.29	−0.01	**−0.66**	0.04
CG_VALUE	−0.11	0.36	−0.19	−0.24	−0.24	−0.38	0.25	0.23
CG_MISSI	0.09	**0.41**	−0.04	**−0.42**	−0.02	−0.22	0.25	0.33
CG_CEOAP	**−0.58**	0.22	−0.09	−0.27	**−0.63**	−0.11	−0.01	0.16
CG_BORPO	**−0.49**	−0.10	−0.22	**−0.58**	**−0.71**	−0.30	**0.42**	−0.25
CG_SELEC	**0.54**	**0.46**	0.19	−0.10	**0.55**	0.05	0.17	**0.53**
CG_CSRPO	0.30	**0.49**	−0.37	0.19	0.31	**−0.41**	−0.18	**0.42**
CG_ACSEP	−0.22	**0.74**	0.37	0.02	−0.21	0.19	0.13	**0.81**
CG_ACAUD	**−0.48**	**0.86**	−0.02	0.03	**−0.45**	−0.10	−0.17	**0.88**
CG_ACPUB	−0.11	**0.53**	−0.56	0.03	−0.12	**−0.68**	−0.22	0.37
CG_ACANL	0.18	**0.51**	0.10	0.33	0.22	−0.01	−0.04	**0.52**
OP_TECNA	−0.33	−0.09	**−0.73**	−0.03	−0.31	**−0.51**	**−0.49**	−0.19
OP_ANCIL	−0.37	0.05	**−0.68**	−0.26	**−0.44**	**−0.65**	−0.14	−0.12
OP_CARHA	−0.34	−0.23	**−0.55**	0.39	−0.19	−0.15	**−0.68**	−0.20
OP_PAXHA	0.11	0.04	**−0.49**	0.02	0.14	−0.37	−0.21	−0.02
OP_TRANS	0.35	−0.31	**−0.41**	0.07	0.32	−0.28	−0.13	−0.38
FA_ENTIT	**−0.42**	−0.09	−0.21	−0.40	**−0.48**	−0.23	0.02	−0.19
FA_HMAST	**−0.73**	0.04	−0.25	−0.15	**−0.76**	−0.29	−0.18	−0.07
FA_POLIC	**0.45**	0.24	−0.22	−0.05	**0.47**	−0.34	−0.07	0.18
FA_LANDO	**−0.55**	−0.06	−0.07	−0.03	**−0.53**	−0.03	−0.18	−0.10
FA_LANDS	**−0.48**	−0.04	−0.11	−0.06	**−0.48**	−0.18	−0.15	−0.13

FA_LANDP	**−0.58**	0.13	0.16	0.11	**−0.58**	0.17	−0.09	0.15
FA_LANDD	−0.23	−0.32	−0.07	0.07	−0.19	0.02	−0.24	−0.33
PO_CLAUS	**0.45**	0.30	−0.18	0.05	**0.40**	−0.24	0.06	0.26
PO_URBAN	**0.61**	0.08	−0.20	−0.19	**0.58**	−0.29	0.10	0.04
PO_ENVIR	0.23	0.26	0.09	−0.03	0.23	0.06	0.05	0.29
PO_RULES	−0.07	0.33	−0.29	−0.10	−0.11	**−0.42**	−0.03	0.20
PO_SUSTA	**0.40**	0.28	−0.32	−0.07	0.34	**−0.51**	0.09	0.14
PO_BOTTL	0.34	0.18	**−0.50**	0.20	0.37	**−0.51**	−0.27	0.07
PO_IMPLE	0.30	0.26	−0.13	−0.16	0.23	−0.23	0.09	0.20
PO_ITSYS	0.25	**0.54**	−0.25	−0.1	0.22	−0.25	0.01	**0.52**
PO_PROMO	0.10	0.06	−0.36	−0.12	0.07	−0.25	−0.06	0.01
PO_TRAIN	**0.42**	0.11	−0.23	−0.04	0.37	−0.37	0.02	0.00
PO_SOCIE	0.33	**0.43**	−0.29	−0.28	0.19	**−0.57**	0.27	0.27
PB_STRAP	**0.78**	0.20	−0.01	−0.08	**0.64**	−0.29	0.37	0.12
PB_DINVE	**0.44**	0.29	−0.08	0.00	0.36	−0.23	0.19	0.23
PB_REGEX	**0.41**	**0.66**	−0.12	0.02	0.33	**−0.43**	0.16	**0.54**
PB_SERVI	0.06	−0.17	**−0.45**	0.03	0.02	−0.24	−0.16	−0.21
PB_HINTE	**0.63**	0.32	−0.07	0.19	**0.60**	−0.16	0.05	0.31
PB_TRAIN	**0.52**	**0.43**	−0.19	−0.02	**0.47**	−0.42	0.11	0.33
IR_PDUES	−0.23	−0.33	0.01	−0.3	−0.24	0.08	−0.04	−0.31
IR_LEASE	0.22	**0.44**	−0.13	−0.23	0.08	−0.36	0.34	0.32
IR_SERVI	−0.09	0.07	−0.05	**0.80**	0.13	0.22	**−0.54**	0.17
IR_PUBFU	0.30	**−0.47**	0.11	0.17	0.34	0.23	−0.02	**−0.44**
FI_PRICE	**−0.64**	0.12	−0.34	0.21	**−0.58**	−0.28	**−0.48**	0.07
FI_PROMO	0.05	0.10	0.05	**−0.44**	−0.06	−0.15	0.35	0.02
FI_CROSS	−0.13	0.07	**−0.40**	−0.30	−0.21	**−0.44**	0.01	−0.04
FI_LEVEL	**−0.82**	0.00	−0.11	−0.17	**−0.79**	0.04	−0.22	0.00
FI_COLLE	**−0.61**	0.27	**−0.43**	−0.38	**−0.68**	**−0.40**	−0.07	0.18
FI_BENEF	−0.35	−0.02	0.03	**−0.48**	−0.38	−0.05	0.18	−0.01
FI_INVES	−0.31	−0.11	**−0.47**	0.14	−0.23	−0.22	**−0.54**	−0.14
FI_WAGES	**−0.59**	−0.16	0.00	−0.06	**−0.56**	0.18	−0.21	−0.12
FI_RESUL	−0.11	−0.08	−0.30	0.10	−0.05	−0.15	−0.36	−0.10
FI_TARGT	−0.08	−0.12	**0.46**	0.13	−0.01	**0.49**	0.05	0.00

Notes: factor loadings are Varimax rotated; values $\geqslant 0.4$ in bold; RMSEA model without region dummy variables (left): 0.155; RMSEA model with region dummy variables (right): 0.162.

Table 4: Correspondence between factors in models with and without dummy variables

Model without dummy variables	*Relationship*	*Model with dummy variables*
Factor 1	+	Factor 1
Factor 2	+	Factor 4
Factor 3	+	Factor 2
Factor 4	−	Factor 3

the corresponding factor in the model with the dummy variables. For each factor, loadings higher than 0.3 are represented in individual tables. In each table, variables with an estimated residual variance lower or equal to 0.5 are highlighted in bold. Estimated residual variances indicate how much of each variable is explained through the entire model, that is, comprising all factors. The annex gives the estimated residual variances for all variables.

Factor 1: *Latin – Hanseatic contrasts in autonomy and pro-activeness*
Table 5 illustrates that Factor 1 is generally characterised by positive loadings for variables that relate to functional pro-activeness, both within (PO) and beyond (PB) the own port. Negative loadings exist for variables that relate to financial (FI) and functional autonomy (FA), as well as devolution (DV). Variables on corporate governance (CG) demonstrate a mixed picture. Positive loading exists for the size of the supervisory boards (CG_BORSZ), but a negative one on politicians being significantly present in them (CG_BORPO). Negative loadings exist on profit maximisation as the main economic objective (CG_PROFI) and the external audit of financial accounts (CG_ACAUD). A positive loading appears for the use of public selection procedures to land contracts (CG_SELEC). Although the factor loadings are not high for operational variables (OP), they are generally negative (except for transport services (OP_TRANS)).

In summary, we could say that, somehow paradoxically, Factor 1 matches limited autonomy with a substantial degree of pro-activeness. If we compare this picture with the model that has regional variables included, we find that Factor 1 has a strongly positive loading for the Latin region (RG_LATIN) and a strongly negative one for the Hanse region (RG_HANSE).

Factor 2: *Large corporately governed port authorities*
Table 6 shows that Factor 2 has positive loadings for size-related variables (income (IR_INCOM), number of staff (SZ_STAFF) and volume of cargo (SZ_CARGO)). Positive loadings also exist for transparency-related variables in the category of corporate governance (for example, where it concerns financial accounts (CG_ACSEP, CG_ACAUD, CG_ACPUB) and the use of public selection

Table 5: Loadings Factor 1 (with and without dummy variables)

Model without region dummy variables (Factor 1)		
Positive factor loading	>0.7	PB_STRAP, CG_BORSZ
	>0.6	**PB_HINTE**, PO_URBAN
	>0.5	**CG_SELEC, PB_TRAIN**
	>0.4	FA_POLIC, PO_CLAUS, PB_DINVE, CG_OBJEC, PO_TRAIN, **PB_REGEX**, PO_SUSTA
	>0.3	OP_TRANS, PO_BOTTL, PO_SOCIE
Negative factor loading	<−0.8	**FI_LEVEL**
	<−0.7	**FA_HMAST**, DV_DECEN
	<−0.6	**FI_PRICE, FI_COLLE**
	<−0.5	FI_WAGES, CG_CEOAP, FA_LANDP, FA_LANDO, DV_REFYR
	<−0.4	**CG_BORPO**, FA_LANDS, CG_PROFI, **CG_ACAUD**, FA_ENTIT
	<−0.3	DV_CORPT, **OP_ANCIL**, FI_BENEF, **OP_CARHA**, **OP_TECNA**, FI_INVES
Model with region dummy variables (Factor 1)		
Positive factor loading	>0.8	**RG_LATIN**
	>0.6	**CG_BORSZ**, **PB_STRAP**, PB_HINTE
	>0.5	PO_URBAN, **CG_SELEC**
	>0.4	FA_POLIC, **PB_TRAIN**
	>0.3	PO_CLAUS, CG_OBJEC, PO_TRAIN, PO_BOTTL, PB_DINVE, PO_SUSTA, IR_PUBFU, **PB_REGEX**, OP_TRANS, CG_CSRPO
Negative factor loading	<−0.8	**RG_HANSE, DV_DECEN**
	<−0.7	**FI_LEVEL, FA_HMAST, CG_BORPO**
	<−0.6	**FI_COLLE**, CG_CEOAP
	<−0.5	**FI_PRICE**, FA_LANDP, FI_WAGES, DV_REFYR, FA_LANDO
	<−0.4	FA_ENTIT, FA_LANDS, **CG_ACAUD, OP_ANCIL**
	<−0.3	FI_BENEF, **OP_TECNA**

Note: Variables with an estimated residual variance <0.50 are indicated in bold.

procedures for contracting out land to third parties (CG_SELEC)). It furthermore has positive loadings on functional pro-activeness, both within (PO) and beyond the own port (PB). Within the investment category, a positive loading is present for land lease being the highest percentage of operational income (IR_LEASE) and a negative one for public funding being the highest percentage (IR_PUBFU). A negative loading also appears for private ownership of the port authority (DV_PRIVA).

In summary, Factor 2 combines the size of the port authority with principles of good corporate governance and functional pro-activeness. Compared with the corresponding Factor 4 in the model with regional dummy variables, we notice that these do not appear in the list of significant variables. The regional adherence does not therefore play a role.

Factor 3: *New European public conservators*

It appears from Table 7 that Factor 3 shows predominantly negative loadings, especially for variables that relate to operational involvement in port services (OP),

Table 6: Loadings: Factor 2 (without dummy variables) and Factor 4 (with dummy variables)

Model without region dummy variables (Factor 2)		
Positive factor loading	>0.8	**CG_ACAUD, IR_INCOM**
	>0.7	**CG_ACSEP**
	>0.6	**PB_REGEX**
	>0.5	SZ_STAFF, PO_ITSYS, SZ_CARGO, **CG_ACPUB**, CG_ACANL
	>0.4	**CG_CSRPO, CG_SELEC**, IR_LEASE, PO_SOCIE, **PB_TRAIN**, CG_MISSI
	>0.3	CG_VALUE, PO_RULES, **PB_HINTE**
Negative factor loading	<-0.4	IR_PUBFU
	<-0.3	IR_PDUES, FA_LANDD, OP_TRANS, **DV_PRIVA**
Model with region dummy variables (Factor 4)		
Positive factor loading	>0.8	**CG_ACAUD, CG_ACSEP, IR_INCOM**
	>0.6	**SZ_STAFF**
	>0.5	**PB_REGEX, CG_SELEC**, SZ_CARGO, PO_ITSYS, CG_ACANL
	>0.4	CG_CSRPO
	>0.3	**CG_ACPUB**, CG_MISSI, PB_TRAIN, IR_LEASE, PB_HINTE, DV_CORPT
Negative factor loading	<-0.4	IR_PUBFU
	<-0.3	OP_TRANS, FA_LANDD, IR_PDUES

Note: Variables with an estimated residual variance <0.50 are indicated in bold.

Table 7: Loadings: Factor 3 (without dummy variables) and Factor 2 (with dummy variables)

Model without region dummy variables (Factor 3)		
Positive factor loading	>0.4	CG_OBJEC,
	>0.3	DV_REFYR, **IR_INCOM, CG_ACSEP**
Negative factor loading	<-0.7	**OP_TECNA**
	<-0.6	**OP_ANCIL**
	<-0.5	**CG_ACPUB, OP_CARHA**
	<-0.4	PO_BOTTL, OP_PAXHA, FI_INVES, FI_TARGT, PB_SERVI, **DV_PRIVA, FI_COLLE**, OP_TRANS, FI_CROSS
	<-0.3	**CG_CSRPO**, PO_PROMO, **FI_PRICE**, PO_SUSTA, FI_RESUL
Model with region dummy variables (Factor 2)		
Positive factor loading	>0.6	**RG_NWLAT**
	>0.4	FI_TARGT
	>0.3	DV_REFYR, *RG_NWHAN (0.299)*
Negative factor loading	<-0.6	**CG_ACPUB, OP_ANCIL**
	<-0.5	PO_SOCIE, PO_SUSTA, **OP_TECNA**, PO_BOTTL
	<-0.4	FI_CROSS, **PB_REGEX**, PO_RULES, **PB_TRAIN**, CG_CSRPO
	<-0.3	**FI_COLLE**, CG_VALUE, OP_PAXHA, PO_TRAIN, IR_LEASE, FA_POLIC, **CG_BORPO**

Note: Variables with an estimated residual variance <0.50 are indicated in bold.

corporate governance (transparency) (CG), functional pro-activeness within (PO) and beyond the port (PB), as well as financial autonomy (FI). A negative loading also exists for private ownership of the port authority (DV_PRIVA), whereas a positive loading appears for the variable that indicates whether the port authority obtained its present legal form in the last decade (DV_REFYR).

Factor 3 bears resemblance to the 'conservator' type of port authority that was identified in Table 1. Compared with the corresponding Factor 2 in the model with regional dummy variables, we see a strong positive loading for the New Latin region (RG_NWLAT) and a modest positive loading for the New Hanse region (RG_NWHAN).

Factor 4: *Anglo-Saxon private entrepreneurs*

Finally, Table 8 shows that Factor 4 has positive loadings for devolution variables (DV), most strongly for privatisation (DV_PRIVA). It also has a strongly positive loading for the variable that indicates that the provision of services forms the highest percentage of income of the port authority (IR_SERVI). This corresponds with the positive loading for the variables that indicate that the port authority provides cargo-handling services (OP_CARHA) and has maximization of its own profit as an economic objective (CG_PROFI). The factor has negative loadings on financial autonomy variables (FI). A negative loading appears on politicians being significantly present in the supervisory board of the port authority (CG_BORPO).

This factor has elements of the entrepreneurial type indicated in Table 1. The negative loadings on financial autonomy (FI) seem paradoxical, however. Factor 4 relates negatively to Factor 3 in the model with regional dummy variables. Taking this into account, it is obvious that the Anglo-Saxon regional variable (RG_ANGLO) plays a very important role.

Table 8: Loadings: Factor 4 (without dummy variables) and Factor 3 (with dummy variables)

Model without region dummy variables (Factor 4)		
Positive factor loading	>0.9	**DV_PRIVA**
	>0.8	**IR_SERVI**
	>0.4	DV_CORPT, CG_PROFI
	>0.3	SZ_STAFF, **OP_CARHA**, CG_ACANL
Negative factor loading	<-0.5	**CG_BORPO**
	<-0.4	FI_BENEF, FI_PROMO, CG_MISSI
	<-0.3	FA_ENTIT, **FI_COLLE**, IR_PDUES, FI_CROSS
Model with region dummy variables (Factor 3)		
Positive factor loading	>0.4	**CG_BORPO, RG_HANSE**
	>0.3	CG_OBJEC, **PB_STRAP**, FI_PROMO, CG_BORSZ, IR_LEASE, **IR_INCOM**
Negative factor loading	<-0.9	**DV_PRIVA**
	<-0.8	**RG_ANGLO**
	<-0.6	**OP_CARHA, CG_PROFI**
	<-0.5	DV_CORPT, IR_SERVI, FI_INVES
	<-0.4	**OP_TECNA, FI_PRICE**
	<-0.3	FI_RESUL, IR_CAPAS

Note: Variables with an estimated residual variance <0.50 are indicated in bold.

Conclusions and Research Agenda

There exists a wide range of studies, which discuss port governance in general or focus on particular aspects. However, up until now, research on port governance practices was limited to case studies or rather descriptive analyses. The present study extends this research by analysing a large number of European port authorities ($n = 110$) in a quantitative manner, using factor analysis. The 2010 ESPO Fact-Finding Survey proved to be a valuable source of information to explore differences in governance practices between European ports.

The results confirm the existence of different types of port governance in Europe, which to some extent correspond with the hypothetical typology according to which port authorities can be conservators, facilitators or entrepreneurs. Differences are mainly geographically defined and the subdivision in Hanseatic, Latin, Anglo-Saxon and new Member State port authorities proves to be a valuable one. Taking into account that, proportionally, most port authorities in Europe belong to either the Hanse or Latin tradition, the difference between them translates itself in a North–South duality which not only involves simple ownership differences, but also covers many other governance elements, especially functional and financial autonomy, which is typically more limited in the south.

In addition to this geographical explanation of diversity, we could also detect differences in terms of governance practices between small and large ports. The latter generally follow a more pro-active approach and score higher on transparency-related variables.

The findings of our analysis invite more in-depth research. The principal factors should be explored further to explain apparent paradoxes, such as the limited functional and financial autonomy that Latin port authorities seem to combine with a pro-active facilitator approach. The same goes for the outspoken entrepreneurial profile of Anglo-Saxon port authorities that seems to be bound by limited financial autonomy. This in-depth research will be done through comparative case study analysis. The most pertinent variables can furthermore be transformed into performance indicators in order to keep track of evolutions in port governance practices over time. Finally, the potentially harmonising influence of EU law and policy on European port governance should be analysed (Verhoeven, 2009).

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Appendix

Table A: Estimated residual variances

Variable	*Model without region dummy variables*	*Model with region dummy variables*
	Estimated residual variance	*Estimated residual variance*
SZ_CARGO	0.63	0.70
SZ_PASSG	0.97	0.98
SZ_STAFF	0.51	0.50
IR_CAPAS	0.87	0.84
IR_INCOM	0.19	0.25
CG_BORSZ	0.46	0.40
RG_HANSE	—	0.14
RG_NWHAN	—	0.89
RG_ANGLO	—	0.07
RG_LATIN	—	0.01
RG_NWLAT	—	0.46
DV_PRIVA	−0.20	0.09
DV_DECEN	0.44	0.22
DV_CORPT	0.57	0.52
DV_REFYR	0.59	0.55
CG_OBJEC	0.58	0.60
CG_PROFI	0.53	0.48
CG_VALUE	0.77	0.69
CG_MISSI	0.65	0.78
CG_CEOAP	0.54	0.57
CG_BORPO	0.36	0.16
CG_SELEC	0.46	0.39
CG_CSRPO	0.50	0.53
CG_ACSEP	0.28	0.25
CG_ACAUD	0.04	−0.02
CG_ACPUB	0.40	0.34
CG_ACANL	0.59	0.69
OP_TECNA	0.35	0.37
OP_ANCIL	0.33	0.35
OP_CARHA	0.38	0.43
OP_PAXHA	0.75	0.80
OP_TRANS	0.61	0.66
FA_ENTIT	0.62	0.68
FA_HMAST	0.39	0.30
FA_POLIC	0.69	0.62
FA_LANDO	0.68	0.68
FA_LANDS	0.75	0.70
FA_LANDP	0.62	0.61
FA_LANDD	0.84	0.80
PO_CLAUS	0.68	0.72
PO_URBAN	0.55	0.57
PO_ENVIR	0.87	0.86
PO_RULES	0.79	0.77
PO_SUSTA	0.65	0.60
PO_BOTTL	0.57	0.53
PO_IMPLE	0.80	0.85
PO_ITSYS	0.57	0.62

Table A *continued*

Variable	*Model without region dummy variables*	*Model with region dummy variables*
	Estimated residual variance	*Estimated residual variance*
PO_PROMO	0.85	0.93
PO_TRAIN	0.76	0.73
PO_SOCIE	0.54	0.49
PB_STRAP	0.35	0.36
PB_DINVE	0.71	0.73
PB_REGEX	0.39	0.39
PB_SERVI	0.76	0.88
PB_HINTE	0.47	0.51
PB_TRAIN	0.50	0.49
IR_PDUES	0.75	0.84
IR_LEASE	0.69	0.64
IR_SERVI	0.34	0.61
IR_PUBFU	0.65	0.64
FI_PRICE	0.43	0.35
FI_PROMO	0.79	0.85
FI_CROSS	0.73	0.76
FI_LEVEL	0.29	0.32
FI_COLLE	0.22	0.34
FI_BENEF	0.65	0.82
FI_INVES	0.66	0.59
FI_WAGES	0.62	0.60
FI_RESUL	0.88	0.84
FI_TARGT	0.76	0.76